دنیا کے بڑے بڑے عظیم الشان کامیابیوں کی کنجی صرف دعا ہے۔

PRACTICE MANUAL FOR COST ACCOUNTING

BY

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QUESTIONS

DECISION MAKING

[Question # 1]

A company is considering the closure of its internal printing department. The department prints all of the company's publicity material and it also carries out other printing jobs as required. An external firm has offered to produce all of the company's printing requirements for a total cost of Rs: 9,000 per month. The internal printing department's costs are as follows:

(a) A total of 80,000 sheets of customized paper are used each month, at a cost of Rs: 50 per 1,000 sheets. The contract for supply of the paper requires three months' notice of cancellation. The company does not hold stocks of the paper but any excess can be sold for a net price of Rs: 20 per 1,000 sheets.

(b) A total of 400 liters of fluorescent ink are used each month, at a cost of Rs: 1.80 per litre. The contract for supply of this ink requires 1 month's notice of cancellation. No stocks of ink are held but any excess can be sold for Rs: 0.50 net per litre.

(c) Other paper and materials costs amount to Rs: 2,850 per month.

(d) The printing machinery is rented for Rs: 4,500 per month. It is operated for 120 hours each month. The rental contract can be cancelled with 2 months' notice.

(e) The two employees in the department are each paid Rs: 1,000 per month. The company has a no-redundancy policy which means that the employees are guaranteed employment even if the department closes.

(f) Overhead cost for the printing department is as follows:

(i) Variable overhead: Rs: 4 per machine hour.

(ii) Fixed overhead: Rs: 3 per machine hour.

Variable overhead varies in direct proportion to the machine hours operated. Fixed overhead represents an apportionment of central overheads which would not alter as a result of the printing department's closure.

Requirement

Calculate the long-term monthly saving or extra cost which will result from the closure of the printing department. If you consider that the department should be closed, you are asked to advice on the most appropriate timing for its closure.

[Question # 2]

Fudge Ltd operates at three factory sites producing a closely related product range. The 20 X 4 budgets for Fudge Ltd's operations are as follows:

	Croydon	***Luton***	***Southend***
	Rs: 000	**Rs: 000**	**Rs: 000**
Variable	475	2,200	1,000
Fixed (site)	375	1,300	650
Fixed (central)	50	200	100
Sales	1,000	4,000	2,000
Profit	**100**	**300**	**250**

The lease of the Croydon site expires at the end of 20 X 4. Four alternative options have been identified for the 20X5 operations:

1. Renew the Croydon site lease at an additional annual rental of Rs: 50,000.
2. Shut the Croydon site and franchise Croydon production to another manufacturer at a 1.5 per cent commission on sales.
3. Shut the Croydon site and switch production to Luton; this would involve an additional Rs: 250,000 per year fixed costs at Luton and additional transport costs on production transferred amounting to 7.5 per cent of sales.
4. Shut down the Croydon site and switch production to Southend; this would involve additional fixed costs of Rs: 200,000 per year at Southend and additional transport costs on production transferred amounting to 10 per cent of sales.

Requirements

Evaluate the options and advise:

(a) Which option is most attractive on purely financial grounds?

(b) What strategic factors are relevant which might be beyond the scope of your analysis in (a).

[Question # 3]

JP Ltd produces three joint products – A, B and C – which are then further processed. It is normal practice for the company to apportion all pre-separation costs on the basis of weight of output of each joint product.

Data for the last period is as follows:

Costs incurred up to separation point Rs: 9,600

	Product A	*Product B*	*Product C*
Output (kg)	*100*	*60*	*80*
	Rs:	**Rs:**	**Rs:**
Costs incurred after separation point	*2,000*	*1,200*	*800*
Selling price per kg			
After further processing	*50*	*80*	*60*
At pre-separation point (estimate)	*25*	*70*	*45*

Requirements

(a) Prepare a statement showing the profit or loss made by each product using the present method of apportioning pre-separation costs.

(b) Comment on the method used by JP Ltd to attribute pre-separation costs to its joint products.

(c) Advise the management of JP Ltd whether or not, on purely financial grounds, it should further process any of the three products.

[Question # 4]

PMS plc is a large diversified organisation with several departments. It is concerned over the performance of one of its departments – department P. PMS plc is concerned that department P has not

been able to meet its sales target in recent years and is considering either to reduce the level of production or to shut down the department.
The following information has been made available:

Budgeted sales and production in units		50,000
		Rs: 000
Sales		500
Less -- production costs		
Material A – 1 kg per unit	50	
Material B – 1 litre per unit	25	
Labour – 1 hour per unit	125	
Variable overhead	100	
Fixed overhead	50	
Non-production costs	50	
Total cost		(400)
Budgeted profit		**100**

The following additional information has also been made available:

(i) There is 50,000 kg of material A in stock. This originally cost Rs: 1 per kg. Material A has no other use and unless it is used by the division it will have to be disposed of at a cost of Rs: 500 for every 5,000 kg
(ii) There are 30,000 liters of material B in stock. Any unused material can be used by another department to substitute for an equivalent amount of a material, which currently costs Rs: 1.25 per liter. The original cost of material B was Rs: 0.50 per liter and it can be replaced at a cost of Rs: 1.50 per liter.
(iii) All production labor hours are paid on an hourly basis. Rumors of the closure of the department have led to a large proportion of the department's employees leaving the organization. Uncertainty over its closure has also resulted in management not replacing these employees. The department is therefore short of labor hours and has sufficient to produce 25,000 units. Output in excess of 25,000 units would require the department to hire contract labor at a cost of Rs: 3.75 per hour. If the department is shut down the present labor force will be deployed within the organization.
(iv) Included in the variable overhead is the depreciation of the only machine used in the department. The original cost of the machine was Rs: 200,000 and it is estimated to have a life of 10 years. Depreciation is calculated on a straight-line basis. The machine has a current resale value of Rs: 25,000. If the machinery is used for production it is estimated that the resale value of the machinery will fall at the rate of Rs: 100 per 1,000 units produced. All other costs included in variable overhead vary with the number of units produced.
(v) Included in the fixed production overhead is the salary of the manager of department P which amounts to Rs: 20,000. If the department were to shut down the manager would be made redundant with a redundancy pay of Rs: 25,000. All other costs included in the fixed production overhead are general factory overheads and will not be affected by any decision concerning department P.
(vi) The non-production cost charged to department P is an apportionment of the total non-production costs incurred by the department.
(vii) The marketing manager suggests that either:

- a sales volume of 25,000 units can be achieved with a selling price of Rs: 9.00 per unit and an advertising campaign of Rs: 25,000; or
- a sales volume of 35,000 units can be achieved at a selling price of Rs: 7.50 with an advertising campaign costing Rs: 35,000.

Requirements

(a) As the management accountant of PMS plc you have been asked to investigate the following options available to the organization:

(i) Reduce production to 25,000 units
(ii) Reduce production to 35,000 units
(iii) Shut down department P.

(b) Discuss the relevance of opportunity costs in decision-making

[Question # 5]

D runs a ceramics company that employs twenty staff. The employees work a basic 40-hour week for 48 weeks a year, and are paid on an hourly basis. The average wage per hour is Rs: 10.42. The fixed costs for the pottery total Rs: 30,000 per annum.

The company makes tableware and tiles. A set of tableware sells for Rs: 50. The costs per set are:

	Rs:
Direct materials	10
Direct labor	10
Variable overheads	10

Tiles sell for Rs: 200 per 100 tiles and the costs per hundred are:

	Rs:
Direct materials	20
Direct labor	50
Variable overheads	50

The normal sales mix is 600 tiles to 20 sets of tableware. In most years the company works close to normal capacity, but at present the business is operating at 60 per cent of capacity. Because of this, D has assigned two members of staff to refurbish the pottery showroom, which should take those 8 weeks to complete. He has also recently agreed to redecorate and tile the changing rooms and surround of the local swimming pool. This is a charitable work and should take three of D's staff half a year to complete. However, D has since been offered two large contracts, which he bid for a few months ago.

Fish-and-chip shops contract

The first contract is from a company that owns a chain of up market fish-and-chip shops.
The company needs tiles for five new fish-and-chip shops that it is about to open. D has heard from a reliable source that the company plans to open a further 30 new shops over the next 2 or 3 years. The tiles for the five shops are required in 6 months' time, and each shop will require 20,000 tiles at the normal selling price less 5 per cent.

Z plc contract

The second potential contract is from a department store, Z plc, which requires 40,000 sets of pastel colored tableware in one year's time. This may lead to further annual orders from Z plc. D has already produced designs for the product, which the company has agreed; D reckons that this took Rs: 2,500 of his time. The price agreed per set is the normal price less 15 per cent quantity discount. If he accepts the contract he will need to have the moulds made, which will cost Rs: 15,000. In order to complete this contract a considerable amount of production space is required to store and dry the moulds and to store the completed goods ready for dispatch in 1 year's time.

D owns a warehouse adjacent to the pottery. This warehouse is leased to another business on an annual basis at a rental of Rs: 10,000 per annum. Fortunately, the lease is due for renewal this month and D could use the warehouse to complete the large contract for Z plc. He estimates that its use would cost him Rs: 3,000 in extra fixed operating costs per annum.

Staffing and capacity information

D has no difficulty in recruiting staff as required, but he feels that he could not absorb more than eight new employees in the coming year. Recruitment costs are Rs: 500 per employee.
He also has little difficulty in getting staff to work 6 hours' overtime per week at 150 per cent of their normal rate of pay. However, they could only work at this level for half of the 48 weeks worked per annum.

If D accepted either job he could stop the two members of staff decorating the showroom and hire a contractor, which would cost Rs: 5,000. If he brought the three staff back from the work on the swimming pool he would feel obliged to make a donation of Rs: 35,000 which would pay for a contractor to finish the work. Twenty-five per cent of the pottery's output each year is made up of new one-off orders from small outlets. D feels that, if he wished to do other, more profitable, work, he could stop supplying these customers without long-term detriment to his business.

Requirements

(a) Produce calculations that show whether the contracts are feasible and profitable. Where appropriate, explain your reasoning, and the figures in your calculations.
(b) Recommend, with reasons, whether D should accept either or both of the contracts. Describe the longer-term implications of the actions you recommend.

[Question # 6]

A company is considering whether to do a special job for a customer. The job will need 200 units of direct materials. These are already held in inventory, but they are used regularly for other work that the company does. These 200 units were purchased for $3 per unit, but their purchase cost has recently been increased to Rs: 3.20 by the supplier. If the decision is taken to do the job for the supplier, the 200 units already held will be used. However, because the materials are used regularly for other work, additional replacement materials will have to be purchased. These will cost Rs: 3.20 per unit, which is the relevant cost. The relevant cost of using the 200 units of materials is therefore Rs: 640 (200 units' ×Rs: 3.20).

[Question # 7]

A company has been asked to quote a price for a one-off contract. The contract would require 5,000 kilograms of material X. Material X is used regularly by the company. The company has 4,000 kilograms of material X currently in inventory, which cost Rs: 2 per kilogram. The price for material X has since risen to Rs: 2.10 per kilogram. What are the relevant costs of the material X for the contract?

[Question # 8]

A company has been asked to quote a price for a one-off contract. The contract would require 2,000 kilograms of material Y. There are 1,500 kilograms of material Y in inventory, but because of a decision taken several weeks ago, material Y is no longer in regular use by the company. The 1,500 kilograms originally cost Rs: 7,200, and have a scrap value of Rs: 1,800. New purchases of material Y would cost Rs: 5 per kilogram. What are the relevant costs of the materials for the contract?

[Question # 9]

In order to carry out some work, a company would need to use 500 kilos of Material M. It already has sufficient quantities of the material in inventory, but due to the recent closure of a business operation, the materials are no longer in regular use. The material M has a scrap value of Rs: 3 per kilo after selling costs. However, they could also be used as an alternative material in another operation, where it could be used instead of the same quantity of material P. Material P is in regular use and costs Rs: 4 per kilo to buy. What are the relevant costs of the material M?

[Question # 10]

A company has been asked by a customer to carry out a special job. The work would require 20 hours of skilled labor time. There is a limited availability of skilled labor, and if the special job is carried out for the customer, skilled employees would have to be moved from doing other work that earns a contribution of Rs: 40 per labor hour. Skilled labor is paid Rs: 30 per hour. What is the relevant cost of the labor?

[Question # 11]

A company has been asked to do a special job for a customer. This would require 8 hours of Grade A labor and 6 hours of Grade B labor. Grade A labor is paid Rs: 20 per hour and Grade B labor is paid Rs: 15 per hour. The Grade A labor would have to be taken off other work that earns a contribution of Rs: 40 per hour. There is sufficient Grade B labor available: if the Grade B employees do not work on this job, they will be paid but will have no other revenue-earning work to do. What are the relevant costs of the labor for the job?

[Question # 12]

A company is considering a contract that will require labor time in three departments.

Department: 1. The contract would require 200 hours of work in department 1, where the work force is paid Rs: 10 per hour. There is currently spare labor capacity in department 1 and there are no plans to reduce the size of the workforce in this department.

Department: 2. The contract would require 100 hours of work in department 2 where the workforce is paid Rs: 12 per hour. This department is currently working at full capacity. The company could ask the work force to do overtime work, paid for at the normal rate per hour plus 50% overtime premium. Alternatively, the work force could be diverted from other work that earns a contribution of Rs: 4 per hour.

Department: 3. The contract would require 300 hours of work in department 3 where the workforce is paid Rs: 20 per hour. Labour in this department is in short supply and all the available time is currently spent making product Z, which earns a contribution of Rs: 10 per hour. What is the relevant cost for the contract of labor in the three departments?

[Question # 13]

A machine was purchased eight years ago for Rs: 20,000 and is depreciated at the rate Of Rs: 2,000 per year. The net book value of the machine is Rs: 4,000 and its net disposal value is Rs: 3,000. A similar machine would cost Rs: 45,000 today. The machine is not due to be replace for another two years, but as it has developed a fault which cannot be repaired, the company must replace the machine immediately. What is the relevant cost of the machine?

[Question # 14]

LW plc is currently deciding whether to undertake a new contract. 15 hours of labor will be required for the contract. LW plc currently products product L, the standard cost details of which are shown below.

STANDARD COST CARD PRODUCT L

	Rs. /Unit
Direct Materials (10kg @ Rs. 2)	20
Direct Labor (5 hrs @ Rs. 6)	30
	50
Selling price	72
Contribution	22

1. What is the relevant cost of labor if the labor must be hired form outside the organization?
2. What is the relevant cost of labor if LW plc expects to have 5 hours spare capacity?
3. What is the relevant cost of labor if labor is in short supply?

[Question # 15]

BSE Veterinary Services is a specialist laboratory carrying out tests on cattle to ascertain whether the cattle have any infection. At present, the laboratory carries out 12,000 tests each period but, because of current difficulties with the beef herd, demand is expected to increase to 18,000 tests a period, which would require an additional shift to be worked. The current cost of carrying out a full test is:

	£ per test
Materials	115
Technicians' wages	30
Variable overhead	12
Fixed overhead	50

Working the additional shift would:
(i) require a shift premium of 50 per cent to be paid to the technicians on the additional shift;
(ii) Enable a quantity discount of 20 per cent to be obtained for all materials if an order was placed to cover 18,000 tests;
(iii) Increase fixed costs by £700,000 per period. The current fee per test is £ 300.

Requirements

(a) Prepare a profit statement for the current 12,000 capacity.
(b) Prepare a profit statement if the additional shift was worked and 18,000 tests were carried out.
(c) Comment on three other factors that should be considered before any decision is taken.

[Question # 16]

Proposal received to manufacture 12,000 units of T over 12 months at a selling price of $3 per unit. The following statement has been prepared:

	$	$
Sales revenue		36,000
Costs: Material X (at historical cost)	5,000	
Material Z (at contract price)	9,000	
Manufacturing labour	10,000	
Depreciation of machine	4,000	
Variable overheads @ 30c per unit	3,600	
Fixed overheads (absorbed @ 80% of manufacturing labour)	8,000	(39,600)
		(3,600)

Further information

1. Material X cannot be used or sold for any other product. It would cost $200 to dispose of the existing inventories.
2. Each unit of new production uses two kilos of material Z. The company has entered into a long-term contract to buy 24,000 kilos at an average price of 37.5c per kilo. The current price is 17.5c per kilo. This material is regularly used in the manufacture of the company's other products.
3. The machine which would be used to manufacture T was bought new three years ago for $22,000. It had an estimated life of five years with a scrap value of $2,000. If the new product is not manufactured the machine could be sold immediately for $7,000. If it is used for one year it is estimated that it could then be sold for $4,000.
4. The new product requires the use of skilled labour, which is scarce. If product T were not made this labour could be used on other activities, which would yield a contribution of $1,000.

Required

Prepare a statement of relevant costs and revenues and determine whether or not the proposal should be accepted.

[Question # 17]

A plc is deciding whether to undertake a new contract. 15 hours of labour are required for the contract. Labour is currently at *full capacity* producing X.

Cost card for X	$/unit
Direct materials (10 kg @ $2)	20
Direct labour (5 hrs @ $6)	30
Variable overheads (60% of direct labour)	18
	68
Selling price	90
Contribution	**22**

Required: What is the cost of using 15 hours of labour for the contract?

[Question # 18]

LB Ltd has been approached by a customer to manufacture a specialized machine. This would be a one-off order which LB Ltd would have to undertake in addition to its normal budgeted production. The assistant accountant has prepared the following quotation:

	Note	**$**
Direct materials:		
Aluminum plating (20m2 @ $10per m2)	1	200
Rivets (100 @ $1 each)	2	100
Direct labor:		
Skilled (50 hrs @ $16 per hour)	3	800
Semi-skilled (20 hrs @ $10 per hour)	4	200
Overheads	5	100
		1,400
Administration overhead @ 10% of production cost	6	140
		1,540
Profit 20% of total cost	7	308
Selling price		**£1,848**

Notes

1. The aluminum plating is regularly used on other work within the business. It has an inventory value of $10 per m2 although the current purchase price has recently risen to $12 per m2.
2. Rivets are currently held in inventory and cost $1 each although the company has no further use for them. They could be sold to a scrap merchant for $0.50 each.
3. Skilled labourers are paid $16 per hour and are currently fully utilised on other work. If the job was undertaken it would be necessary to either work a maximum of 40 hours of overtime (paid at time and an half) and/or reduce the production of another product which earns contribution of $20 per hour.
4. There is currently 100 hours of idle semi-skilled labour time available.
5. Overheads represent an apportionment to cover factory fixed costs.

6. It is policy to add 10% to the production cost of each job to cover the administration cost of orders accepted.
7. Profit of 20% of total cost is added to each job as part of standard pricing policy.

Required: Prepare, on a relevant cost basis, the minimum price which should be quoted for the job.

[Question # 19]

Company XYZ produces two components (C1 and C2) and is planning the allocation of its available resources for the next period. 75 units of component C1 and 60 units of component C2 are required to be produced but machine hour capacity is restricted to a total of 300 hours. Any deficit of components produced in-house can be made up by the purchase of any quantity of either component from an outside supplier. The objective of Company XYZ is to satisfy the requirement for components at minimum total cost. The following information is available concerning each component:

	Component	
	C1	C2
	Costs ($ per unit):	
Direct materials	6·20	8·70
Direct labour	5·10	7·50
Variable production overheads	1·20	1·30
Fixed production overheads	4·80	6·40
	17·30	**23·90**
Machine hours (per unit)	2·0	3·0
Price from outside supplier ($ per unit)	**18·50**	**25·90**

Required:

(a) Calculate the variable costs of producing each component in-house.
(b) Calculate the extra costs of buying-in each component.
(c) Determine which component should have production priority. Show workings clearly and justify your conclusion.
(d) Calculate the number of units of each component that should be manufactured by Company XYZ.

[Question # 20]

A] The following particulars are extracted from the records of a company.

Particulars	Product A	Product B
Sale price per unit	Rs.100	Rs.120
Consumption of material	2 kg	3 kg
Material cost	Rs.10	Rs.15
Direct labour cost	15	10
Direct expenses	5	6
Machine hours used	3	2
Fixed overheads per unit	Rs.5	Rs.10
Variable overheads per unit	15	20

Direct labour per hour is Rs.5.

Comment on the profitability of each product [both use same raw material], when,
I] Total sales potential in units is limited
II] Total sales potential in value is limited
III] Raw material is in short supply
IV} Production capacity [in terms of machine hours] is limited.
B] Assuming raw material as the key factor, availability of which is 10,000 kg and maximum sales potential of each product being 3500 units, **find out the product mix** which will yield maximum profits.

[Question # 21]

P Ltd. manufactures and sells children's toys of high quality over an extensive market utilizing the services of skilled artists who are paid at an average rate of Rs.15 per hour. The total number of skilled hours available in a year is only 14000. The details of planned production for 2008-09; estimated cost and unit selling prices are given below:

Product [Toy]	Production Planned [Units]	Direct Materials Per Unit Rs.	Direct Labour Per Unit Rs.	Fixed Overheads Per Unit Rs.	Selling Price Per Unit Rs
A	3000	20	10	15	70
B	4000	24	12	18	92
C	4000	32	12	18	95
D	3000	40	16	24	110
E	2000	60	20	30	180

Variable overheads costs amount to 50% of the direct labor cost. The company has estimated the following maximum and minimum demands for each product.

Particulars	**A**	**B**	**C**	**D**	**E**
Maximum – Units	**5000**	**6000**	**6000**	**4000**	**4000**
Minimum - Units	**1000**	**1000**	**1000**	**500**	**500**

You are **required** to work out profit as per the production plan of the company and also compute the optimum profit in the given situation.

[Question # 22]

XY Ltd. is manufacturing three household products, A, B and C and selling them in a competitive market. Details of current demand, selling price and cost structure are given below.

Particulars	**A**	**B**	**C**
Expected Demand	10,000	12,000	20,000
Selling Price	20	16	10
Variable cost per unit			
Direct material Rs: 10 per kg	6	4	2
Direct Labor Rs: 1.5 per hour	3	3	1.50
Variable Overhead	2	1	1.0
Fixed Overheads per unit	Rs: 5	Rs: 4	Rs: 2

The company is frequently affected by acute scarcity of raw material and high labor turnover. During the next period, it is expected to have one of the following situations:

I] Raw material available will be only 12 100 kg

II] Direct labour hours available will be only 5000 hrs.

III] It may be possible to increase sales of any one product by 25% without any additional fixed costs but by spending Rs.20, 000 on advertisement. There will be no shortage of materials or labor.

Required: Suggest the best production plan in each case and the resultant profit that the company would earn according to your suggestion.

[Question # 23]

A company has compiled the following data for the preparation of its budget for the year 2008-09.

Particulars	A	B	C
Sales Per month - units	8,000	4,000	6,000
Selling Price	Rs: 40 per unit	Rs: 80 per unit	Rs: 100 per unit
Variable cost per unit			
Direct material Rs: 10 per kg	Rs: 20 per unit	Rs: 48 per unit	Rs: 40 per unit
Deptt # 1 - Rs: 5 per hour	5	10	20
Deptt # 2 - Rs: 4 per hour	8	4	12
Variable Overhead	Rs: 3 per unit	Rs: 3 per unit	Rs: 7 per unit
Fixed Overheads per unit	Rs: 150,000 per month		

After the budget was discussed, the following action plan was approved for improving the profitability of the company.

I] Direct labour in department 1, which is in short supply, should be increased by 15, 000 hours by spending fixed overheads of Rs.8, 000 per month.

II] To boost sales, an advertisement program should be launched at a cost of Rs.10, 000 per month.

III] The selling price should be reduced by: A: 2.5%, B: 8.75%, C: 1%

IV] The sales target has been increased and the sales department has confirmed that the company will be able to achieve the following quantities of sales.

A: 12, 000 units, B: 6, 000 units, C: 10, 000 units

Required:

1. Present the original budget for the year 2008-09

2. Set an optimal product mix after taking into the action plan into consideration and determine the monthly profit.

3. In case the requirement of direct labour hour of department 2 in excess of 40, 000 hours is to be met by overtime working involving double the normal rate, what will be the effect of so working overtime on the optimum profit as computed in 2 above?

[Question # 24]

Vinak Ltd. is operating at 75% level of activity produces and sells two products A and B. The cost sheet of the two products is given below.

Particulars	A	B
Unit Produced & sold	600	400
Selling Price	Rs: 23 per unit	Rs: 19 per unit
Direct material	Rs: 2 per unit	Rs: 4 per unit
Direct Labor	Rs: 4 per unit	Rs: 4 per unit
Selling & Admin Overhead [60% Fixed]	Rs: 8 per unit	Rs: 5 per unit
Fixed Overheads [40% Fixed]	Rs: 5 per unit	Rs: 3 per unit

Factory overheads are absorbed on the basis of machine hours, which is the limiting [key] factor. The machine hour rate is Rs.2 per hour. The company receives an offer from Canada for the purchase of product A at a price of Rs.17.50 per unit. Alternatively, the company has another offer from the Middle East for the purchase of product B at a price of Rs.15.50 per unit. In both the cases, a special packing charge of 50 p per unit has to be borne by the company. The company can accept either of the two export orders and in either case the company can supply such quantities as may be possible to be produced by utilizing the balance of 25% of its capacity.

You are required to prepare,

I] A statement showing the economics of the two export proposals giving your recommendations as to which proposal should be accepted.

II] A statement showing the overall profitability of the company after incorporating the export proposal recommended by you.

[Question # 25]

Sterling Industries Ltd. manufactures product Z by making and assembling three components, A, B and C. The components are made in a machine shop using three identical machines each of which can make any of the three components. However, the total capacity of the three machines is only 12,000 machine hours per month and is just sufficient to meet the current demand. Labour for assembling is available according to requirements. Further details are given below.

Component	Machine Hours Per Unit	Variable Cost per Unit	Market price at which thee component can be purchased
A	4	Rs: 48	Rs: 64
B	5	Rs: 60	Rs: 75
C	6	Rs: 80	Rs: 110
Assembling [per unit of Z]	-	Rs: 30	-

Fixed cost per month amounts to Rs.50, 000. Product Z is sold at Rs.300 per unit. From next month onwards the company expects the demand for Z to rise by 25%. As the machine capacity is limited, the company wants to meet the increase in demand by buying such numbers of A, B or C which is more profit table.

You are asked to find out the following:

I] Current demand and profits made by the company.
II] Which component and how many units of the same should be bought from the market to meet the increase in demand?
III] Profit made by the company is suggestion in I is accepted?

[Question # 26]

A company produces 30, 000 units of product A and 20, 000 units of product B per annum. The sales value and costs of the two products are as follows:

Sales value	Rs.760, 000
Factory overheads:	Rs.190, 000
Direct material:	Rs.140, 000
Administrative and selling overheads:	Rs.1, 20, 000
Direct labour:	Rs1, 90, 000

50% of the factory overheads are variable and 50% of the administrative and selling overheads are fixed. The selling price of A is Rs.12 per unit and Rs.20 per unit for B. The direct material and labour ratio for product A is 2:3 and for B is 4:5. For both the products, the selling price is 400% of direct labour. The factory overheads are charged in the ratio of direct labour and administrative and selling overheads are recovered at a fl at rate of Rs.2 per unit for A and Rs.3 per unit for B. Due to fall in demand, of the above products, the company has a plan to diversify and make product C using 40% capacity. It has been estimated that for C direct material and direct labour will be Rs.2.50 and Rs.3 per unit respectively. Other variable costs will be the same as applicable to the product A. The selling price of product C is Rs.14 per unit and production will be 30 000 units.

Assuming 60% capacity is used for manufacture of A and B, **Calculate,**

I] Present cost and profit
II] Cost and profit after diversification
III] Give your recommendations as to whether to diversify or not.

[Question # 27]

The annual budget of ABC Ltd. at 60% and 80% level of performance is as under. [Rs. in thousands]

Particulars	60% Capacity	80% capacity
Direct material	360	480
Direct Labor	480	640
Selling & Distri. Overhead	136	148
Production Overheads	252	276
Administrative Overhead	124	132
Total	1352	1676

The company is experiencing difficulties in selling its products and is presently operating at 50% capacity. The sales revenue for the year is estimated at Rs.900,000. The directors are seriously considering suspending operations till the market picks up.

Market research undertaken by the company reveals that in about 12 month's time, the sales will pick up and the company can comfortably operate at 75% level of performance and earn a sales income of Rs.1800,000 in that year. The sales personnel of the company do not want to suspend operations for fear of adverse reactions in the market but the directors want to decide the issue purely on financial considerations. If the manufacturing and other operations of the company are suspended for a year, it is estimated that,

1) The present fixed cost could be reduced to Rs.2, 20, 000 per annum.
2) The settlement cost of personnel not required would amount to Rs.1, 50, 000.
3) The maintenance of plant has to go on and that would cost Rs.20, 000 per annum
4) On resuming operations, the expenditure connected with reopening after shut down would amount to Rs.80, 000.

Submit a **report to the directors** and indicate therein, based on purely financial considerations, whether it would be advisable to suspend the company's operations in the current year.

[Question # 28]

Fujiyan Industries specializes in production of food and personal care products. During the year 2010, the company intends to launch a new product called PQR. The relevant details are as follows:

i) The product would be sold in 1 pack size of 500 grams and the sales have been projected of 200,000 units
ii) For producing 1 kg of output, following materials would be required:
   a) 0.5 kg of material A which costs Rs. 300 per kg.
   b) 1 kg of material B. Current stock of material B is 250,000 kgs and it was purchased @ Rs. 100 per kg.Its current purchase price is Rs. 125 per kg. The expiry date of the current stock is February 28, 2011. Before the expiry date, it could be disposed of at the rate of Rs. 110 per kg.
iii) Cost of packing materials for pack size 500 grams has been projected at Rs 30 per unit.
iv) 100 kgs of product would require 5 hours of skilled labour and 10 hours of unskilled labour. Skilled labour is paid at Rs. 70 per hour and unskilled labour at Rs. 45 per hour.

Currently, the company has 500 idle hours of skilled labour and has a policy to pay 50% for idle hours.

Required:

Calculate the sale price for the new product assuming that the company wants to earn a profit of 25% on the cost of the product which shall include relevant costs only.

[Question # 29]

You are the management accountant of a publishing and printing company which has been asked to quote for the production of a program for the local village fair. The work would be carried out in addition to the normal work of the company. Because of existing commitments, some weekend working would be required to complete the printing of the program. A trainee accountant has to produce the following cost estimates based upon the resources required as specified by the production manager:

		Rs.
Direct materials	– paper (book value)	5,000
	– inks (purchase price)	2,400
Direct labour	– skilled 250 hours @ Rs.4.00	1,000
	– unskilled 100 hours @ Rs.3.50	350
Variable overhead (350 hours @ Rs.4.00)		1,400
Printing press depreciation (200 hours @ Rs.2.50)		500
Fixed production costs (350 hours @ Rs.6.00)		2,100
Estimating department costs		400
		13,150

You are aware that considerable publicity could be obtained for the company if you are able to win this order and the price quoted must be very competitive. The following notes are relevant to the cost estimate above:

(1) The paper to be used is currently in inventory at a value of Rs.5,000. It is of an unusual color which has not been used for some time. The replacement price of the paper is Rs.8,000, whilst the scrap value of that in inventory is Rs.2,500. The production manager does not foresee any alternative use for the paper if it is not used for the village fair programs.
(2) The inks required are not held in inventory. They would have to be purchased in bulk at a cost of Rs.3,000. 80% of the ink purchased would be used in printing the programs. No other use is foreseen for the remainder nor can it be resold.
(3) Skilled labour: Due to shortage of skilled labour, 50% of the time required for the printing of this programme would be worked at weekends for which a premium of 25% above the normal hourly rate is paid. The normal hourly rate is Rs.4 per hour.
(4) Unskilled labour is presently under-utilized, and at present 200 hours per week is recorded as idle time. If the printing work is carried out at a weekend, 25 unskilled hours would have to occur at this time, but the employees concerned would be given two hours time off (for which they would be paid) in lieu of each hour worked.
(5) Variable overhead represents the cost of operating the printing press and binding machines.
(6) When not being used by the company, the printing press is hired to outside companies for Rs.6 per hour. This earns a contribution of Rs.3 per hour. There is unlimited demand for this facility.
(7) Fixed production costs are those incurred by and absorbed into production, using an hourly rate based on budgeted activity.
(8) The cost of the estimating department represents time spent in discussions with the village fair committee concerning the printing of its program.

Required:

Prepare a revised cost estimate using the opportunity cost approach, showing clearly the minimum price that the company should accept for the order. Give reasons for each resource valuation in your cost estimate.

[Question # 30]

The Telephone Co (T Co) is a company specialising in the provision of telephone systems for commercial clients. There are two parts to the business:

– installing telephone systems in businesses, either first time installations or replacement installations;
– supporting the telephone systems with annually renewable maintenance contracts.

T Co has been approached by a potential customer, Push Co, who wants to install a telephone system in new offices it is opening. Whilst the job is not a particularly large one, T Co is hopeful of future business in the form of replacement systems and support contracts for Push Co. T Co is therefore keen to quote a competitive price for the job. The following information should be considered:

1. One of the company's salesmen has already been to visit Push Co, to give them a demonstration of the new system, together with a complimentary lunch, the costs of which totaled $400.
2. The installation is expected to take one week to complete and would require three engineers, each of whom is paid a monthly salary of $4,000. The engineers have just had their annually renewable contract renewed with T Co. One of the three engineers has spare capacity to complete the work, but the other two would have to be moved from contract X in order to complete this one. Contract X generates a contribution of $5 per engineer hour. There are no other engineers available to continue with Contract X if these two engineers are taken off the job. It would mean that T Co would miss its contractual completion deadline on Contract X by one week. As a result, T Co would have to pay a one-off penalty of $500. Since there is no other work scheduled for their engineers in one week's time, it will not be a problem for them to complete Contract X at this point.
3. T Co's technical advisor would also need to dedicate eight hours of his time to the job. He is working at full capacity, so he would have to work overtime in order to do this. He is paid an hourly rate of $40 and is paid for all overtime at a premium of 50% above his usual hourly rate.
4. Two visits would need to be made by the site inspector to approve the completed work. He is an independent contractor who is not employed by T Co, and charges Push Co directly for the work. His cost is $200 for each visit made.
5. T Co's system trainer would need to spend one day at Push Co delivering training. He is paid a monthly salary of $1,500 but also receives commission of $125 for each day spent delivering training at a client's site.
6. 120 telephone handsets would need to be supplied to Push Co. The current cost of these is $18·20 each, although T Co already has 80 handsets in inventory. These were bought at a price of $16·80 each. The handsets are the most popular model on the market and frequently requested by T Co's customers.
7. Push Co would also need a computerized control system called 'Swipe 2'. The current market price of "Swipe 2" is $10,800, although T Co has an older version of the system, 'Swipe 1', in inventory, which could be modified at a cost of $4,600. T Co paid $5,400 for Swipe 1 when it ordered it in error two months ago and has no other use for it. The current market price of Swipe 1 is $5,450, although if T Co tried to sell the one they have, it would be deemed to be 'used' and therefore only worth $3,000.

8. 1,000 meters of cable would be required to wire up the system. The cable is used frequently by T Co and it has 200 meters in inventory, which cost $1·20 per meter. The current market price for the cable is $1·30 per meter.
9. You should assume that there are four weeks in each month and that the standard working week is 40 hours long.

Required:

(a) Prepare a cost statement, using relevant costing principles, showing the minimum cost that T Co should charge for the contract. Make DETAILED notes showing how each cost has been arrived at and EXPLAINING why each of the costs above has been included or excluded from your cost statement.
(b) Explain the relevant costing principles used in part (a) and explain the implications of the minimum price that has been calculated in relation to the final price agreed with Push Co.

[Question # 31]

A company has an item of equipment that originally cost $50,000. It would now cost $60,000 to replace. Its current carrying amount (net book value) is $20,000 and it is being depreciated by $10,000 each year. The company does not use the equipment any more, and does not foresee any further use for it. Another company, not a competitor, has offered to buy the equipment for $12,000. What is the relevant cost of the equipment?

[Question # 32]

A company has an item of equipment that originally cost $30,000. Its net book value is now $12,000. It could be used now on a three-month contract. If it is not used for the contract it would be sold off, and the net disposal proceeds would be $4,000. After use on the contract, the equipment would no longer have any sale value, and it would have to be dismantled and disposed of at a cost of $2,000. What is the relevant cost of the equipment?

[Question # 33]

A contract is under consideration which would require 1,400 hours of direct labour. There is spare capacity of 500 hours of direct labour, due to the cancellation of another order by a customer. The other time would have to be found by asking employees to work in the evenings and at weekends, which would be paid at 50% above the normal hourly rate of $15. Alternatively, the additional hours could be found by switching labour from other work which earns a contribution of $5 per hour.

Required: Calculate the relevant cost of direct labour if the contract is accepted and undertaken.

[Question # 34]

The management of Springer plc is considering next year's production and purchase budgets. One of the components produced by the company, which is incorporated into another product before being sold, has a budgeted manufacturing cost as follows:

	(£)
Direct material	14
Direct labour (4 hours at £3 per hour)	12
Variable overhead (4 hours at £2 per hour)	8
Fixed overhead (4 hours at £5 per hour)	20
Total cost	**54** per unit

Trigger plc has offered to supply the above component at a guaranteed price of £50 per unit.

Required:

(a) Considering cost criteria only, advise management whether the above component should be purchased from Trigger plc. Any calculations should be shown and assumptions made, or aspects which may require further investigation should be clearly stated.

(b) Explain how your above advice would be affected by each of the two *separate* situations shown below.

(i) As a result of recent government legislation if Springer plc continues to manufacture this component the company will incur additional inspection and testing expenses of £56 000 per annum, which are not included in the above budgeted manufacturing costs.

(ii) Additional labour cannot be recruited and if the above component is not manufactured by Springer plc the direct labour released will be employed in increasing the production of an existing product which is sold for £90 and which has a budgeted manufacturing cost as follows:

	(£)
Direct material	10
Direct labour (8 hours at £3 per hour)	24
Variable overhead (8 hours at £2 per hour)	16
Fixed overhead (8 hours at £5 per hour)	40
	90 per unit

All calculations should be shown.

(c) The production director of Springer plc recently said:

'We must continue to manufacture the component as only one year ago we purchased some special grinding equipment to be used exclusively by this component. The equipment cost £100 000, it cannot be resold or used elsewhere and if we cease production of this component we will have to write off the written down book value which is £80 000.' **Draft a brief reply** to the production director commenting on his statement.

[Question # 35]

You have received a request from EXE plc to provide a quotation for the manufacture of a specialized piece of equipment. This would be a one-off order, in excess of normal budgeted production. The following cost estimate has already been prepared:

		Note	(£)
Direct materials:			
	Steel (10 m2 at £5.00 per sq. metre)	1	50
	Brass fittings	2	20
Direct labour			
	Skilled (25 hours at £8.00 per hour)	3	200
	Semi-skilled (10 hours at £5.00 per hour)	4	50
Overhead	(35 hours at £10.00 per hour)	5	350
Estimating time		6	100
			770
Administrative overhead at 20% of production cost		7	154
			924
Profit at 25% of total cost		8	231
Selling price			**1155**

Notes

1. The steel is regularly used, and has a current stock value of £5.00 per sq. metre. There are currently 100 sq. metres in stock. The steel is readily available at a price of £5.50 per sq. metre.
2. The brass fittings would have to be bought specifically for this job: a supplier has quoted the price of £20 for the fittings required.
3. The skilled labour is currently employed by your company and paid at a rate of £8.00 per hour. If this job were undertaken it would be necessary either to work 25 hours overtime which would be paid at time plus one half *or* to reduce production of another product which earns a contribution of £13.00 per hour.
4. The semi-skilled labour currently has sufficient paid idle time to be able to complete this work.
5. The overhead absorption rate includes power costs which are directly related to machine usage. If this job were undertaken, it is estimated that the machine time required would be ten hours. The machines incur power costs of £0.75 per hour. There are no other overhead costs which can be specifically identified with this job.
6. The cost of the estimating time is that attributed to the four hours taken by the engineers to analyse the drawings and determine the cost estimate given above.
7. It is company policy to add 20% on to the production cost as an allowance against administration costs associated with the jobs accepted.
8. This is the standard profit added by your company as part of its pricing policy.

Required:

(a) Prepare, on a relevant cost basis, the lowest cost estimate that could be used as the basis for a quotation. Explain briefly your reasons for using *each* of the values in your estimate.
(b) There may be a possibility of repeat orders from EXE plc which would occupy part of normal production capacity. What factors need to be considered before quoting for this order?
(c) When an organisation identifies that it has a single production resource which is in short supply, but is used by more than one product, the optimum production plan is determined by ranking the products according to their contribution per unit of the scarce resource.

Using a numerical example of your own, reconcile this approach with the opportunity cost approach used in (a) above.

[Question # 36]

Budgeted information for A Ltd for the following period, analysed by product, is shown below

	Product I	Product II	Product III
Sales units (000s)	225	376	190
Selling price (£ per unit)	11.00	10.50	8.00
Variable costs (£ per unit)	5.80	6.00	5.20
Attributable fixed costs (£000s)	275	337	296

General fixed costs, which are apportioned to products as a percentage of sales, are budgeted at £1 668 000.

Required:

(a) **(i)** Calculate the budgeted profit of A Ltd, and of each of its products.
(ii) Recalculate the budgeted profit of A Ltd on the assumption that Product III is discontinued, with no effect on sales of the other two products. State and justify other assumptions made.
(iii) Additional advertising, to that included in the budget for Product I, is being considered. Calculate the minimum extra sales units required of Product I to cover additional advertising expenditure of £80 000. Assume that all other existing fixed costs would remain unchanged.
(iv) Calculate the increase in sales volume of Product II that is necessary in order to compensate for the effect on profit of a 10% reduction in the selling price of the product. State clearly any assumptions made.

(b) Discuss the factors which influence cost behavior in response to changes in activity.

[Question # 37]

You work as a trainee for a small management consultancy which has been asked to advise a company, Rane Limited, which manufactures and sells a single product. Rane is currently operating at full capacity producing and selling 25 000 units of its product each year. The cost and selling price structure for this level of activity is as follows:

	At 25 000 units (£ per unit)	output (£ per unit)
Production costs		
Direct material	14	
Direct labour	13	
Variable production overhead	4	
Fixed production overhead	8	
Total production cost		39
Selling and distribution overhead:		
Sales commission – 10% of sales value	6	
Fixed	3	9
Administration overhead:		
Fixed		2
Total cost		50
Mark up – 20%		10
Selling price		**60**

A new managing director has recently joined the company and he has engaged your organization to advice on his company's selling price policy. The sales price of £60 has been derived as above from a cost-plus pricing policy. The price was viewed as satisfactory because the resulting demand enabled full capacity operation. You have been asked to investigate the effect on costs and profit of an increase in the selling price. The marketing department has provided you with the following estimates of sales volumes which could be achieved at the three alternative sales prices under consideration.

Selling price per unit	£70	£80	£90
Annual sales volume (units)	20 000	16 000	11 000

You have spent some time estimating the effect that changes in output volume will have on cost behaviour patterns and you have now collected the following information.

1. Direct material: The loss of bulk discounts means that the direct material cost per unit will increase by 15% for all units produced in the year if activity reduces below 15 000 units per annum.
2. Direct labour: Savings in bonus payments will reduce labour costs by 10% for all units produced in the year if activity reduces below 20 000 units per annum.
3. Sales commission: This would continue to be paid at the rate of 10% of sales price.
4. Fixed production overhead: If annual output volume was below 20 000 units, then a machine rental cost of £10 000 per annum could be saved. This will be the only change in the total expenditure on fixed production overhead.
5. Fixed selling overhead: A reduction in the part-time sales force would result in a £5000 per annum saving if annual sales volume falls below 24 000 units. This will be the only change in the total expenditure on fixed selling and distribution overhead.
6. Variable production overhead: There would be no change in the unit cost for variable production overhead.
7. Administration overhead: The total expenditure on administration overhead would remain unaltered within this range of activity.
8. Stocks: Rane's product is highly perishable, therefore no stocks are held.

Task 1

(a) Calculate the annual profit which is earned with the current selling price of £60 per unit.
(b) Prepare a schedule to show the annual profit which would be earned with each of the three alternatives selling prices.

Task 2

Prepare a **brief memorandum** to your boss, Chris Jones. The memorandum should cover the following points:
(a) Your recommendation as to the selling price which should be charged to maximise Rane Limited's annual profits.
(b) *Two* non-financial factors which the management of Rane Limited should consider before planning to operate below full capacity.

Another of your consultancy's clients is a manufacturing company, Shortage Limited, which is experiencing problems in obtaining supplies of a major component. The component is used in all of its four products and there is a labour dispute at the supplier's factory, which is restricting the component's availability. Supplies will be restricted to 22 400 components for the next period and the company wishes to ensure that the best use is made of the available components. This is the only component

used in the four products, and there are no alternatives and no other suppliers. The components cost £2 each and are used in varying amounts in each of the four products. Shortage Limited's fixed costs amount to £8000 per period. No stocks are held of finished goods or work in progress.

The following information is available concerning the products.

	Product A	Product B	Product C	Product D
Maximum Demand	**4000 units**	**2500 units**	**3600 units**	**2750 units**
	(£ per unit)	**(£ per unit)**	**(£ per unit)**	**(£ per unit)**
Selling price	14	12	16	17
Component costs	4	2	6	8
Other variable costs	7	9	6	4

Task 3

(a) Prepare a recommended production schedule for next period which will maximise Shortage Limited's profit.

(b) Calculate the profit that will be earned in the next period if your recommended production schedule is followed.

[Question # 38]

Classic Chemical Industries is engaged in manufacturing four products, has prepared the following budget for 2010:

		Washing Powder	Detergent Powder	Bleaching Powder	Rust Remover
Production	Kgs	20,000	5,000	25,000	15,000
Selling price	Rs./ Kg	65.25	110.25	132.75	192.00
Direct materials	Rs./ Kg	18.00	40.50	31.50	72.00
Direct labour	Rs./ Kg	22.50	30.00	54.00	72.00
Variable overheads	Rs./ Kg	6.75	15.00	18.00	19.50
Fixed overheads	Rs. per annum	225,000	75,000	675,000	540,000

When the budget was discussed, it was proposed that the production should be increased by 10,000 Kgs, for which capacity existed in 2010. It was also decided that for the next year, i.e., 2011, the production capacity should further be increased by 25,000 Kgs, over and above the increase of 10,000 Kgs, as given above for 2010. The additional production capacity of 25,000 Kgs, should be used for the manufacture of Detergent Powder for which new production facilities were to be created at an annual fixed overhead cost of Rs.105,000. The direct material costs of the four products were expected to increase by 10% in 2011 while the other costs and selling prices would remain the same.

Required:

(a) Find the profit for 2010 on the assumption that the existing capacity of 10,000 Kgs, is utilized to maximize the profit.

(b) Prepare a statement of profit for 2011. 04

(c) Assuming that the increase in the output of Detergent Powder may not fully materialize in the year 2011, find the quantity of Detergent Powder, to be sold in 2011 to earn the same overall profit as earned in 2010.

[Question # 39]

The CEO of ZAY & Co., engaged in manufacturing and selling of electrical home appliances, has provided you the following information for three products:

Standard cost of production per unit:

Rs. 000

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Material	45	27	50
Labour cost (Team of workers):			
Assembling (@ Rs.2, 500 per hour)	10	15	7.5
Packing (@ Rs.2, 000 per hour)	6	8	8

Budgeted data for the year 2011 is as under:

Rs. 000

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Demand for the year (Qty)	7500	12500	10000
Selling price per unit (Rs.000.)	85	62	80
Fixed Overheads (Rs.000.)	256000		

During a budget meeting GM Production has pointed out that machine capacity required in assembling is currently 111,000 hours per annum, although this will increase to 145,000 hours per annum with a 20% increase in fixed overhead and 7.50% reduction in direct material cost per unit when the new plant, already ordered, is delivered. However, this will not be during the year for which the budget is being prepared. He further informed that a subcontractor has offered following prices for production per unit with an assurance to quality and timely delivery:

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Subcontractor's Offer	75	56	73

Required:

(a) As a management consultant advise the CEO of ZAY & Co., how the services of subcontractor should be used to meet the expected demand in most profitable manner?
(b) Prepare profitability statement for the year 2011 in support of your advice in (a) above.
(c) Briefly explain the reasoning in support of your recommendations.

[Question # 40]

(a) Briefly define term differential costing? How does it differ from marginal costing?
(b) Maxon Chemicals engaged in manufacturing of two joint products A and B. both used as basic ingredients for textile industry. Chief Financial Officer of the company has provided you the following information:

			Rs.
Consolidated units sold -	Numbers	1,000	
Selling price per unit			750
Material required per unit			225
Labour hours @ Rs.50 per hour			2,200
Variable overheads % of direct labour		150%	
Fixed overheads			200,000

The trend analysis of sales of last ten (10) years reveals that one third **(1/3)** of consolidated revenue relates to product B. Company has an option to process further the joint products and sell them at higher rates to maximize profit. Company is properly equipped for this further processing. The incremental revenues and expenses involved in further processing are as under:

Consolidated revenue after further processing	Rs. 975,000
Additional quantity of material required for A	350 units
Additional quantity of material required for B	120 units
Additional direct labour hours required for A	570 hours
Additional direct labour hours required for B	200 hours

Required:

Advise the company whether further processing should be undertaken or not. Your advice must be based on differential costing techniques.

[Question # 41]

The prices of different raw materials are continuously declining whereas direct labour rates are going up. Hite Industries Limited, produces school bags for all age groups has decided to pass on savings, if any, to the consumers. For this purpose Chief Financial Officer (CFO) has submitted following three proposals to board of directors for their approval:

Proposal	Description
A	90% of net savings in cost is to be passed on.
B	80% of the savings in the cost of raw material, less 90% of the increase in labour cost is to be passed on.
C	75% of the savings in the cost of raw material is to be passed on.

Other data related to the proposals:

Particulars	Age group		
	Pre-Primary	Primary	Secondary
Current selling price (Rs.)	105	125	130
Current profit per unit (Rs.)	15	20	25

Reduction in cost of raw material:	Consumption in kgs per 10 units		
Material-W reduction of Rs.3.00 per kg	15	20	40
Material-X reduction of Rs.5.50 per kg	10	5	16
Material-Y reduction of Rs.2.25 per kg	5	6	17
Material-Z reduction of Rs.4.75 per kg	20	15	18
Direct labour hours per 10 units	25	20	30
Increase in direct labour rate per hour	5.00	6.00	7.50

Required:
Work out the following under each proposal A, B and C submitted by CFO:

(i) Revised selling price,
(ii) Revised profit and
(iii) Revised profitability percentage (%). (Round off your answer to nearest rupee).

[Question # 42]

Management of a shopping mall is planning for the next year (360 days) divided into three sessions: peak, mid and low. Shopping mall has 1,000 stalls, which are charged on daily basis. The stall charges (per day) are different in each of the seasons. The charges per day include utilities. Other services (refreshment and restaurant) are also available. Details of shopping mall, its services and forecast for the next year are given below:

Season	Unit of Measurement	Peak	Mid	Low
Days	Nos.	90	120	150
Stall charges per day	Rs.	1,000	800	550
Stall occupancy	%	95	75	50
Average visitors per stall per day	Nos.	18	15	12
Total stalls revenue	Rs.	85.5 m	72.0 m	41.25m
Per visitor cost	Rs.	12	12	12
Per stall cost	Rs.	80	90	110
Refreshment stall usages by visitors	%	10	30	30
Refreshment contribution per visitor	Rs.	3	3	3
Restaurant usages by visitors	%	30	50	70
Restaurant contribution per visitor	Rs.	3.75	5	7.50
Stalls fixed cost	Rs.	30 m	40 m	50 m
Refreshment fixed cost	Rs.	2.0 million per year		
Restaurant fixed cost	Rs.	5.4 million per year		

Other Information:

(i) Refreshment stall (Rs. 2 million) and restaurant (Rs. 5.4 million) fixed cost could be made redundant with no redundancy cost, if refreshment stall and restaurant were to close temporarily for one or more seasons of the year.
(ii) Other fixed cost could be reduced by 75%, if the shopping mall were to close temporarily for one or more seasons of the year.
(iii) There are also some costs that are incurred by the shopping mall and can only be avoided if it is permanently closed. These costs are estimated to Rs. 20,000,000 for next year.

Required:

(a) Prepare a profitability statement for the next year. Your statement should show the shopping mall's each activity by seasons and in total.
(b) Identify the action that management could take to maximize the profit.
(c) Explain two factors that the management should consider before implementing the actions which you suggested in (b) above.

[Question # 43]

MB Co. is a local small textile mill. It has been asked to provide textile supplies for an international buyer. Management believes that this order may provide an opportunity to enter in international market. As a result they intend to make this deal finalized by offering lowest price. Detail of cost required to produce supplies are here under:

1. A regular in use fabric of 5,000 meters will be required. Currently 8,000 meters of fabric is in stock originally purchase at Rs. 12 per meter. Replacement cost for this fabric is Rs. 12.50 per meter and resale value is Rs. 10.50.
2. 1,500 Kgs special dyes and chemical only useable for this order will be required, minimum order quantity is 2,000 Kgs at Rs. 9 per Kg.
3. Other direct cost for this order will be Rs. 150,000. Total overall other cost will decrease by 3% with a net benefit of Rs. 30,000 to this order.
4. Overall labour supervision cost is Rs. 12,000 per 8-hour day.
5. A total of 500 direct labour hours will be required. The current wage rate for trained labours is Rs. 11 per hour. Currently 75 hours are in spare for fix contractor agreement.

The additional hours would be obtained by either:

1. Overtime at a cost of Rs. 14 per hour, or
2. Hiring temporary staff at a cost of Rs. 12 per hour.

I. Temporary staffs need to be supervised 10 hours by existing supervisors.
II. 400 machine hours will be required. The machine to be used is already leased at a cost of Rs. 6,000 per day. Variable running cost of this machine is Rs. 7 per hour.
III. The company absorbs its fixed cost using an absorption rate of Rs. 20 per direct labor hour.

Required:

What will be the minimum price for this offer at 10% margin on total cost? Explain each case.

[Question # 44]

A company makes and sells a single product. The sales price is $20 per unit. Annual sales demand is currently 24,000. Annual fixed costs are $250,000, and the variable cost per unit is $8, made up as follows:

Variable cost per unit	$
Materials	4
Direct labour	3
Other variable costs	1
Total variable cost	8

The company is considering a proposal to reduce the sales price from $20 to $19. At the lower price, it is expected that annual sales demand would be 30,000 units. The following changes in costs would occur if annual production and sales are increased to 30,000 units:

- A favourable volume price discount would be obtained on direct material purchases, and materials costs would fall by 10% for all units produced by the company during the year.

- The company's output capacity is 28,000 units during normal working time. At output volumes above this amount, some overtime would have to be worked. The overtime premium is 50% on top of normal hourly rates of pay. Total fixed cost expenditure would increase to $260,0000.

Required

(a) Calculate the effect on annual profit of the proposed price reduction and recommend (on the basis of change in profit) whether the price should be reduced.

(b) Briefly state any other factors, other than profitability, that might influence the pricing decision.

[Question # 45]

An Umbrella manufacturer makes an average net profit of Rs.2.50 per piece on a selling price of Rs.14.30 by producing and selling 60,000 pieces or 60% of the potential capacity.

His cost of sales is

Direct material	3.5
Direct wages	1.25
Work overheads	6.25 (50% fixed)
Sales overheads	0.80 (25% variable)

During the current year, he intends to produce the same number of units but anticipates That his fixed charges will go up by 10% while the direct labour and direct materials will go up by 8% and 6% respectively. But he has no option of increasing the selling price. Under this situation. He obtains an offer for further 20% of his capacity.

What minimum price will you recommend for acceptance of offer to ensure the Manufacturer an overall profit of Rs.1,67,300/- ?

[Question # 46]

Nuksan Ltd.which makes only one product, sells 10,000 units of its product making a loss of Rs.10,000/-. The variable cost per unit of the product is Rs.8/- and the fixed cost is Rs.30,000/-

Sales units	Probability
10,000	0.10
12,000	0.15
14,000	0.20
16,000	0.30
18,000	0.25

(i) What is the probability that the company will continue to make losses ?
(ii) What is the probability that the company will make a profit of Rs.6,000 ?
(iii) What is the probability that the profit will be at the most Rs.2,000 ?

[Question # 47]

Ever Forward Ltd is manufacturing and selling two products, Splash and Flash at selling prices of Rs.3 and Rs.4 respectively. The following sales strategy has been outlined for the year 2003 :

(i) Sales planned for the year will be Rs.7.20 lakhs in the case of Splash and Rs.3.50 Lakhs in the case of Flash

(ii) To meet the competition, the selling price of Splash will be reduced by 20% and that of Flash by 12.5%

(iii) Break-even is planned at 60% of the total sales of each product

(iv) Profit for the year to be achieved is planned as Rs.69,120 in the case of Splash and Rs.17,500 in the case of Flash. This would be possible by lauching a cost reduction programme and reducing the present annual fixed expenses of Rs.1,35,000 allocated at Rs.1,08,000 to Splash and Rs.27,000 to Flash.

You are required to present the proposal in financial terms giving clearly the following information:

(a) Number of units to be sold of Splash and Flash to break even as well as the total number of units of Splash and Flash to be sold during the year.

(b) Reduction in fixed expenses, product wise, that is envisaged by the Cost Reduction Programme.

[Question # 48]

A multi-product company has the following costs and output data for the last year

	Product		
	X	Y	Z
Sales mix (in value)	40%	35%	25%
Selling price	Rs. 20	Rs. 25	Rs. 30
Variable cost per unit	Rs. 10	Rs. 15	Rs. 18
Total fixed costs	Rs.1,50,000		
Total sales	Rs.5,00,000		

The company proposes to replace product Z with product S.
Estimated cost and output data are:

	Product		
	X	Y	Z
Sales mix (in value)	50 %	30%	20%
Selling price	Rs. 20	Rs. 25	Rs. 28
Variable cost per unit	Rs. 10	Rs. 15	Rs. 14
Total fixed costs	Rs.1,60,000		
Total sales	Rs.4,50,000		

Analyze the proposed change and suggest what decision the company should take.
Also state the break even point for the company as a whole in the two situations.

[Question # 49]

S.M.Ltd is engaged in the manufacture of plastic bottles of standard size. The factory has eight machines of identical size, each capable of producing 50 bottles per hour. The variable costs per bottle is Re.0.40 and the selling price is Re.1.00 each.

The Company has received an offer from another firm for manufacture of 50,000 units of a plastic moulded toy. The price per toy is Rs.6.00 and the variable cost is Rs.4.80 each. In case the company takes up the job, it has to meet the expenses of making a special mould required for the manufacture of the toy. The cost of the mould is Rs.20,000 The company's time study analysis shows that the machines can produce only 20 toys per hour. The company has a total capacity of 10,000 hours during the period in which the toy is required to be manufactured. The fixed costs excluding the cost of construction of the mould during the period will be Rs.2,00,000. The company has an order for the supply of 3,75,000 bottles during the period.

Required:

1. Do you advise the company to take up the order for manufacturing plastic moulded toys during the time it has an order in its books for the supply of 3,75,000 bottles?
2. If the order for the supply of bottles increases to 5,00,000 bottles will you advise the company to accept the order for the supply of the plastic moulded toys?
3. An associate company of S.M.Ltd has idle capacity and is willing to take up the whole or part of the manufacturing of the plastic moulded toys on subcontracting basis. The sub-contract price inclusive of the cost of construction of mould is Rs.5.60 per toy. Determine the minimum expected excess machine hour capacity needed to justify producing any portion of the toy order by the company itself rather subcontracting.
4. The company expected that it would be left with an excess capacity of 1600 machine hours during the period. Consequently, it accepted the toy order and subcontracted the balance requirements of the toys to meet the order. Later the demand for bottles increased to 4,50,000 units for the period. Since the company had accepted the toy order to fill 1600 machines hours, it could meet the demand for bottles only to the extent of 8400 machine hours. Work out the loss which the company suffered in not being able to predict the demand for the bottles accurately.

[Question # 50]

Auer Company had received an order for a piece of special machinery from Jay Company. Just as Auer Company completed the machine, Jay Company declared bankruptcy, defaulted on the order, and forfeited the 10% deposit paid on the selling price of Rs. 72,500. Auer's manufacturing manager identified the costs already incurred in the production of the special machinery for Jay as follows:

		Rs.
Direct materials used		16,600
Direct labour incurred		21,400
Manufacturing overhead applied:		
Variable	10,700	
Fixed	5,350	16,050
Fixed selling and administrative		5,405
Total cost		59,455

Another company, Kaytell Corp., would be interested in buying the special machinery if it is reworked to Kaytell's specifications. Auer offered to sell the reworked special machinery to Kaytell as a special order for a price of Rs. 68,400. Kaytell has agreed to pay the net machinery to the specifications of Kaytell are as follows:

	Rs.
Direct materials	6,200
Direct labour	4,200
	10,400

A second alternative available to Auer is to convert the special machinery to the standard model. The standard model lists for Rs. 62,500. The additional identifiable costs to convert the special machinery to the standard model are:

	Rs.
Direct material	2,850
Direct labour	3,300
	6,150

A third alternative for the Auer Company is to sell, as a special order, the machine as is (i.e. without modifications) for a net price of Rs. 52,000. However, the potential buyer of the unmodified machine does not want it for 60 days. The buyer offers a Rs. 7,000 down payment with final payment upon delivery. The following additional information is available regarding Auer's operations:

Sales commission rate on sales of standard models is 2% while the sales commission rate on special orders is 3%. All sales commissions are calculated on net sales price (i.e., list price less cash discount, if any).

Normal credit terms for sales of standard models are 2/10, n/30 (2/10 means a discount of 2% is given if payment is made within 10 days; n/30 means full amounts is due within 30 days). Customers take the discounts except in rare instances. Credit terms for special orders are negotiated with the customer. The application rates for overhead are as follows:

Manufacturing:		
	Variable	50% of direct-labour cost
	Fixed	25% of direct-labour cost
Selling and administrative:		
	Fixed	10% of cost of production.

Normal time required for rework is one month. A surcharge of 5% of the sales price is placed on all customer requests for minor modifications of standard models. Auer normally sells a sufficient number of standard models for the company to operate at a volume in excess of the breakeven point. Auer does not consider the time value of money in analyses of special orders and projects whenever the time period is less than one year because the effect is not significant.

Required

1. Determine the contribution that each of the three alternatives will add to the Auer Company's before-tax profits.
2. If Kaytell makes Auer a counteroffer, what is the lowest price Auer Co. should accept for the reworked machinery from Kaytell? Explain your answer.

3. Discuss the influence that fixed-factory overhead cost should have on the sales prices quoted by Auer Company for special orders when (a) a firm is operating at or below the breakeven point; (b) a firm's special orders constitute efficient utilisation of unused capacity above the breakeven volume.

[Question # 51]

Tiptop Textiles manufactures a wide range of fashion fabrics. The company is considered whether to add a further product the "Superb" to the range. A market research survey recently undertaken at a cost of Rs. 50,000 suggests that demand for the "Superb" will last for only one year, during which 50,000 units could be sold at Rs. 18 per unit. Production and sale of "Superb" would take place evenly throughout the years. The following information is available regarding the cost of manufacturing "Superb".

Raw Materials: Each "Superb" would require 3 types of raw material Posh, Flash and Splash. Quantities required, current stock levels and cost of each raw material are shown below. Posh is used regularly by the company and stocks are replaced as they are used. The current stock of Flash is the result of overbuying for an earlier contract. The material is not used regularly by Tiptop Textiles and any stock that was not used to manufacture "Superb" would be sold. The company does not carry a stock of Splash and the units required would be specially purchased.

Raw Materials	Quantity Required per unit	Current Stock Level	Original Cost	Current Replacement Price	Current Resale Value
			Rs.	Rs.	Rs.
Posh	1.00	100,000	2.10	2.50	1.80
Flash	2.00	60,000	3.30	2.80	1.10
Splash	0.5	0	-	5.50	5.00

Labour: Production of each "Superb" would require a quarter of an hour of skilled labour and two hours of unskilled labour. Current wage rates are Rs. 3 per hour for skilled labour and Rs. 2 per hour for unskilled labour. In addition, one foreman would be required to devote all his working time for one year in supervision of the production of Superb. He is currently paid an annual salary of Rs. 15,000. Tiptop Textiles is currently finding it very difficult to get skilled labour. The skilled workers needed to manufacture "Superb" would be transferred from another job on which they are earning a contribution surplus of Rs. 1.50 per labour hour, comprising sales revenue of Rs. 10.00 less skilled labour wages of Rs. 3.00 and other variable costs of Rs. 5.50. It would not be possible to employ additional skilled labour during the coming year. Because the company intends to expand in the future, it has decided not to terminate the services of any unskilled worker in the foreseeable future. The foreman is due to retire immediately on an annual pension of Rs. 6,000 payable by the company. He has been prevailed upon to stay on for a further year and to defer his pension for one year in return for his annual salary.

Machinery: Two machines would be required to manufacture "Superb" MT 4 and MT 7. Details of each machine are as under:

		Start of the year	End of the year
		Rs.	Rs.
MT 4	Replacement cost	80,000	65,000
	Resale value	60,000	47,000
MT 7	Replacement cost	13,000	9,000
	Resale value	11,000	8,000

Straight-line depreciation has been charged on each machine for each year of its life Tiptop Textiles owns a number of MT 4 machines, which are used regularly on various products. Each MT 4 is replaced as soon as it reaches the end of its useful life. MT 7 machines are no longer used and the one, which would be used for "Superb", is the only one the company now has. If it was not used to produce "Superb", it would be sold immediately.

Overheads: A predetermined rate of recovery for overhead is in operation and the fixed overheads are recovered fully from the regular production at Rs. 3.50 per labour hour. Variable overhead costs for "Superb" are estimated at Rs. 1.20 per unit produced.

You are **required** to compute such a cost sheet for "Superb" with all details of materials, labour, overhead etc., substantiating the figures with necessary explanations.

[Question # 52]

The officers' Recreation Club of a large public sector undertaking has a cinema theatre for the exclusive use of themselves and their families. It is a bit difficult to get good motion pictures for show and so pictures are booked as and when available.

The theater has been showing the picture "Blood Bath" for the past two weeks. This picture, which is strictly for adults only, has been great hit and the Manager of the theatre is convinced that the attendance will continue to be above normal for another two weeks, if the show of "Blood Batch" is extended. However, another popular movie, eagerly looked forward to by both adults and children alike, -"Appu on the Airbus" is booked for the next two weeks. Even if "Blood Bath" is extended, the theatre has to pay the regular rental on "Appu on the Airbus" as well.

Normal attendance at the theater is 2,000 patrons per weeks, approximately one-fourth of who are children under the age of 12. Attendance for "Blood Bath" has been 50% greater than the normal total. The manager believes that this would taper off during a second two weeks, 25% below that of the first two weeks during the third week and 33.33% below that of the first two weeks during the fourth weeks. Attendance for "Appu on the Airbus" would be expected to be normal throughout its run, regardless of the duration.

All runs at the theater are shown at the regular price of Rs. 2 for adults and Rs. 1.20 for children under 12. The rental charge for "Blood Bath" is Rs. 900 for one week or Rs. 1,500 for two weeks. For "Appu on the Airbus" it is Rs. 750 for one week or Rs. 1,200 for two weeks. All other operating costs are fixed Rs. 4,200 per week, except for the cost of potato wafers and cakes, which average 60% of their selling price. Sales of potato wafers and cakes regularly average Rs. 1.20 per patron, regardless of age.

The Manager can arrange to show "Blood Bath" for one week and "Appu on the Airbus" for the following week or he can extend the show of "Blood Bath" for two weeks; or else he can show "Appu on the Airbus" for the weeks, as originally booked.

Show by computation, the most profitable course of action he has to pursue.

[Question # 53]

Forward Foundry Ltd., is feeling the effects of a general recession in the industry. Its budget for the coming year is based on an output of only 500 tonnes of castings a month, which is less than half of its capacity. The prices of castings vary with the composition of the metal and the shape of the mould, but they average Rs. 175 a tonne. The following details are from the monthly production cost budget at the 500 tonne level:

	Core Making	Melting and pouring	Moulding	Clearing & grinding
	Rs.	Rs.	Rs.	Rs.
Labour	10,000	16,000	6,000	4,500
Variable overhead	3,000	1,000	1,000	1,000
Fixed overhead	5,000	9,000	2,000	1,000
Total	**18,000**	**26,000**	**9,000**	**6,500**
Labour & overhead Per direct labour hour	9.00	6.50	6.00	5.20

Operating at this level has brought the company to the brink of break-even. It is feared that if the lack of work continues, the company may have to layoff some of the most highly skilled workers whom it would be difficult to get back when the volume picks up later no. No wonder, the works Manager at his juncture, welcomes an order for 90,000 castings, each weighing about 40 lb. To be delivered on a regular schedule during the next six months. As the immediate concern of the works Manager is to keep his work force together, occupied, he does not want to lose the order and is ready to recommend a quote on a no profit on loss basis. Materials required would cost Re. 1 per cost after deducting scrap credits. The direct labour hours per casting required for each department would be:

Core making	0.09
Melting & pouring	0.15
Moulding	0.06
Cleaning & grinding	0.06

Variable overhead would bear a normal relationship to labour cost in the melting and pouring department and in the moulding department. In core making, cleaning and grinding however, the extra labour requirements would not be accompanied by proportionate increases in variable overhead. Variable overhead would increase by Rs. 1.20 for every additional labour hour in core making and by 30 paise for every additional labour hour in cleaning and grinding. Standard wage rates are in operation in each department and no labour variances are anticipated.

To handle an order as large as this, certain increases in fixed factory overhead would be necessary amounting to Rs. 1,000 a month for all departments put together. Production for this order would be spread evenly over the six months period.

You are **required** to:

(a) Prepare a revised monthly labour and overhead cost budget, reflecting the addition of this order.

(b) Determine the lowest price at which quotation can be given for 90,000 casting without incurring a loss.

[Question # 54]

Estimated direct material requirements of a business concern viz. ABC Ltd. for the year 2011-12 are 1,00,000 units. Units cost for orders below 120,000 units is Rs. 10. When size of order equals 120,000 units or more the concern received a discount of 2% on the above quoted per unit price. Keeping in view the following two alternatives:

- Buy 120,000 units at the start of the year;
- Buy 10,000 units per month.

Calculate the opportunity cost, if the concern has the facility of investing surplus funds in government bonds at the rate of 10% interest.

[Question # 55]

Zed Ltd. operates two shops. Products A is manufactured in shop –1 and customers' jobs against specific orders are being carried out in shop –2. Its annual statement of income is:

	Shop –1 (Product –A) Rs.	**Shop –2 (Job works) Rs.**	**Total Rs.**
Sales/Income	125,000	250,000	375,000
Material	40,000	50,000	90,000
Wages	45,000	100,000	145,000
Depreciation	18,000	31,500	49,500
Power	2,000	3,500	5,500
Rent	5,000	30,000	35,000
Heat & light	500	3,000	3,500
Other expenses	4,500	2,000	6,500
Total costs	115,000	220,000	335,000
Net income	**10,000**	**30,000**	**40,000**

The depreciation charges are for machines used in the shops. The rent and heat and light are apportioned between the shops on the basis of floor area occupied. All other costs are current expenses identified with the output in a particular shop.

A valued customer has given a job to manufacture 5,000 units of X for shop –2. As the company is already working at its full capacity, it will have to reduce the output of product –A by 50%, to accept the said job. The customer is willing to pay Rs. 25 per unit of X. The material and labour will cost Rs. 10 and Rs. 18 respectively per unit. Power will be consumed on the job just equal to the power saved on account of reduction of output of A. In addition the company will have to incur additional overheads of Rs. 10,000.

You are **required** to compute the following in respect of this job.

- Differential cost;
- Full costs;
- Opportunity cost; and
- Sunk cost
- Advise whether the company should accept the job.

[Question # 56]

The Z company owns operates a chain of 25 stores. Budgeted data for the Garden stores are as follows:

	Rs.
Annual sales	425,000
Annual cost of goods sold and other operating expenses	382,000
Annual building ownership costs (not included above)	20,000

The company can lease the building to a large flower shop for Rs. 4,000 per month. **Decide** whether to continue operations of this store or to lease using:

- The total project (or comparative statement) approach
- The incremental (or relevant cost) approach
- The opportunity cost approach

[Question # 57]

Ranka Builders has been offered a contract by Excel ltd. to build for it five special Guest Houses for use by top management. Each Guest house will be an independent one. The contract will be for a period of one year and the offer price is Rs. 1 Crore. In addition, Excel Ltd. will also provide 2 grounds of land, free of cost for the purpose of construction. The chief Accountant of Ranka Builders has prepared an estimate on the basis of which he has advised that the contract should not be accepted at the price offered. His estimate was as follows:

		Rs. In lakhs
Land (3 Grounds at Rs. 20 lakhs each)		60
Drawings and design		7
Registration		10
Materials:	Cement & Sand	6
	Bricks & Tiles	4
	Steel	10
	Others (including interior decoration)	10
Labour	Skilled	12
	Unskilled	8
	Supervisor's salary	5
Overheads	General	12
	Depreciation	6
Total cost		**150**

The Accountant also provides the following information:

- **Land**: The requirement of land is 3 grounds costing Rs. 20 lakhs per ground. Excel Ltd. will provide 2 grounds free of cost.

- **Drawing & design**: These have already been prepared and 50% of the cost has already been incurred.
- **Materials:**
  - Cement and sand are already in stock and are in regular use. If use for this contract, they have to be replaced at a cost of Rs. 8 lakhs.
  - Bricks and tiles represent purchases made several months before for a different contract. They could be sold readily for a net Rs. 5 lakhs after meeting all further expenses.
  - Others: Materials worth Rs. 2 lakhs relating to interior decoration are in stock for which no alternative used is expected in the near future. However they can be sold for Rs. 1 lakhs.
- **Labour:**
  - Skilled workers will be transferred to this project from another project. The project manger claimed that if the men were return to him, he could have earned the company an additional Rs. 2 lakhs in terms of profits.
  - The supervisor undertakes various tasks in the sties and his pay and continuity of employment will not be affected by the new contract. If the contract is taken, he will devote half of his time.
- **Overheads:**
  - The equipment that would be used on the contract was bought one year before for Rs. 30 lakhs and is expected to last for five years. It can also be used on other contracts and the current replacement price will be Rs. 32 lakhs and in a year's time it will be Rs. 25 lakhs.
  - The general overheads include both specific and absorbed overheads. If the contract is not undertaken, Rs. 4 lakhs of the same can be avoided.
- Ranka Builders has also on hand another project, which would not be executed if the contract from Excel Ltd. were to be accepted. The estimated profit on that project is Rs. 10 lakhs.

In the light of information given above, you are **required** to indicated with reasons whether the contract from Excel Ltd. should be accepted or not.

[Question # 58]

A construction company has accepted contract AX and work thereon is about to begin however, the company has received an offer for another contract BX. The company cannot, due to certain constraints, take up both the contracts simultaneously. In case the company is desirous of taking up contract BX, it can get the first contract AX rescinded upon payment of a penalty of Rs. 70,000. The following are the estimates relating to the two contracts;

	Contract AX	Contract BX
	Rs.	Rs.
Materials X – in stock at original cost	54,000	---
Materials Y – in stock at original cost	---	62,000
Materials X – firm orders placed at original cost	76,000	---
Materials X – Not yet ordered (at current cost)	150,000	---
Materials Z – Not yet ordered (at current cost)	---	178,000
Labour – to be engaged and paid for	215,000	275,000
Site Management Costs	85,000	85,000

Travel and another expenses	17,000	14,000
Depreciation of Plant	24,000	32,000
Interest on Capital at 12%	12,800	16,000
Head Office expenses allocated to contracts	31,690	33,100
Total	665,490	695,100
Contract Price	720,000	880,000
Estimated Profit	**54,510**	**184,900**

The following additional information is available:

-- Materials X is not regular use. It can be used as a substitute for other materials, which are currently quoted at 10% less than the original cost of X.

-- Materials Y is in regular use and its price has doubled since it was purchased. Its net realizable value if sold will be its new price less 15%. It can, however, be kept in store for use in other contracts to be taken in the next year.

-- If contracts AX is under taken, a part of the plant having spare capacity can be hired out for a rental of Rs. 15,000 for the period.

-- It is the policy of the company to change notional interest on the estimated working capital at 12% per annum.

-- Either of two contracts can be completed by 31st March, 2003, which is the close of the company's financial year.

-- Site management cost is fixed.

Required:

(i) Using the relevancy of cost concept prepare a comparative statement to show the net benefit resulting form each contract.

(ii) Advise the management of the company as to which of two contracts should be undertaken.

[Question # 59]

A firm produces three products, the details of sales, contribution margin and the fixed costs apportioned to the products are as under:

	Product		
	A	B	C
Sales values (Rs.)	1,000,000	800,000	200,000
Contribution (Rs.)	40%	30%	25%
Fixed expenses (Rs.)	340,000	180,000	90,000

i. Fixed expenses attributable to product 'C' are Rs. 40,000.

ii. Product C incurs a loss and hence the management wishes to consider two alternatives:

- Discontinue product 'C' to save the loss.
- Discontinue product 'C' and utilize the capacity to manufacture product 'D'. In this case the sales value of product D is Rs. 200,000 and the contribution is 35%.

Which alternative should be adopted?

[Question # 60]

Something More Ltd. is considering adding products to its product line. After a lot of deliberations between the sales and production personnel, it is decided that products P, Q and R would be the most desirable additions to the company's products range on account of the technical competency, marketing potential and production flexibility as regards these products. In fact P, Q and R can all be made on the same kind of plant as that already in use and therefore as regards production, all products can be readily interchanged. However, it is considered necessary to build further plant facilities to cater for this additional production in this connection the following data is relevant:

Products	P	Q	R
	Rs.	Rs.	Rs.
Direct materials per unit	100	120	90
Direct labour per unit	50	70	90
Variable overheads per unit	50	130	100
Selling price per unit	350	420	370
Demand in units per cost period (on the basis of the above selling price)	200	125	750
Machine hours required per unit of production	15	5	3

It is felt that initially extra plant facilities can be built to operate at the following five different levels of activity viz. 1,800, 2,300, 2,800, 3,300 & 3,800 machines hours per cost period. The fixed overhead costs for a cost period relevant to these five different levels of activity are estimated at Rs. 15,000, Rs. 20,000, Rs. 26,000, Rs. 33,000 & Rs. 39,000 respectively.

You are **required** to advise, with supporting figures, the product or products to be manufactured and in what quantities at each of the five contemplated levels of activity that would seem most desirable to be pursued for maximization of profits.

[Question # 61]

B. Ltd. is having a big plant where tailor made jobs are carried out. Recently a customer has approached them for a job as per specifications supplied. B. Ltd. does not want to loose the customer and is ready to quote a lower price. The planning engineer was asked to prepare an estimate of materials requirements as per the specifications. The cost estimates worked out are as under:

		Rs.
(1)	Steel sheets 5000 kg at Rs. 15 per kg.	75,000
(2)	Steel rods 1000 kg at Rs. 10 per kg	10,000
(3)	Bearing, hardware items etc.	15,000
(4)	Employees Costs:	
	Monthly rate-grade A (400 hours at Rs. 10)	4,000
	Monthly rated-grade B (600 hours at Rs. 8)	4,800
(5)	Overheads:	
	Fabrication shop (500 hours at Rs. 20)	10,000
	Welding shop (300 hours at Rs. 40)	12,000
	Planning Engineers (200 hours at Rs. 15)	3,000
	Design Engineers (100 hours at Rs. 15)	1,500
	Total estimated costs	**135,300**

Following additional information is available

(1) The stocks of steel sheets are more than sufficient and were purchased a year age. Present market price of this item is Rs. 12 per kg.

(2) The steel rods were purchased five years back at Rs. 10 per kg. Present purchase price is Rs. 18 per kg. This material is already declared as non-moving and can be sold in market as such at Rs. 15 per kg or can be substituted for alloy steel rods which are presently costing Rs 17 per kg.

(3) The labour force is always moved from job to job depending on urgency. It is likely that the above job, if accepted, will have to be done by grade-A workers alone.

(4) The fabrication shop is treated as profit centre. A transfer price of Rs. 20 per hour is used for charging to other shops in the workshop. The fabrication shop also does jobs for outsiders whom Rs. 25 per hour are charged. The transfer price fixed by welding shop is Rs. 40 per hour. The transfer prices are calculated as under:

	Fabrication	Welding
Variable cost per machine hour	7	16
Departmental Fixed Costs	6	20
Profit	7	4
Transfer price	20	40

(5) The hourly rates of planning/design engineers are Rs. 10 per hour. However, for outside consultancy work, it is a practice to charge Rs. 15 per hour.

The management wants to have the bare minimum cost for the job so that the opportunity of getting the order is not lost.

(1) Revise the cost estimate using the additional information. Give reasons for each of the revised figure used in your calculations.

(2) Briefly state the applicability of opportunity cost approach and its implications in practical situations.

(3) Do you think that opportunity cost is relevant in a situation of alternate choice or make or buy decisions?

[Question # 62]

B Ltd. is a company that has in stock, materials of type XY that cost Rs. 75,000, but those are now obsolete and have a scrap value of only Rs. 21,000. Other than selling the material for scrap, there are only two alternative uses for them.

Alternative 1 –Converting the obsolete materials into a specialized product, which would require the following additional work and materials –

Material A	600 units
Material B	1,000 units
Direct Labour	
5,000 hours unskilled	
5,000 hours semi-skilled	
5,000 hours highly skilled	
Extra selling and delivery expenses	Rs. 27,000
Extra advertising	Rs. 18,000

The conversion would produce 900 units of saleable product and these could be sold for Rs. 300 per unit.

Material A is already is stock and is widely used within the firm. Although present stocks, together with orders already planned, will be sufficient to facilitate normal activity and extra material used by adopting this alternative will necessitate such materials being replaced immediately. Material B is also in stock, but it is unlikely that any additional supplies can be obtained form some considerable time because of an industrial dispute. At the present time Material B is normally used in the production of product Z, which sells at Rs. 390 per unit and incurs total variable (cost excluding material B) of Rs. 210 per unit. Each unit of product Z uses four units of Materials B. The details of Materials A and B are as follows:

	Material A (Rs.)	**Material B (Rs.)**
Acquisition cost at the time of purchase	100 per unit	Rs. 10 per unit
Net realizable value	85 per unit	Rs. 18 per unit
Replacement cost	90 per unit	--

Alternative 2 – Adopting the obsolete materials for use as a substitute for a sub-assembly that is regularly used within the firm. Details of the extra work and materials required are as follows:

Material C	1,000 units
Direct Labour	
	4,000 hours unskilled
	1,000 hours semi-skilled
	4,000 hours highly skilled

1,200 units of the sub-assembly are regularly used per quarter at a cost of Rs. 900 per unit. The adaptation of material XY would reduce the quantity of the sub-assembly purchased from outside the firm to 900 units for the next quarter only. However, since the volume purchased would be reduced, some discount would be lost and the price of those purchased from outside would increase to Rs. 1,050 per unit for that quarter.

Material C is not available externally though, 1,000 units required would be available from stocks, it would be produced as extra production. The standard cost per unit of material C would be as follows:

	Rs.
Direct labour (6 hrs. Unskilled labour)	18
Raw materials	13
Variable overhead: (6 hours)	16
Fixed overhead: (6 hours @ 3 per hr)	18
	55

Variable overheads	Re. 1 per direct labour hour
Fixed overhead	Rs. 3 per direct labour hour
Unskilled labour	Rs. 3 per direct labour hour
Semi-skilled labour	Rs. 4 per direct labour hour
Highly skilled labour	Rs. 5 per direct labour hour

The unskilled labour is employed on a casual basis and sufficient labour can be acquired to exactly meet the production requirements. Semi-skilled labour is part of the permanent labour force, but the company has temporary excess supply of this type of labour at the present time. Highly skilled labour is in short supply and cannot be increased significantly in the short-term; this labour is presently engaged in meeting the demand for product L, which requires 4 hours of highly skilled labour. The contribution from the sale of one unit of product L is Rs. 24.

Given the above information, you are **required** to present cost information advising whether the stocks of Material XY should be sold, converted into a specialized product (Alternative 1) or adopted for use as a substitute for a sub –assembly (Alternative 2).

PROCESS COSTING

[Question # 1]

Z manufactures three joint products (M, N and P) from the same common process. The following process account relates to the common process last month and is typical of the monthly results of operating this process:

Common Process Account

	Litres	*Rs:*		*Litres*	*Rs:*
Opening work in process	1,000	5,320	Normal loss	10,000	20,000
Materials	100,000	250,000	*Output – M*	25,000	141,875
Conversion costs:			*Output – N*	15,000	85,125
Variable		100,000	Output P	45,000	255,375
Fixed		180,000	Closing work in process	800	3,533
			Abnormal loss	5,200	29,412
	101,000	**535,320**		**101,000**	**535,320**

Each one of the products can be sold immediately after the common process, but each one of them can be further processed individually before being sold. The following further processing costs and selling prices per litre are expected:

Product	*Selling price after common process* Rs/*litre*	*Selling price after further processing* Rs/*litre*	*Further variable processing cost* Rs/*litre*
M	6.25	8.40	1.75
N	5.20	6.45	0.95
P	6.80	7.45	0.85

Requirement

(a) State the method used to apportion the common costs between the products M, N and P and comment on its acceptability. Explain why it is necessary to apportion the common costs between each of the products.

(b) Evaluate the viability of the common process, and determine the optimal processing plan for each of the three products showing appropriate calculations.

JOINT & BY-PRODUCT

[Question # 1]

A firm manufactures three joint products, A, B, C and a by-product X by processing a common stock of material, which cost Rs.8 per kg. The details of output, market price and the initial processing cost for an input of 10,000 kg of raw material are as follows:

Product	Output - Kg	Current Market Price/Kg	Initial Processing Cost
A	5000	18	Direct labor 1000 hours @ Rs:20
B	2500	20	Variable Overheads: 80% of Direct labor
C	1500	24	Fixed overheads: Rs: 21,000
X	500	4	

The company apportions common cost among joint products on physical units' basis. All the by-products can be further processed further and sold at a higher market price, with some sales promotion efforts. The estimated processing cost, marketing cost and the final selling price are given below:

Product	Further Processing Cost per kg - Rs	Further Marketing Cost per kg - Rs	Final Price per kg - Rs
A	4	2	28
B	5	2	26
C	6	2	34
X	2	1	6

Required:

[a] Cost of joint products at the point of separation after initial processing. Comment on the method of apportioning joint costs.
[b] Profit or loss if the products are sold without further processing.
[c] Which of the products have to be processed further for maximizing profits? Show working.

[Question # 2]

A company purchases raw materials worth Rs.11.04 lakhs and processes them into four products, P, Q, R and S, which have a unit sales value of Rs.3, Rs.9, Rs.16 and Rs.60 respectively at split-off point, as they could be sold as such to other processors. However, during a year, the company decided to further process and sell products P, Q and S while R was not be processed further but sold at split off point to other processors. The processing of raw materials into the four products cost Rs.28 lakhs to the company. The other data for the year were as under:

Product	Output (Units)	Sales (Rs)	Additional Processing costs after split off {All variable costs} (Rs)
P	10,00,000	46	12
Q	20,000	4	2.40
R	10,000	1.60	--
S	18,000	12	0.40

You are **required** to work out the following information for managerial decision- making.

I] If the joint costs are allocated amongst the four products on the basis of 'Net Realizable Value' at split off point, what would be the company's annual income?

II] If the company had sold off all other three products at split off stage, identify the increase/ decrease in the company's annual income as compared to I above.

III] What sales strategy could the company have planned to maximize its profit in the year?

IV] Identify the net increase in income if the strategy at III is adopted, as compared to I above?

[Question # 3]

A firm's basic rate is Rs 8 per hour and overtime rates are time and a half for evenings and double time for weekends. The following details have been recorded on three jobs:

	Job X321 Clock hours	Job X333 Clock hours	Job X156 Clock hours
Normal Time	480	220	150
Evening Time	102	60	80
Weekend	10	30	16

Required:

Calculate the labour cost chargeable to each of the jobs in the following circumstances:

a) Where overtime is worked occasionally to meet production requirements

b) Where overtime is worked at the customer' request to bring forward the delivery time.

[Question # 4]

F Ltd has a distillation plant that produces three joint products, P, Q and R, in the proportions 10:5:5. After the split-off point the products can be sold for industrial use or they can be taken to the mixing plant for blending and refining. The latter procedure is normally followed. For a typical week, in which all the output is processed in the mixing plant, the following income statement can be prepared:

Product	P	Q	R
Sales (gallons)	1,000	500	500
	Rs.	**Rs.**	**Rs.**
Price per gallon	12.50	20	10
Sales revenue	12,500	10,000	5,000
Joint process cost (Apportioned using output volume)	5,000	2,500	2,500
Mixing plant cost:			
Process costs	3,000	3,000	3,000

Other separable costs	2,000	500	500
	10,000	6,000	6,000
Profit / (loss)	2,500	4,000	(1,000)

The joint process costs are 25% fixed and 75% variable, whereas the mixing plant costs are 10% fixed and 90% variable and all the 'other separable costs' are variable.

If the products had been sold at the split-off point the selling price per gallon would have been:

Product P	Product Q	Product R
Rs.5.00	Rs.6.00	Rs.1.50

There are only 45 hours available per week in the mixing plant. Typically 30 hours are taken up with the processing of Product P, Q and R (10 hours for each product line) and 15 hours are used for other work that generates (on average) a profit of Rs.200 per hour after being charged with a proportionate share of the plant's costs (including fixed costs @ Rs.30 per hour). The manager of the mixing plant considers that he could sell all the plant's processing time externally at a price that would provide this rate of profit.

It has been suggested that:

(i) since Product R regularly makes a loss, it should be sold off at the split-off point;

(ii) it might be possible advantageously to change the mix of products achieved in the distillation plant. It is possible to change the output proportions to 7:8:5 at a cost of Rs.1 for each additional gallon of Q produced by the distillation plant.

Required:

Compare the costs and benefits for each of the above proposals. Use your analysis to suggest any improvements that seem profitable.

[Question # 5]

Sniff Co manufactures and sells its standard perfume by blending a secret formula of aromatic oils with diluted alcohol. The oils are produced by another company following a lengthy process and are very expensive. The standard perfume is highly branded and successfully sold at a price of $39·98 per 100 millilitres (ml). Sniff Co is considering processing some of the perfume further by adding a hormone to appeal to members of the opposite sex. The hormone to be added will be different for the male and female perfumes. Adding hormones to perfumes is not universally accepted as a good idea as some people have health concerns. On the other hand, market research carried out suggests that a premium could be charged for perfume that can 'promise' the attraction of a suitor.

The market research has cost $3,000. Data has been prepared for the costs and revenues expected for the following month (a test month) assuming that a part of the company's output will be further processed by adding the hormones. The output selected for further processing is 1,000 litres, about a tenth of the company's normal monthly output. Of this, 99% is made up of diluted alcohol which costs $20 per litre. The rest is a blend of aromatic oils costing $18,000 per litre. The labour required to produce 1,000 litres of the basic perfume before any further processing is 2,000 hours at a cost of $15 per hour. Of the output selected for further processing, 200 litres (20%) will be for male customers and 2 litres of hormone costing $7,750 per litre will then be added. The remaining 800 litres (80%) will be for

female customers and 8 litres of hormone will be added, costing $12,000 per litre. In both cases the adding of the hormone adds to the overall volume of the product as there is no resulting processing loss. Sniff Co has sufficient existing machinery to carry out the test processing. The new processes will be supervised by one of the more experienced supervisors currently employed by Sniff Co. His current annual salary is $35,000 and it is expected that he will spend 10% of his time working on the hormone adding process during the test month. This will be split evenly between the male and female versions of the product. Extra labour will be required to further process the perfume, with an extra 500 hours for the male version and 700 extra hours for the female version of the hormone-added product. Labour is currently fully employed, making the standard product. New labour with the required skills will not be available at short notice. Sniff Co allocates fixed overhead at the rate of $25 per labour hour to all products for the purposes of reporting profits.

The sales prices that could be achieved as a one-off monthly promotion are:

– Male version : $75·00 per 100 ml
– Female version : $59·50 per 100 ml

Required:

(a) Outline the financial and other factors that Sniff Co should consider when making a further processing decision. Note: no calculations are required.
(b) Evaluate whether Sniff Co should experiment with the hormone adding process using the data provided. Provide a separate assessment and conclusion for the male and the female versions of the product.
(c) Calculate the selling price per 100 ml for the female version of the product that would ensure further processing would break even in the test month.
(d) Sniff Co is considering outsourcing the production of the standard perfume. Outline the main factors it should consider before making such a decision.

[Question # 6]

Bits and Pieces (B&P) operates a retail store selling spares and accessories for the car market. The store has previously only opened for six days per week for the 50 working weeks in the year, but B&P is now considering also opening on Sundays. The sales of the business on Monday through to Saturday averages at $10,000 per day with average gross profit of 70% earned. B&P expects that the gross profit % earned on a Sunday will be 20 percentage points lower than the average earned on the other days in the week. This is because they plan to offer substantial discounts and promotions on a Sunday to attract customers. Given the price reduction, Sunday sales revenues are expected to be 60% *more than* the average daily sales revenues for the other days. These Sunday sales estimates are for new customers only, with no allowance being made for those customers that may transfer from other days. B&P buys all its goods from one supplier. This supplier gives a 5% discount on *all* purchases if annual spend exceeds $1,000,000. It has been agreed to pay time and a half to sales assistants that work on Sundays. The normal hourly rate is $20 per hour. In total five sales assistants will be needed for the six hours that the store will be open on a Sunday. They will also be able to take a half-day off (four hours) during the week. Staffing levels will be allowed to reduce slightly during the week to avoid extra costs being incurred. The staff will have to be supervised by a manager, currently employed by the company and paid an annual salary of $80,000. If he works on a Sunday he will take the equivalent time off during the week when the assistant manager is available to cover for him at no extra cost to B&P. He will also be paid a bonus of 1% of the extra sales generated on the Sunday project.

The store will have to be lit at a cost of $30 per hour and heated at a cost of $45 per hour. The heating will come on two hours before the store opens in the 25 'winter' weeks to make sure it is warm enough for customers to come in at opening time. The store is not heated in the other weeks. The rent of the store amounts to $420,000 per annum.

Required:

(a) Calculate whether the Sunday opening incremental revenue exceeds the incremental costs over a year (ignore inventory movements) and on this basis reach a conclusion as to whether Sunday opening is financially justifiable.
(b) Discuss whether the manager's pay deal (time off and bonus) is likely to motivate him.
(c) Briefly discuss whether offering substantial price discounts and promotions on Sunday is a good suggestion.

[Question # 7]

PQR Limited produces two joint products – P and Q – together with a by-product R, from a single main process (process 1). Product P is sold at the point of separation for £5 per kg, whereas product Q is sold for £7 per kg after further processing into product Q2. By-product R is sold without further processing for £1.75 per kg. Process 1 is closely monitored by a team of chemists, who planned the output per 1000 kg of input materials to be as follows:

Product P	500 kg
Product Q	350 kg
Product R	100 kg
Toxic waste	50 kg

The toxic waste is disposed of at a cost of £1.50 per kg, and arises at the end of processing.
Process 2, which is used for further processing of product Q into product Q2, has the following cost structure:

Fixed costs	£6000 per week
Variable costs	£1.50 per kg processed

The following actual data relate to the first week of accounting period 10:

	Process 1	
Opening work in process		Nil
Materials input 10 000 kg costing		£15 000
Direct labour		£10 000
Variable overhead		£4 000
Fixed overhead		£6 000
Outputs:		
Product P	4800 kg	
Product Q	3600 kg	
Product R	1000 kg	
Toxic waste	600 kg	
Closing work in progress		nil
	Process 2	
Opening work in process		nil
Input of product Q		3600 kg
Output of product Q2		3300 kg
Closing work in progress		300 kg, 50% converted

Conversion costs were incurred in accordance with the planned cost structure.

Required:

(a) Prepare the main process account for the first week of period 10 using the final sales value method to attribute pre-separation costs to joint products.
(b) Prepare the toxic waste accounts and process 2 account for the first week of period 10.
(c) Advise the management of PQR Limited whether or not, on purely financial grounds, it should continue to process product Q into product Q2:
(i) if product Q could be sold at the point of separation for £4.30 per kg; *and*
(ii) if 60% of the weekly fixed costs of process 2 were avoided by not processing product Q further.

[Question # 8]

A distillation plant, which works continuously, processes 1000 tonnes of raw material each day. The raw material costs £4 per tonne and the plant operating costs per day are £2600. From the input of raw material the following output is produced:

		(%)
Distillate	X	40
Distillate	Y	30
Distillate	Z	20
By-product	B	10

From the initial distillation process, Distillate X passes through a heat process which costs £1500 per day and becomes product X which requires blending before sale. Distillate Y goes through a second distillation process costing £3300 per day and produces 75% of product Y and 25% of product X1. Distillate Z has a second distillation process costing £2400 per day and produces 60% of product Z and 40% of product X2. The three streams of products X, X1 and X2 are blended, at a cost of £1555 per day to become the saleable final product XXX. There is no loss of material from any of the processes. By-product B is sold for £3 per tonne and such proceeds are credited to the process from which the by-product is derived. Joint costs are apportioned on a physical unit basis.

You are **required** to:

(a) draw a flow chart, flowing from left to right, to show for one day of production the flow of material and the buildup of the operating costs for each product;
(b) present a statement for management showing for *each* of the products XXX, Y and Z, the output for *one* day, the total cost and the unit cost per tonne;
(c) Suggest an alternative method for the treatment of the income receivable for by-product B than that followed in this question.

[Question # 9]

A chemical company carries on production operations in two processes. Materials first pass through process I, where a compound is produced. A loss in weight takes place at the start of processing. The following data, which can be assumed to be representative, relates to the month just ended:

Quantities	**(kg):**
Material input	200 000
Opening work in process (half processed)	40 000
Work completed	160 000
Closing work in process (two-thirds processed)	30 000
Costs	**(£):**
Material input	75 000
Processing costs	96 000
Opening work in process:	
Materials	20 000
Processing costs	12 000

Any quantity of the compound can be sold for £1.60 per kg. Alternatively, it can be transferred to process II for further processing and packing to be sold as Starcomp for £2.00 per kg. Further materials are added in process II such that for every kg of compound used, 2 kg of Starcomp result. Of the 160 000 kg per month of work completed in process I, 40 000 kg are sold as compound and 120 000 kg are passed through process II for sale as Starcomp. Process II has facilities to handle up to 160 000 kg of compound per month if required. The monthly costs incurred in process II (other than the cost of the compound) are:

	120 000 kg of compound input	**160 000 kg of compound input**
Materials (£)	120 000	160 000
Processing costs (£)	120 000	140 000

Required:

(a) Determine, using the average method, the cost per kg of compound in process I, and the value of both work completed and closing work in process for the month just ended.

(b) Demonstrate that it is worth while further processing 120 000 kg of compound.

(c) Calculate the minimum acceptable selling price per kg, if a potential buyer could be found for the additional output of Starcomp that could be produced with the remaining compound.

[Question # 10]

C Ltd operates a process which produces three joint products. In the period just ended costs of production totaled £509 640. Output from the process during the period was:

Product - W	276 000 kilos
Product - X	334 000 kilos
Product - Y	134 000 kilos

There were no opening stocks of the three products. Products W and X are sold in this state. Product Y is subjected to further processing. Sales of Products W and X during the period was:

Product - W	255 000 kilos at £0.945 per kilo
Product - X	312 000 kilos at £0.890 per kilo

128 000 kilos of Product Y were further processed during the period. The balance of the period production of the three products W, X and Y remained in stock at the end of the period. The value of closing stock of individual products is calculated by apportioning costs according to weight of output.

The additional costs in the period of further processing Product Y, which is converted into Product Z, were:

Direct labour	£10 850
Production overhead	£7 070

96 000 kilos of Product Z were produced from the 128 000 kilos of Product Y. A byproduct BP is also produced which can be sold for £0.12 per kilo. 8000 kilos of BP were produced and sold in the period. Sales of Product Z during the period were 94 000 kilos, with a total revenue of £100 110. Opening stock of Product Z was 8000 kilos, valued at £8640. The FIFO method is used for pricing transfers of Product Z to cost of sales. Selling and administration costs are charged to all main products when sold, at 10% of revenue.

Required:

(a) Prepare a profit and loss account for the period, identifying separately the profitability of each of the three main products.

(b) C Ltd has now received an offer from another company to purchase the total output of Product Y (i.e. before further processing) for £0.62 per kilo. Calculate the viability of this alternative.

[Question # 11]

A company produces two joint products A and B from the same basic materials. The processing is completed in three departments. Materials are mixed and processed in Department-1. At the end of this process, .A. and .B. get separated. After separation, A is completed in Department-2 and .B. is finished in Department-3. During a particular period 200,000 Kgs of raw material were processed in Department-1, at a total cost of Rs.875,000 and the resultant 60% becomes A and 30% B and 10% normally lost in processing A is further processed in Department-2 at a cost of Rs.180,000 where 1/6 of the quantity received from Department-1 is lost in processing. In Department-3 further new material added to the material received from Department-1 and weight mixture is doubled, there is no quantity loss in the department and further processing and material cost is Rs.150,000. Following are the details:

	Product A	**Product B**
Quantity sold (Kgs.)	90,000	115,000
Sales price per Kg (Rs.)	10	4

There were no beginning inventories. If these products are sold at split-off-point, the selling price of A and B would be Rs.8 and Rs.4 per Kg respectively.

Required:

(a) Prepare statements showing:

(i) Apportionment of joint cost to product .A. and .B. in proportion of sales value at split-off point.

(ii) Cost per kg of each product indicating joint cost, processing cost and total cost separately.

(iii) Product-wise profit for the period.

(b) Offer your comments to increase the profitability.

[Question # 12]

M/s Technoplast International Limited having a capacity of moulding and machining 4,800 tonnes of special material per annum which passes through two production departments Moulding and Machining. The sales forecast for the next financial year envisages full utilization of production capacity in the following territories:

Northern Zone: 3,000 tonnes @ Rs.750,000 per tonne
Southern Zone: 1,800 tonnes @ Rs.1,000,000 per tonne

Over the years the company has established three possible sources of raw material as under:

KOREA	CHINA	TAIWAN
Agrees to supply, 3,600 tonnes of input materials @ Rs.300,000 per tonne	Offers to supply 4,000 tonnes of input materials @ Rs.275,000 per tonne	Agrees to supply @ Rs.325,000 per tonne. If the entire input requirement is taken from them they will offer a discount of 5%
The additional cost of freight etc., for bringing the input materials from suppliers' origin is as under:		
Rs.10,000 per tonne to be spent by M/s Technoplast	Rs.15,000 per tonne to be spent by M/s Technoplast	The transport cost is to be paid by the supplier

- The average level of scrap arising from the two production departments Moulding and Machining are 5 % and 10% respectively which is calculated on the final output.
- The realizable value of scrap which is used by local moulders is sold out @ Rs.75,000 per tonne for Moulding Department and @ Rs.100,000 per tonne for Machining Department. This realization is credited to the cost of production.
- Budget for the departmental cost for the next year are as under:

Rs.(million)

	Moulding Department	Machining Department
Direct Labour	8.00	24.00
Overheads	32.00	72.00

Required:

Work out the following:

(a) Gross quantity of input material required to be produced.

(b) Selection of the source of the procurement and the price at which this input is to be procured.

(c) Total profitability for the next year assuming a distribution cost of 15% on cost of production.

[Question # 13]

A company a raw material into five products. In Process 1, products AXE and BXE are produced in 1:1 ratio. Product AXE than passes on to Process 2 where it is processed into CXE and DXE. Product BXE is used in process 3 to produce the product EXE.
Product AXE yields products CXE and DXE in ratio of 7:3. CXE is processed further in Process 4 after which it is sold for Rs.18 per unit. DXE may be sold immediately at Rs.14.40 per unit or it may be processed further in process 5 after which it can be sold for Rs.20.80 per unit.
Exe is processed in process 6 where normal spoilage of 5% occurs. The spoiled units are disposed of at a price of Rs.2 per unit. EXE sells at Rs.15.20 per unit.
The costs incurred during a period are as under:

Process	Output Units	Costs Rs.
1	1,00,000	5,41,000
2	50,000	1,50,000
3	50,000	1,08,000
4	35,000	1,30,000
5	15,000	1,00,000
6	47,500	97,000

The output of Process 6 represents good units. The process costs are variable costs
(i) Prepare a statement showing the apportionment of joint costs to products AXE and BXE and products CXE and DXE
(ii) State with supporting calculations whether the product DXE should be processed in process 5 or not
(iii) Prepare a statement of profit for the period based on your decision at (ii) above

[Question # 14]

A company produces product, 'A' which is at present being sold at Rs. 7 each; the monthly production is 25,000 units. The company can, as an alternative make product 'F' by using one unit of 'A', as raw material, in each unit of 'F'. Product 'F' can be sold at Rs. 10/- each. The company pays sales commission at 10% on sales value. Capacity to manufacture 'F' is available to the extent of 12,500 units per month without additional capital cost. Taking the following additional information advice whether or not the company should go in for the manufacture of product 'F'.

	'A'	'F'
	Rs.	Rs.
Raw Materials cost	1.50	0.50
Labour & overheads	2.10	1.40

The figures given for 'F' represent expenses incurred in addition to those incurred the manufacture of 'A'. The supervision charges for manufacturing 'F' will be Rs. 4,000 per month extra.

[Question # 15]

X Ltd. is in the Food processing Industry. In one of its processes, three joint products are manufactured. Traditionally, the company has apportioned costs incurred up to the joint products' pre-separation point on the basis of weight of outputs of the product.

You are **required** to prepare statements for management to show;

- The profit or loss of each product as ascertained using weight basis of apportioning pre-separation joint costs.
- The optimal contribution, which could be obtained from the manufacture of these products.

The following process data for December are given. Cost incurred up to separation points are Rs. 96,000:

	Product A	Product B	Product C
Cost incurred after separation point (Rs.)	20,000	12,000	8,000
Selling price per ton of completed Product (Rs.)	500	800	600
Estimated, if sold at separation point (Rs.)	250	700	450
Output (tonne)	100	60	80

The cost of any unused capacity after the separation point should be ignored.

STANDARD COSTING

[Question # 1]

A company manufactures a product in a process production system. There is some wastage in production, and normal loss is 10% of the number of units input to the process. The standard price per unit of direct material is Rs: 4.50 per unit.
What would be the **standard direct material cost per unit** of output:

(a) If an ideal standard is used, and the standard does not provide for any loss in process?

(b) If the standard cost allows for a loss of 10% of input materials in producing each unit of output.

[Question # 2]

A company produces sandwiches. Each sandwich requires two slices of bread and a loaf of bread contains 24 slices. Each loaf of bread costs Rs: 6. it is estimated that currently 20% of bread is wasted. Management would like to reduce this wastage to 10%.
Calculate a standard material cost for a sandwich based on

a) Ideal conditions
b) Current conditions
c) Attainable conditions

[Question # 3]

Brenda and Eddie run The Italian Restaurant selling a variety of pasta dishes each using similar ingredients and taking the same amount of time to prepare. To try to control costs they instigate a standard costing system, deriving the following standard cost per meal.

		$/meal
Ingredients (average value) 400g @ $1.50/kg	=	0.60
Labour 30 mins @ $4/hour	=	2.00
Variable overheads 30 mins @ $1/hour	=	0.50
Fixed overheads 30 mins @ $2.50/hour	=	1.25
		4.35
Standard profit		2.60
Selling price		**6.95**

The overheads are absorbed on the assumption that Brenda and Eddie normally sell 100 pasta meals per day over the year during which they are open for 300 days. During one six day week, the following results are obtained:

Meals sold 630 total revenue	=	$4,500
Ingredients bought: 260 kg for		
used: 240 kg		$380
Hours paid: 300 hrs costing		$1,350
Time lost due to late delivery of ingredients	=	10 hours
Variable overheads		$325
Fixed overheads		$750

Required
Reconcile the budgeted contribution to the actual profit (for one week) using **marginal** costing and suggest possible causes for the variances identified.

[Question # 4]

A company has a process in which three inputs are mixed together to produce Product Pip. The standard mix of inputs to produce 90 kg of Product Pip is shown below:

	$
50 kg of ingredient A at $80 per kg	4,000
30 kg of ingredient J at $100 per kg	3,000
20 kg of ingredient H at $120 per kg	2,400
	9,400

During March 2,000 kg of ingredients were used to produce 1,900 kg of Product Pip. Inputs were as follows:

	$
1,040 kg of ingredient A at $75 per kg	78,000
560 kg of ingredient J at $105 per kg	58,800
400 kg of ingredient H at $125 per kg	50,000
	186,800

Required: Calculate the materials mix and yield variance for June.

[Question # 5]

Sobchak Co uses a system of standard absorption costing and variance analysis to control the costs and revenues in its airline catering business. A standard cost operating statement for one of its divisions for May 2009 is given below. Standard cost operating statement Westside division May 2009

			$
Budgeted profit			12,000
Sales volume profit variance			(1,500) adverse
Standard profit on actual sales			10,500
Sales price variance			1,750 favourable
Cost variances:	favourable	adverse	
	$	$	
Direct ingredients price	2,000		
Direct ingredients usage		1,500	
Direct labour rate		1,850	
Direct labour efficiency		2,000	
Fixed overhead expenditure	1,000		
Fixed overhead capacity		200	
Fixed overhead efficiency		800	
	3,000	6,350	(3,350) adverse
Actual profit			$8,900

Sobchak Co carries no inventory.

Required:

(a) Suggest a possible operational cause for each of any FIVE of the variances given in the standard cost operating statement above. Your answer should identify possible interrelationships between the variances you select.

(b) Below is a standard cost card and actual results for Sobchak Co's Eastside division for May 2009. Standard cost card: Eastside division May 2009

	$ per meal
Selling price	20·00
Direct ingredients (0·5 kg at $6 per kg)	(3·00)
Direct labour (1 hour at $10 per hour)	(10·00)
Fixed overhead (1 direct labour hour at $4 per hour)	(4·00)
Standard profit per meal	**3·00**

Budgeted sales and production for May 2009 were 5,000 meals. Actual results: Eastside division May 2009 (extract)

Actual sales volume	5,200 meals
Actual production	5,200 meals
Actual sales revenue	$98,800
Actual fixed overhead	$19,000

Required:

Calculate the following variances for the Eastside division for May 2009:

(i) the sales volume profit variance;
(ii) the sales price variance;
(iii) the fixed overhead expenditure variance;
(iv) the fixed overhead volume variance.

[Question # 6]

Hill Co is a manufacturing company that uses standard absorption costing and variance analysis to control its costs and revenues. The standard cost card for its single product is given below.

	$
Direct materials: 4 kg at $2·50 per kg	10·00
Direct labour: 2 hours at $12 per hour	24·00
Fixed overhead: 2 hours at $6 per direct labour hour	12·00
Standard cost per unit	**46·00**

In the most recent period, 12,000 units were produced. Budgeted production for the period was 10,000 units. Actual direct materials used cost $140,400 and actual direct labour cost was $345,000 for the 27,600 actual hours worked. Actual fixed overhead incurred was $115,000.

Hill Co's management accountant wishes to reconcile budgeted and actual cost for the period. She has correctly calculated that the direct material price and usage variances were $5,400 adverse and $15,000 adverse respectively, but she has asked you to complete the reconciliation.

Required:

(a) Calculate the following variances for the most recent period:

(i) Direct labour rate variance;
(ii) Direct labour efficiency variance;
(iii) Fixed overhead expenditure variance;
(iv) Fixed overhead capacity variance;
(v) Fixed overhead efficiency variance.

(b) Prepare a statement, in a form that will be useful to Hill Co's management that reconciles budgeted and actual costs for the most recent period.

When asked to explain the direct material variances for the most recent period, Hill Co's production manager argued that the price variances were the purchasing department's responsibility, not his. He also argued that the usage variance was adverse because his department had been instructed by the sales department to make 12,000 units rather than the 10,000 budgeted. This resulted in the use of more material, and once again the variance was not his responsibility.

Required: Explain whether you agree with the production manager's arguments.

[Question # 7]

Santoro Co uses standard absorption costing and variance analysis to control costs. It is currently reviewing the standard cost of its only product. The basic standard cost card is given below.

		Basic Standard $ per unit
Direct labour (0·3 labour hours x $11 per hour)	=	3·30
Direct material (4kg x $0·40 per kg)	=	1·60
Variable overhead (5 machine hours x $3 per hour)	=	15·00
Fixed overhead (5 machine hours x $1·50)	=	7·50
		27·40

The basic standards for the product were established four years ago. The company now wishes to set an *attainable* standard cost for the coming period. The following information is available:

1. Direct labour

Under perfect operating conditions an operator produces 5 units per hour. However under normal efficient operating conditions 15 minutes of every direct labour hour are lost due to the need to clean the work area. Labour should be paid $15 per hour in the coming period if nationally agreed wage rates are adhered to.

2. Material

The relevant material price index for the industry will rise from a level of 105 four years ago to an expected level of 168 in the coming period. The increase is due to changes in world market price. The raw material supplier has offered a quantity discount of 6·25% if Santoro Co is prepared to buy in bulk. Santoro Co has no holding costs associated with storing direct materials. The basic material usage standard is considered appropriate for current operations.

3. Overheads

If Santoro co-operates efficiently in the coming period its overhead will be represented by the following equation:

Y = $500,000 + $3X
where
Y = total overhead for the period
X = machine hours operated in the period.

Efficient operations should result in the use of 400,000 machine hours to make 100,000 units of finished product in the coming period.

Required:
Construct a standard cost card for Santoro Co's only product for the coming period. The standard cost should be set at an attainable level, taking into account, where appropriate, the information given above.

[Question # 8]

S.V. Ltd. manufactures a single product, the standard mix of which is as follows:

Material A	60% at Rs.20 per kg
Material B	40% at Rs.10 per kg

Normal loss in the production is 20% of input. Due to shortage of material A, the standard mix was changed and the actual mix was as follows:

Material A	105 kg at Rs.20 per kg
Material B	95 kg at Rs.9 per kg

Actual loss was 35 kg, while the actual output was 165 kg

Required: Calculate all material variances.

[Question # 9]

Sarhad Industries Limited is a manufacturing company which produces a single product. It operates a standard costing system and the management accountant had calculated the following variances for the month of December 2005:

Rupees	Rupees
Materials	**Labour**
Usage 4,200 (F)	Efficiency 10,780 (A)
Price 9,520 (A)	Rate 4,200 (F)
Variable overhead	**Fixed overhead**
Total 540 (A)	Volume 8,220 (F)
	Expenditure 2,620 (A)

The following additional information is available:
1. Price paid for raw material was Re. 0.40 per kg more than the standard price.
2. Closing stock of raw material was 200 kgs more than the opening stock.
3. Actual wage rate paid during the month was Rs. 3.40 per hour.
4. All overheads are absorbed into production costs on the basis of standard hours produced using the following rates:
   - Fixed overheads Rs. 5.00 per standard hour
   - Variable overheads Rs. 0.50 per standard hour
5. There was no opening or closing work-in-progress.
6. The following actual costs for December 2005 have been incurred:

	Rupees
Materials used	199,920
Wages incurred	142,800
Variable overheads	20,000
Fixed overheads	189,000

7. Actual production of finished goods during December 2005 was 4,865 units.

Required: Prepare a standard cost sheet.

[Question # 10]

C Ltd manufactures a single product. During the month of November 2011, it produced and sold 5,120 kgs. The costs incurred during the month are as follows:

Materials	Kg.	Price per kg. (Rs.)	Total (Rs.)
A	2,400	7.70	18,480
B	2,000	25.60	51,200
C	1,150	62.40	71,760
	5,550		141,440

Labour	Hours	Rate per hour (Rs.)	Total (Rs.)
Department X	500	52	26,000
Department Y	360	40	14,400
			40,400

Standard costs per batch as determined by the Technical Department are given below:

Materials	Kg	Price perKg (Rs.)	Total (Rs.)
A	17.0	6	102
B	11.5	26	299
C	8.5	60	510
	37		911
Less: standard loss	(1)		
Standard yield	36		

Labour	Hours	Rate per hour (Rs.)	Total (Rs.)
Department X	4	50	200
Department Y	2	36	72
			272

There was no opening or closing stocks.

Required: [use two decimal for material kgs and labour hours]

(a) Calculate the material price, usage, mix and yield variances

(b) Calculate the labour cost, efficiency and rate variances for each of the production departments.

[Question # 11]

Simply Soup Limited manufactures and sells soups in a JIT environment. Soup is made in a manufacturing process by mixing liquidised vegetables, melted butter and stock (stock in this context is a liquid used in making soups). They operate a standard costing and variances system to control its manufacturing processes. At the beginning of the current financial year they employed a new production manager to oversee the manufacturing process and to work alongside the purchasing manager. The production manager will be rewarded by a salary and a bonus based on the directly attributable variances involved in the manufacturing process. After three months of work there is doubt about the performance of the new production manager. On the one hand, the cost variances look on the whole favourable, but the sales director has indicated that sales are significantly down and the overall profitability is decreasing.

The table below shows the variance analysis results for the first three months of the manager's work.

Table: 1

F = Favourable. A = Adverse

	Month: 1	Month: 2	Month: 3
Material Price Variance	$300 (F)	$900 (A)	$2,200 (A)
Material Mix Variance	$1,800 (F)	$2,253 (F)	$2,800 (F)
Material Yield Variance	$2,126 (F)	$5,844 (F)	$9,752 (F)
Total Variance	$4,226 (F)	$7,197 (F)	$10,352 (F)

The actual level of activity was broadly the same in each month and the standard monthly material total cost was approximately $145,000.

The standard cost card is as follows for the period under review.

	$
0.90 litres of liquidised vegetables @ $0.80/ltr	0.72
0.05 litres of melted butter @$4/ltr	0.20
1.10 litres of stock @ $0.50/ltr	0.55
Total cost to produce 1 litre of soup	1.47

Required:

(a) Using the information in table 1:

(i) Explain the meaning of each type of variances above (price, mix and yield but excluding the total variance) and briefly discuss to what extent each type of variance is controllable by the production manager.
(ii) Evaluate the performance of the production manager considering both the cost variance results above and the sales director's comments.
(iii) Outline two suggestions how the performance management system might be changed to better reflect the performance of the production manager.

(b) The board has asked that the variances be calculated for Month 4. In Month 4 the production department data is as follows:

Actual results for Month 4

Liquidised vegetables:	Bought	82,000 litres	costing : $69,700
Melted butter:	Bought	4,900 litres	costing : $21,070
Stock:	Bought	122,000 litres	costing : $58,560

Actual production was 112,000 litres of soup

Required:
Calculate the material price, mix and yield variances for Month 4. You are not required to comment on the performance that the calculations imply. Round variances to the nearest $.

[Question # 12]

Spike Co manufactures and sells good quality leather bound diaries. Each year it budgets for its profits, including detailed budgets for sales, materials and labour. If appropriate, the departmental managers are allowed to revise their budgets for planning errors.

In recent months, the managing director has become concerned about the frequency of budget revisions. At a recent board meeting he said 'There seems little point budgeting any more. Every time we have a problem the budgets are revised to leave me looking at a favourable operational variance report and at the same time a lot less profit than promised.'

Required:

(a) Describe the circumstances when a budget revision should be allowed and when it should be refused.

Two specific situations have recently arisen, for which budget revisions were sought:

Materials

A local material supplier was forced into liquidation. Spike Co's buyer managed to find another supplier, 150 miles away at short notice. This second supplier charged more for the material and a supplementary delivery charge on top. The buyer agreed to both the price and the delivery charge without negotiation. 'I had no choice', the buyer said, 'the production manager was pushing me very hard to find any solution possible!' Two months later, another, more competitive, local supplier was found. A budget revision is being sought for the two months where higher prices had to be paid.

Labour

During the early part of the year, problems had been experienced with the quality of work being produced by the support staff in the labour force. The departmental manager had complained in his board report that his team were 'unreliable, inflexible and just not up to the job'. It was therefore decided, after discussion of the board report that something had to be done. The company changed its policy so as to recruit only top graduates from good quality universities. This has had the effect of pushing up the costs involved but increasing productivity in relation to that element of the labour force. The support staff departmental manager has requested a budget revision to cover the extra costs involved following the change of policy.

Required:

(b) Discuss each request for a budget revision, putting what you see as both sides of the argument and reach a conclusion as to whether a budget revision should be allowed.

The market for leather bound diaries has been shrinking as the electronic versions become more widely available and easier to use. Spike Co has produced the following data relating to leather bound diary sales for the year to date:

	Budget
Sales volume	180,000 units
Sales price	$17·00 per unit
Standard contribution	$7·00 per unit

The total market for diaries in this period was estimated in the budget to be 1·8m units. In fact, the actual total market shrank to 1·6m units for the period under review.

Actual results for the same period

Sales volume	176,000 units
Sales price	$16·40 per unit

Required:

(c) Calculate the total sales price and total sales volume variance.
(d) Analyze the total sales volume variance into components for market size and market share.
(e) Comment on the sales performance of the business.

[Question # 13]

Chaff Co processes and sells brown rice. It buys unprocessed rice seeds and then, using a relatively simple process, removes the outer husk of the rice to produce the brown rice. This means that there is substantial loss of weight in the process. The market for the purchase of seeds and the sales of brown rice has been, and is expected to be, stable.

Chaff Co uses a variance analysis system to monitor its performance. There has been some concern about the interpretation of the variances that have been calculated in month 1.

1. The purchasing manager is adamant, despite criticism from the production director, that he has purchased wisely and saved the company thousands of dollars in purchase costs by buying the required quantity of cheaper seeds from a new supplier.
2. The production director is upset at being criticised for increasing the wage rates for month 1; he feels the decision was the right one, considering all the implications of the increase. Morale was poor and he felt he had to do something about it.
3. The maintenance manager feels that saving $8,000 on fixed overhead has helped the profitability of the business. He argues that the machines' annual maintenance can wait for another month without a problem as the machines have been running well.

The variances for month 1 are as follows:

	$
Material price	48,000 (Fav)
Material usage	52,000 (Adv)
Labour rate	15,000 (Adv)
Labour efficiency	18,000 (Fav)
Labour idle time	12,000 (Fav)

Variable overhead expenditure	18,000 (Adv)
Variable overhead efficiency	30,000 (Fav)
Fixed overhead expenditure	8,000 (Fav)
Sales price	85,000 (Adv)
Sales volume	21,000 (Adv)

Fav = Favourable, Adv = Adverse

Chaff Co uses labour hours to absorb the variable overhead.

Required:

(a) Comment on the performance of the purchasing manager, the production director and the maintenance manager using the variances and other information above and reach a conclusion as to whether or not they have each performed well.

In month 2 the following data applies:

Standard costs for 1 tonne of brown rice

– 1·4 tonnes of rice seeds are needed at a cost of $60 per tonne
– It takes 2 labour hours of work to produce 1 tonne of brown rice and labour is normally paid $18 per hour. Idle time is expected to be 10% of hours paid; this is not reflected in the rate of $18 above.
– 2 hours of variable overhead at a cost of $30 per hour
– The standard selling price is $240 per tonne
– The standard contribution per tonne is $56 per tonne

Budget information for month 2 is

– Fixed costs were budgeted at $210,000 for the month
– Budgeted production and sales were 8,400 tonnes

The actual results for month 2 were as follows:

Actual production and sales were 8,000 tonnes
– 12,000 tonnes of rice seeds were bought and used, costing $660,000
– 15,800 labour hours were paid for, costing $303,360
– 15,000 labour hours were worked
– Variable production overhead cost $480,000
– Fixed costs were $200,000
– Sales revenue achieved was $1,800,000

Required:

(b) Calculate the variances for month 2 in as much detail as the information allows and reconcile the budget profit to the actual profit using marginal costing principles. You are not required to comment on the performance of the business or its managers for their performance in month 2.

[Question # 14]

Secure Net (SN) manufacture security cards that restrict access to government owned buildings around the world. The standard cost for the plastic that goes into making a card is $4 per kg and each card uses 40g of plastic after an allowance for waste. In November 100,000 cards were produced and sold by SN and this was well above the budgeted sales of 60,000 cards.

The actual cost of the plastic was $5·25 per kg and the production manager (who is responsible for all buying and production issues) were asked to explain the increase. He said 'World oil price increases pushed up plastic prices by 20% compared to our budget and I also decided to use a different supplier who promised better quality and increased reliability for a slightly higher price. I know we have overspent but not all the increase in plastic prices is my fault'

The actual usage of plastic per card was 35g per card and again the production manager had an explanation. He said 'The world-wide standard size for security cards increased by 5% due to a change in the card reader technology, however, our new supplier provided much better quality of plastic and this helped to cut down on the waste.'

SN operates a just in time (JIT) system and hence carries very little inventory.

Required:

(a) Calculate the total material price and total material usage variances ignoring any possible planning error in the figures.
(b) Analyse the above total variances into component parts for planning and operational variances in as much detail as the information allows.
(c) Assess the performance of the production manager.

[Question # 15]

Crumbly Cakes make cakes, which are sold directly to the public. The new production manager (a celebrity chef) has argued that the business should use only organic ingredients in its cake production. Organic ingredients are more expensive but should produce a product with an improved flavour and give health benefits for the customers. It was hoped that this would stimulate demand and enable an immediate price increase for the cakes. Crumbly Cakes operates a responsibility based standard costing system which allocates variances to specific individuals. The individual managers are paid a bonus only when net favourable variances are allocated to them.

The new organic cake production approach was adopted at the start of March 2009, following a decision by the new production manager. No change was made at that time to the standard costs card. The variance reports for February and March are shown below (Fav = Favourable and Adv = Adverse)

Manager responsible	Allocated variances	February Variance $	March Variance $
Production manager			
	Material price (total for all ingredients)	25 Fav	2,100 Adv
	Material mix	0	600 Adv
	Material yield	20 Fav	400 Fav

Sales manager

Sales price	40 Adv	7,000 Fav
Sales contribution volume	35 Adv	3,000 Fav

The production manager is upset that he seems to have lost all hope of a bonus under the new system. The sales manager thinks the new organic cakes are excellent and is very pleased with the progress made. Crumbly Cakes operate a JIT stock system and holds virtually no inventory.

Required:

(a) Assess the performance of the production manager and the sales manager and indicate whether the current bonus scheme is fair to those concerned.

In April 2009 the following data applied:

Standard cost card for one cake (not adjusted for the organic ingredient change)

Ingredients	Kg	$
Flour	0·10	0·12 per kg
Eggs	0·10	0·70 per kg
Butter	0·10	1·70 per kg
Sugar	0·10	0·50 per kg
Total input	0·40	
Normal loss (10%)	(0·04)	
Standard weight of a cake	0·36	
Standard sales price of a cake		0·85
Standard contribution per cake after all variable costs		0·35

The budget for production and sales in April was 50,000 cakes. Actual production and sales was 60,000 cakes in the month, during which the following occurred:

Ingredients used	Kg	$
Flour	5,700	$741
Eggs	6,600	$5,610
Butter	6,600	$11,880
Sugar	4,578	$2,747
Total input	23,478	$20,978
Actual loss	(1,878)	
Actual output of cake mixture	21,600	
Actual sales price of a cake		$0·99

All cakes produced must weigh 0·36 kg as this is what is advertised.

Required:

(b) Calculate the material price, mix and yield variances and the sales price and sales contribution volume variances for April. You are not required to make any comment on the performance of the managers.

[Question # 16]

Carad Co is an electronics company which makes two types of televisions – plasma screen TVs and LCD TVs. It operates within a highly competitive market and is constantly under pressure to reduce prices. Carad Co operates a standard costing system and performs a detailed variance analysis of both products on a monthly basis. Extracts from the management information for the month of November are shown below:

		Note
Total number of units made and sold	1,400	1
Material price variance	$28,000 A	2
Total labour variance	$6,050 A	3

Notes

(1) The budgeted total sales volume for TVs was 1,180 units, consisting of an equal mix of plasma screen TVs and LCD screen TVs. Actual sales volume was 750 plasma TVs and 650 LCD TVs. Standard sales prices are $350 per unit for the plasma TVs and $300 per unit for the LCD TVs. The actual sales prices achieved during November were $330 per unit for plasma TVs and $290 per unit for LCD TVs. The standard contributions for plasma TVs and LCD TVs are $190 and $180 per unit respectively.

(2) The sole reason for this variance was an increase in the purchase price of one of its key components, X. Each plasma TV made and each LCD TV made requires one unit of component X, for which Carad Co's standard cost is $60 per unit. Due to a shortage of components in the market place, the market price for November went up to $85 per unit for X. Carad Co actually paid $80 per unit for it.

(3) Each plasma TV uses 2 standard hours of labour and each LCD TV uses 1·5 standard hours of labour. The standard cost for labour is $14 per hour and this also reflects the actual cost per labour hour for the company's permanent staff in November. However, because of the increase in sales and production volumes in November, the company also had to use additional temporary labour at the higher cost of $18 per hour. The total capacity of Carad's permanent workforce is 2,200 hours production per month, assuming full efficiency. In the month of November, the permanent workforce were wholly efficient, taking exactly 2 hours to complete each plasma TV and exactly 1·5 hours to produce each LCD TV. The total labour variance therefore relates solely to the temporary workers, who took twice as long as the permanent workers to complete their production.

Required:

(a) Calculate the following for the month of November, showing all workings clearly:

(i) The sales price variance and sales volume contribution variance;

(ii) The material price planning variance and material price operational variance;

(iii) The labour rate variance and the labour efficiency variance.

(b) Explain the reasons why Carad Co would be interested in the material price planning variance and the material price operational variance.

[Question # 17]

Choc Co is a company which manufactures and sells three types of biscuits in packets. One of them is called 'Ooze' and contains three types of sweeteners: honey, sugar and syrup. The standard materials usage and cost for one unit of 'Ooze' (one packet) is as follows:

	$
Honey (20 grams at $0·02 per gram)	0·40
Sugar (15 grams at $0·03 per gram)	0·45
Syrup (10 grams at $0·025 per gram)	0·25
	1·10

In the three months ended 30 November 2011, Choc Co produced 101,000 units of 'Ooze' using 2,200 kg of honey, 1,400 kg of sugar and 1,050 kg of syrup. Note: there are 1,000 grams in a kilogram (kg).
Choc Co has used activity-based costing to allocate its overheads for a number of years. One of its main overheads is machine set-up costs. In the three months ended 30 November 2011, the following information was available in relation to set-up costs:

Budget	
Total number of units produced	264,000
Total number of set ups	330
Total set-up costs	$52,800
Actual	
Total number of units produced	320,000
Total number of set ups	360
Total set-up costs	$60,000

Required:

(a) Calculate the following variances for materials in Ooze:

(i) Total materials usage variance;

(ii) Total materials mix variance;

(iii) Total materials quantity (yield) variance.

(b) Calculate the following activity-based variances in relation to the set-up cost of the machines:

(i) The expenditure variance;

(ii) The efficiency variance.

[Question # 18]

The following data relates to actual output, actual costs and variances for the fourweekly accounting period number 4 of a company which makes only one product. The value of work-in-progress at the end of period 4 was the same as the value of work-in-progress at the beginning of the month.

Actual production of Product XY 18,000 units

Actual costs incurred:	**$000**
Direct materials purchased and used (150,000 kg)	210
Direct labour costs (32,000 hours)	136
Variable production overhead	38

Variances:	$000
Direct materials price	15 Favourable
Direct materials usage	9 Adverse
Direct labour rate	8 Adverse
Direct labour efficiency	16 Favourable
Variable production overhead - expenditure	6 Adverse
Variable production overhead - efficiency	4 Favourable

Variable production overhead varies with labour hours worked.
A standard marginal costing system is operated.

Required: Present a standard product cost sheet for one unit of Product XY, showing how the standard marginal production cost of the product is made up.

[Question # 19]

SK Limited makes and sells a single product 'Jay' for which the standard cost is as follows:

	£ per unit
Direct materials (4 kilograms at £12.00 per kg)	48.00
Direct labour (5 hours at £7.00 per hour)	35.00
Variable production overhead (5 hours at £2.00 per hour)	10.00
Fixed production overhead (5 hours at £10.00 per hour)	50.00
	143.00

The variable production overhead is deemed to vary with the hours worked. Overhead is absorbed into production on the basis of standard hours of production and the normal volume of production for the period just ended was 20 000 units (100 000 standard hours of production). For the period under consideration, the actual results were:

Production of 'Jay'	**18 000 Units (£)**
Direct material used -- 76 000 kg at a cost of	836 000
Direct labour cost incurred – for 84 000 hours worked	604 800
Variable production overhead incurred	172 000
Fixed production overhead incurred	1 030 000

You are required

(a) To calculate and show, by element of cost, the standard cost for the output for the period;
(b) To calculate and list the relevant variances in a way which reconciles the standard cost with the actual cost (*Note*: Fixed production overhead sub-variances of capacity and volume efficiency (productivity) are *not* required);
(c) To comment briefly on the usefulness to management of statements such as that given in your answer to (b) above.

[Question # 20]

JK plc operates a chain of fast-food restaurants. The company uses a standard marginal costing system to monitor the costs incurred in its outlets. The standard cost 0of one of its most popular meals is as follows:

		£ per meal
Ingredients	(1.08 units)	1.18
Labour	(1.5 minutes)	0.15
Variable conversion costs	(1.5 minutes)	0.06
The standard selling price of this meal is		**1.99**

In one of its outlets, which has budgeted sales and production activity level of 50 000 such meals, the number of such meals that were produced and sold during April 2003 was 49 700. The actual cost data was as follows:

		£
Ingredients	(55 000 units)	58 450
Labour	(1 200 hours)	6 800
Variable conversion costs	(1 200 hours)	3 250
The actual revenue from the sale of the meals was		96 480

Required:

(a) Calculate:

(i) The total budgeted contribution for April 2003;

(ii) The total actual contribution for April 2003.

(b) Present a statement that reconciles the budgeted and actual contribution for April 2003. Show all variances to the nearest £1 and in as much detail as possible.

[Question # 21]

A company manufactures two components in one of its factories. Material A is one of several materials used in the manufacture of both components. The standard direct labour hours per unit of production and budgeted production quantities for a 13-week period were:

		Standard direct labour hours	Budgeted production quantities
Component	X	0.40 hours	36 000 units
Component	Y	0.56 hours	22 000 units

The standard wage rate for all direct workers was £5.00 per hour. Throughout the 13-week period 53 direct workers were employed, working a standard 40-hour week. The following actual information for the 13-week period is available:

Production:		
Component	X,	35 000 units
Component	Y,	25 000 units
Direct wages paid,		£138 500
Material A purchases,	(47 000 kilos costing)	£85 110
Material A price variance,		£430 F
Material A usage	(component X),	33 426 kilos
Material A usage variance	(component X),	£320.32 A

Required:

(a) Calculate the direct labour variances for the period;

(b) Calculate the standard purchase price for material A for the period and the standard usage of material A per unit of production of component X.

[Question # 22]

You have been provided with the following data for S plc for September:

Accounting method:	**Absorption**	**Marginal**
Variances:	**(£)**	**(£)**
Selling price	1900 (A)	1900 (A)
Sales volume	4500 (A)	7500 (A)
Fixed overhead expenditure	2500 (F)	2500 (F)
Fixed overhead volume	1800 (A)	n/a

During September production and sales volumes were as follows:

	Sales	**Production**
Budget	10 000	10 000
Actual	9 500	9 700

Required:

(a) Calculate:

(i) the standard contribution per unit;

(ii) the standard profit per unit;

(iii) the actual fixed overhead cost total.

(b) Using the information presented above, explain why different variances are calculated depending upon the choice of marginal or absorption costing.

[Question # 23]

JC Limited produces and sells one product only, Product J, the standard cost for which is as follows for one unit.

	(£)
Direct material X – 10 kilograms at	£20200
Direct material Y – 5 litres at	£630
Direct wages – 5 hours at	£630
Fixed production overhead	50
Total standard cost	310
Standard gross profit	90
Standard selling price	**400**

The fixed production overhead is based on an expected annual output of 10 800 units produced at an even flow throughout the year; assume each calendar month is equal. Fixed production overhead is absorbed on direct labour hours. During April, the first month of the financial year, the following were the actual results for an actual production of 800 units.

				(£)
Sales on credit:	(800 units at £400)			320 000
Direct materials:				
	X	7800 kilogrammes	159 900	
	Y	4300 litres	23 650	
Direct wages:	4200 hours		24 150	
Fixed production overhead			47 000	
				254 700
Gross profit				**65 300**

The material price variance is extracted at the time of receipt and the raw materials stores control is maintained at standard prices. The purchases, bought on credit, during the month of April were:

X 9000 kilograms at £20.50 per kg from K Limited
Y 5000 litres at £5.50 per litre from C plc.

- Assume no opening stocks.
- Wages owing for March brought forward were £6000.
- Wages paid during April (net) £20 150.
- Deductions from wages owing to the Inland Revenue for PAYE and NI were £5000 and the wages accrued for April were £5000.
- The fixed production overhead of £47 000 was made up of expense creditors of £33 000, none of which was paid in April, and depreciation of £14 000.
- The company operates an integrated accounting system.

You are **required** to

(a) **(i)** calculate price and usage variances for each material,
(ii) Calculate labour rate and efficiency variances,
(iii) Calculate fixed production overhead expenditure, efficiency and volume variances;
(b) show all the accounting entries in T accounts for the month of April – the work-in-progress account should be maintained at standard cost and each balance on the separate variance accounts is to be transferred to a Profit and Loss Account which you are also required to show;
(c) Explain the reason for the difference between the actual gross profit given in the question and the profit shown in your profit and loss account

[Question # 24]

The information of ABC Company for the month of April, 2010 is summarized below relating to the performance of one of its products:

	(Rs.)
Budgeted profit	34,000
Sales volume variance (UF)	(6,800)
Standard profit on actual sales	27,200
Selling price variance (UF)	32,000

The budgeted data and cost variances for the same month are as under:

Budgeted Information	Rs.	Cost variances	Fav	Unfav
			Rs.	Rs.
Sales (1500 units)	160000	Material price variance		80000
Material cost (purchases and consumption 750 Kgs.)	36000	Material usage variance		1200
Labour cost (1,125 Hours)	36000	Labour rate variance		1600
Variable overhead cost	18000	Labour efficiency variance		1200
Fixed overhead cost	36000	Variable OH expenditure variance		4800
Budgeted production volume units	1500	Variable OH efficiency variance		600
		Fixed OH efficiency variance	20000	
		Fixed OH volume variance	1200	

Additional information:

1. Inventories of material and finished goods are valued at standard cost.
2. Production during the month was 1,550 units.
3. Sales for the month of April were Rs.96,000.
4. Material purchased during the month was 1,000 Kgs.

Required:

(a) What does fixed overhead volume variance indicate? 02

(b) Calculate actual figures of the following:

1. Sales volume
2. Quantity of material consumed
3. Material cost
4. Labour hours
5. Labour cost
6. Variable overhead cost
7. Fixed overhead cost

[Question # 25]

A Management Accountant collected following information from the budget and cost accounting record of XY & Z Enterprises for the quarter ended March 31, 2010:

	Master Budget			Actual Budget		
	Product A	Product B	Total	Product A	Product B	Total
Sales in units	40000	50000	90000	37500	58000	95500
						Rs (In Millions)
Sales	30	25	55	26250	26100	52350
Variables Costs:						
Factory overhead	12	10	22	13125	8700	21825
Administrative overhead	4	3	7	3750	4350	8100

Budgeted/ actual fixed factory overheads are Rs.7 million and administrative overheads are Rs.4 million. The management requires discussing the results and comparison in Management Committee Meeting.

Required:

(a) Prepare the following:

I. Flexible budgeted income statement based on actual sales units for each product and total for the company.

II. Income statement under marginal costing showing variances in following columns for the company as a whole:

Master Budget	Flexible Budget	Actual	Volume and Mix Variances	Price and Overhead variances

(b) Calculate the following variances:

I. Sales price variance for each product.

II. Sales volume and sales mix variance for the company.

BREAKEVEN POINT

[Question # 1]

A Company budgets for a production of 150000 units. The variable cost per unit is Rs.14 and fixed cost per unit is Rs.2 per unit. The company fixes the selling price to fetch a profit of 15% on cost.

Required:

A] What is the break- even point?
B] What is the profit/volume ratio?
C] If the selling price is reduced by 5%, how does the revised selling price affects the Break Even Point and the Profit/Volume Ratio?
D] If profit increase of 10% is desired more than the budget, what should be the sales at the reduced price?

[Question # 2]

- Selling price per ton Rs.69.50
- Variable cost per ton Rs.35.50
- Fixed Cost Rs.18.02 lakhs

If this volume represents 40% capacity, **what is the additional profit** for an added production of 40% capacity, the selling price of which is 10% lower for 20% production and 15% lower than the existing price, for the other 20% capacity?

[Question # 3]

A retail dealer in garments is currently selling 24, 000 shirts annually. He supplies the following details for the year ended 31st March 2007.

Selling price per shirt	:	Rs.800
Variable cost per shirt	:	Rs.600
Fixed Cost:		
Staff salaries	:	Rs.2, 400, 000
General Office Cost	:	Rs.800, 000
Advertising Cost	:	Rs.800, 000

As a Cost Accountant, you are **required** to answer the following each part independently:

1. Calculate Break Even Point and margin of safety in sales revenue and number of shirts sold.
2. Assume that 30, 000 shirts were sold during the year, find out the net profit of the firm.
3. Assuming that in the coming year, an additional staff salary of Rs.10, 00, 000 is anticipated, and price of shirt is likely to be increased by 15%, what should be the breakeven point in number of shirts and sales?

[Question # 4]

ABC Ltd. maintains a margin of safety of 37.5% with an overall contribution to sales ratio of 40%. Its fixed costs amount to Rs.5, 00,000. **Calculate** the following:

1. Break Even Sales
2. Total Sales
3. Total Variable Sales
4. Current Profits
5. New 'Margin of Safety' if the sales volume is increased by 7.5%

[Question # 5]

A company manufactures a single product with a capacity of 1 50 000 units per annum. The summarized profitability statement for a year is as under:

Particulars	Amount	Amount
	Rs.	Rs.
Sales: 1 00 000 units @ Rs.15 per unit		1, 500,000
Less: Cost of Sales		
Direct materials	300,000	
Direct labor	200,000	
Production overheads – variable	60,000	
Production overheads – fixed	3,00,000	
Administrative overheads – fixed	150,000	
Selling and distribution overheads – variable	90, 000	
Selling and distribution overheads – fixed	150,000	
Total cost of sales		(1, 250,000)
Profit		**250,000**

You are **required** to evaluate the following options:

1) What will be the amount of sales required to earn a target profit of 25% on sales, if the packing is improved at a cost of Re.1 per unit?

2) There is an offer from a large retailer for purchasing 30, 000 units per annum subject to providing a packing with a different brand name at a cost of Rs.2 per unit. However, in this case there will be no selling and distribution expenses. Also this will not in any way affect the company's existing business. What will be the breakeven price for this additional offer?

3) If an expenditure of Rs.300, 000 is made on advertising, the sales would increase from the present level of 100000 units to 120000 units at a price of Rs.18 per unit. Will that expenditure be justified?

4) If the selling price is reduced by Rs.2 per unit, there will be 100% capacity utilization. Will the reduction in selling price be justified?

[Question # 6]

A company produces 30, 000 units of product A and 20, 000 units of product B per annum. The sales value and costs of the two products are as follows:

Sales value	Rs.760, 000,
Factory overheads	Rs.190, 000,
Direct material	Rs.140, 000,
Administrative and selling overheads	Rs.120, 000,
Direct labor	Rs190, 000

- 50% of the factory overheads are variable and 50% of the administrative and selling overheads are fixed.
- The selling price of A is Rs.12 per unit and Rs.20 per unit for B.
- The direct material and labor ratio for product A is 2:3 and for B is 4:5.
- For both the products, the selling price is 400% of direct labor.
- The factory overheads are charged in the ratio of direct labor and administrative and selling overheads are recovered at a flat rate of Rs.2 per unit for A and Rs.3 per unit for B.
- Due to fall in demand, of the above products, the company has a plan to diversify and make product C using 40% capacity. It has been estimated that for C direct material and direct labor will be Rs.2.50 and Rs.3 per unit respectively. Other variable costs will be the same as applicable to the product A. The selling price of product C is Rs.14 per unit and production will be 30 000 units.

Assuming 60% capacity is used for manufacture of A and B, **calculate**,

I] Present cost and profit
II] Cost and profit after diversification
III] Give your recommendations as to whether to diversify or not.

[Question # 7]

A company sells its products at Rs.15 per unit. In a period, if it produces and sells 8000 units, it incurs a loss of Rs.5 per unit. If the volume is raised to 20 000 units, it earns a profit of Rs.4 per unit.
Calculate Break Even Point both in terms of rupees as well as units.

[Question # 8]

A Company has two Plants at Locations I and II, operating at 100% and 75% of their capacities respectively. The company is considering a proposal to merge the two plants at one location to optimize available capacity. The following details are available in respect of the two plants, regarding their present performance/operation.

Particulars	Location I	Location II
Sales [Rs.in lakhs]	200	75
Variable Costs [Rs. in lakhs]	140	54
Fixed Cost [Rs. in lakhs]	30	14

For decision-making purposes, you are **required** to work out the following information,

I. The capacity at which the merged plan will break even.
II. The profit of the merged plant working at 80% capacity
III. Sales required if the merged plant is required to earn an overall profit of Rs.2,200,000

[Question # 9]

A factory engaged in manufacturing plastic buckets is working to 40% capacity and produces 10, 000 buckets per annum. The present cost break up for one bucket is as under,

Material	Rs.10
Labour	Rs.3
Overheads	Rs.5 [60% fixed]

The selling price is Rs.20 per bucket.

If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the price of material. You are **required** to calculate the profit at 50% and 90% capacities and also show break even points for the same capacity production.

[Question # 10]

A company sells two products, J & K. The sales mix is 4 units of J & 3 units of K. The contribution margins per unit are Rs: 40 for J & Rs: 20 for K. Fixed costs are Rs: 616,000 per month. **Compute** breakeven point.

[Question # 11]

A company manufactures and markets a single product. The company's trading results for the year just ending 20X0 are expected to be:

	Rs	**Rs**
Sales		1,476,461
Direct Materials	492,326	
Direct Labour	316,764	
Overheads	452,318	(1,261,408)
Profit		**215,053**

For the year ahead (20X1), it is planned to reduce the selling price of the product by 5%. Units sold are estimated to increase by 40%. Direct materials cost inflation is expected to be 5% in the year 20X1 and a 5% increase in the hourly wage rate will be payable to the direct labour force for the whole year.

Overhead expenditure in the year prior to 20X0 was 418,232. Production and sales volumes in the year 20X0 have been 12% higher than in the previous year. The high-low method is to be used to estimate the overhead expenditure for the year ahead. Overhead cost inflation is expected to be 6% in the year 20X1.

Required:

a) Prepare a statement showing the trading results for the year 20X1.
b) Calculate the break-even points for each of the two years i.e 20X0 and 20X1.

[Question # 12]

Domco makes and sells a single product, Product P. It is currently producing 112,000 units per month, and is operating at 80% of full capacity. Total monthly costs at the current level of capacity are $611,000. At 100% capacity, total monthly costs would be $695,000. Fixed costs would be the same per month at all levels of capacity between 85% and 100%. At the normal selling price for Product P, the contribution/sales ratio is 60%. A new customer has offered to buy 25,000 units of Product P each month, at 20% below the normal selling price. Domco estimates that for every five units that it sells to this customer, it will lose one unit of its current monthly sales to other customers.

Required

(a) Calculate the variable cost per unit of Product P and total fixed costs per month.
(b) Calculate the current normal sales price per unit, and the contribution per unit at this price.
(c) Calculate the effect on total profit each month of accepting the new customer's offer, and selling 25,000 units per month to this customer. Recommend whether the customer's offer should be accepted.

[Question # 13]

A company makes and sells a single product. The following data relates to the current year's budget.

Sales and production (units)	:	8,000
Variable cost per unit	:	$20
Fixed cost per unit	:	$25
Contribution/sales ratio	:	60%

The selling price next year will be 6% higher than the price in the current year budget and the variable cost per unit will be 5% higher than in the current year budget. Budgeted fixed costs next year will be 10% higher than budgeted fixed costs in the current year.

Required

(a) For the current year, calculate:
(i) The budgeted contribution per unit
(ii) The budgeted total profit
(b) For next year, calculate the number of units that will have to be sold in order to achieve a total profit that is equal to the budgeted profit in the current year.

[Question # 14]

A company has estimated that if it operates at 80% capacity, it will achieve the following results:

	$
Sales	800,000
Total production cost of sales	(300,000)
	500,000
Other costs (in total)	(400,000)
Profit	100,000

It has been estimated that at this activity level, 60% of production costs and 70% of other costs are fixed, and the rest are variable. **What is the expected profit** at a 90% capacity level?

[Question # 15]

A company makes and sells a product that has a variable cost of $12 per unit and a contribution/sales ratio of 25%. At a volume of 30,000 units of sales, total profit would be $25,000. **What are the fixed costs for the period?**

[Question # 16]

A company produces and sells two products with the following costs:

	Product X	Product Y
Variable costs (per £ of sales)	£0.45	£0.6
Fixed costs (per period)	£1 212 000	£1 212 000

Total sales revenue is currently generated by the two products in the following proportions:

Product - X	70%
Product - Y	30%

Required:

(a) Calculate the break-even sales revenue per period, based on the sales mix assumed above.
(b) Prepare a profit–volume chart of the above situation for sales revenue up to £4 000 000. Show on the same chart the effect of a change in the sales mix to product X 50%, product Y 50%. Clearly indicate on the chart the break-even point for each situation.
(c) Of the fixed costs £455 000 are attributable to product X. Calculate the sales revenue required on product X in order to recover the attributable fixed costs and provide a net contribution of £700 000 towards general fixed costs and profit.

[Question # 17]

M Ltd manufactures three products which have the following revenue and costs

	(£ per unit)		
Product	**1**	**2**	**3**
Selling price	2.92	1.35	2.83
Variable costs	1.61	0.72	0.96
Fixed costs:			
Product-specific	0.49	0.35	0.62
General	0.46	0.46	0.46

Unit fixed costs are based upon the following annual sales and production volumes

	(Thousand units)		
Product	**1**	**2**	**3**
	98.2	42.1	111.8

Required:

(a) Calculate:

(i) The break-even point sales (to the nearest £ hundred) of M Ltd based on the current product mix;

(ii) The number of units of Product 2 (to the nearest hundred) at the breakeven point determined in (i) above;

(b) Comment upon the viability of Product 2.

[Question # 18]

Fosterjohn Press Ltd is considering launching a new monthly magazine at a selling price of £1 per copy. Sales of the magazine are expected to be 500 000 copies per month, but it is possible that the actual sales could differ quite significantly from this estimate.

Two different methods of producing the magazine are being considered and neither would involve any additional capital expenditure. The estimated production costs for each of the two methods of manufacture, together with the additional marketing and distribution costs of selling the new magazine, are summarised below:

	Method A	Method B
Variable costs	0.55 per copy	0.50 per copy
Specific fixed costs	£80 000 per month	£120 000 per month
Semi-variable costs:		
The following estimates have been obtained:		
350 000 copies	£55 000 per month	£47 500 per month
450 000 copies	£65 000 per month	£52 500 per month
650 000 copies	£85 000 per month	£62 500 per month

It may be assumed that the fixed cost content of the semi-variable costs will remain constant throughout the range of activity shown.

The company currently sells a magazine covering related topics to those that will be included in the new publication and consequently it is anticipated that sales of this existing magazine will be adversely affected. It is estimated that for every ten copies sold of the new publication, sales of the existing magazine will be reduced by one copy.

Sales and cost data of the existing magazine are shown below:

Sales	220 000 copies per month
Selling price	0.85 per copy
Variable costs	0.35 per copy
Specific fixed costs	£80 000 per month

Required:

(a) Calculate, for each production method, the net increase in company profits which will result from the introduction of the new magazine, at each of the following levels of activity:

- 500 000 copies per month
- 400 000 copies per month
- 600 000 copies per month

(b) Calculate, for each production method, the amount by which sales volume of the new magazine could decline from the anticipated 500 000 copies per month, before the company makes no additional profit from the introduction of the new publication.

(c) Briefly identify any conclusions which may be drawn from your calculations.

[Question # 19]

Mr Belle has recently developed a new improved video cassette and shown below is a summary of a report by a firm of management consultants on the sales potential and production costs of the new cassette.

Sales potential: The sales volume is difficult to predict and will vary with the price, but it is reasonable to assume that at a selling price of £10 per cassette, sales would be between 7500 and 10 000 units per month. Alternatively, if the selling price was reduced to £9 per cassette, sales would be between 12 000 and 18 000 units per month.

Production costs: If production is maintained at or below 10 000 units per month, then variable manufacturing costs would be approximately £8.25 per cassette and fixed costs £12 125 per month. However, if production is planned to exceed 10 000 units per month, then variable costs would be reduced to £7.75 per cassette, but the fixed costs would increase to £16 125 per month.

Mr Belle has been charged £2000 for the report by the management consultants and, in addition, he has incurred £3000 development costs on the new cassette. If Mr Belle decides to produce and sell the new cassette it will be necessary for him to use factory premises which he owns, but are leased to a colleague for a rental of £400 per month. Also he will resign from his current post in an electronics firm where he is earning a salary of £1000 per month.

Required:

(a) Identify in the question an example of

(i) an opportunity cost,

(ii) a sunk cost.

(b) Making whatever calculations you consider appropriate, analyse the report from the consultants and advise Mr Belle of the potential profitability of the alternatives shown in the report. Any assumptions considered necessary or matters which may require further investigation or comment should be clearly stated.

[Question # 20]

Razi Company has prepared its projected income statement for the next year, as under:

	Rs.
Sales (10,000 units)	768,000
Variable expenses	441,600
Contribution margin	326,400
Less fixed expenses	268,800
Net income	57,600

The company is evaluating following four independent situations and has asked you to **work out** the impact of each:

(a) If a new marketing method would increase variable expenses (by an unknown amount that you are to determine), increase sales units 10%, decrease fixed costs 5%, and increase net income by 25%, then what would be the company's break-even point in terms of rupees sales

provided that the new marketing method is adopted? Assume that the sales price per unit would not be changed.

(b) Sales units are increased by 30% in the next year but net income increased by 150%, would the performance of manager be better or worse than expected in terms of net income? Assume that there was adequate capacity to meet the increased volume without increasing fixed costs.

(c) Assume variable costs would decrease by 10% per unit due to a change in the quality of direct materials, and sales quantity would decrease by 5% in spite of increasing advertising costs of Rs. 25,000. Should the company make the change in the materials used in production?

(d) If the company hires an additional salesman at a salary of Rs. 51,000, then how much sales must increase in terms of Rupees to maintain the company's current net income?

LABOR

[Question # 1]

Bonus paid under Hasley Plan with 50% of time saved equal bonus paid under Rowan Plan. When this statement will hold true?

[Question # 2]

Time allowed for job is 8 hours. Hourly rate is Rs: 8/-. **Show** bonus earn, total earning & hourly earning under Hasley & Rowan Plan progressively.

[Question # 3]

The management of XYZ Ltd. is worried about the increasing labor turnover in the factory and before analyzing the causes and taking remedial steps; they want to have an idea of the profit foregone as a result of labor turnover during the last year.
Last years sales amounted to Rs.8, 303, 300 and the profit/volume ratio was 20%. The total number of actual hours worked by the direct labor force was 4.45 lakhs. As a result of the delays by the Personnel department in filling vacancies due to labor turnover, 100, 000 potentially productive hours were lost. The actual direct labor hours included 30, 000 hours attributable to training new recruits, out of which, half of the hours were unproductive.
The cost incurred consequent on labor turnover revealed, on analysis the following.

Settlement cost due to leaving:	Rs.43, 820
Recruitment costs:	Rs.26, 740
Selection costs:	Rs.12, 750
Training costs:	Rs.30, 490

Assuming that the potential production lost as a consequence of labor turnover could have been sold at prevailing prices, find the **profit foregone last year** on account of labor turnover.

[Question # 4]

Mr. A is working by employing 10 skilled workers. He is considering the introduction of some incentive scheme – either Halsey Scheme (with 50% bonus) or Rowan Scheme – of wage payment for increasing the labour productivity to cope with the increased demand for the product by 25%. He feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and he has accordingly given this assurance to the workers.
As a result of the assurance, the increase in productivity has been observed as revealed by the following figures for the current month:

1. Hourly rate of wages (guaranteed) Rs. 2.00
2. Average time for producing 1 piece by one worker at the previous performance 2 hours. (This may be taken as time allowed)
3. No. of working days in the month 25
4. No. of working hours per day for each worker 8
5. Actual production during the month 1,250 units

Required:

1. Calculate effective rate of earnings per hour under Halsey Scheme and Rowan Scheme.
2. Calculate the savings to Mr. A in terms of direct labour cost per piece under the schemes.
3. Advise Mr. A about the selection of the scheme to fulfill his assurance.

[Question # 5]

In Amjad Manufacturing Co., the basic wage rate is Rs. 10 per hour and overtime rates are as follows:
Before and after normal working hours: 175% of basic wage rate
Sundays and holidays: 225% of basic wage rate
During the previous year, the following hours were worked:

Normal time	:	1, 00,000 hours
Overtime before and after working hours	:	20,000 hours
Overtime on Sundays and holidays	:	5,000 hours
Total	:	**1, 25,000 hours**

The following hours have been worked on job 'Z':

Normal	1000
Overtime before and after working hrs.	100
Sundays and holidays	25
Total	**1125**

You are **required** to calculate the labour cost chargeable to jobs 'Z' and overhead in each of the following instances:

(a) Where overtime is worked regularly throughout the year as a policy due to the labour shortage.
(b) Where overtime is worked irregularly to meet the requirements of production.
(c) Where overtime is worked at the request of the customer to expedite the job.

[Question # 6]

During October 2007, the following information is obtained from the Personnel Department of a manufacturing company. Labor force at the beginning of the month 1900 and at the end of the month 2100. During the month, 25 people left while 40 persons were discharged. 280 workers were engaged out of which only 30 were appointed in the vacancy created by the number of workers separated and the rest on account of expansion scheme. **Calculate** the labor turnover by different methods.

[Question # 7]

From the following particulars compute the cost of labor turnover per employee

Particulars	Amount	Amount
A. Preventive Cost		
a) Personnel administration	10, 000	
b) Medical services	6, 000	
c) Welfare	30, 000	
d) Pension scheme	40, 000	
Total		86, 000
B. Replacement Cost		

a) Cost of selection and replacement	6, 050	
b) Inefficiency of new labor - extra wages	4, 000	
c) Inefficiency of new labor - overheads	2, 000	
d) Training costs	3, 950	
e) Loss of output	2, 500	
f) Cost of scrap, tool and machine breakdown etc	15, 500	
Total		34, 000
Grand total		**1, 20, 000**

Note: Average employees during the period 1, 000

[Question # 8]

X, Y and Z are three workers working in a manufacturing company and their output during a particular 40 hours week was 96, 111 and 126 units respectively. The guaranteed rate per hour is Rs.10 per hour, low piece rate is Rs.4 per unit, and high piece rate is Rs.6 per unit. High task is 100 units per week. **Compute** the total earnings and labor cost per unit under Taylor, Merrick and Gantt Task Bonus Plan.

[Question # 9]

Two grades of direct labour workers are employed to produce units of Product 1234. There are 40 Grade 1 employees and 20 Grade 2 employees. All employees work a basic week of 40 hours. Grade 1 employees are paid $10 per hour and Grade 2 employees are paid $15 per hour. If employees work any overtime, they are paid at time-and-one-third (a premium of one third over the basic rate). There are also five 'support workers', such as maintenance engineers, who are paid $12 per hour for a basic 40-hour week. During Week 23, the Grade 1 employees and support workers each worked 40 hours, and the Grade 2 employees worked 46 hours. Due to difficulties with some equipment, 250 hours of Grade 1 labour and 100 hours of Grade 2 labour were recorded as idle time in the week. During Week 23, 4,000 units of Product 1234 were manufactured.

Required

(a) Calculate the direct labour costs and the indirect labour costs in Week 23.
(b) Calculate the direct labour cost per unit of Product 1234 in Week 23.

BUDGETING

[Question # 1]

C operates a system of quarterly budgets. Budgets for the next three quarters have been prepared. The figures below reflect the likely cost behaviour of each element of cost. Quarter 4 is being developed based on these budgets and other information available.

Budget for Quarters 1 to 3

	Q1	Q2	Q3
	(000)	(000)	(000)
	Activity		
Sales (units)	18	34	30
Production (units)	20	40	30
Costs	**$'000**	**$'000**	**$'000**
Direct materials	50	100	75
Production labour	180	280	230
Factory overheads (excluding indirect labour)	170	200	185
Administration	30	30	30
Selling and distribution	29	37	35

In the current planning stage for quarter four, flexible budgets are to be developed for low, most likely and high sales volumes (38,000, 44,000 and 50,000 units respectively). The company wishes to have a closing inventory (end of Quarter 4) equal to the opening inventory for Quarter 1. Management will therefore adjust the production levels to fall in line with this policy. Cost structures as for Quarters 1 to 3 will apply to quarter four except for the following.

1. Raw material prices are expected to rise by 10%.
2. Production labour rates will increase by 2½%. Management have declared that all labour rate increases must be matched by increased efficiency, however, so that labour costs (both total fixed and variable per unit) are unaltered.
3. A quarterly bonus payment of 50% of the variable labour cost per unit will apply for all production above 40,000 units.
4. Fixed factory overheads and fixed selling and distribution expenses will rise by 5%.
5. The expected selling price per unit is $18. Inventory is valued at full factory cost of $13 per unit.

This has been established using absorption principles and based on long-run cost and capacity predictions. Small fluctuations in cost prices or volumes will not cause this unit cost to be amended.

Required

(a) Summarise the variable cost per unit and the total fixed cost for each cost heading that will apply to Quarter 4, for production below 40,000 units.

(b) Prepare flexible separate budget profit statements for the three levels of sales.

[Question # 2]

Treehorn produces a single product. The cost card for this product is as follows:

	$ per unit
Direct materials (3kg per unit at $6 per kg)	18
Direct labour (2 hrs per unit $10 per hour)	20
Fixed overhead (2 hrs per unit at $2 per hour)	4
Total cost	42

Notes

1. Treehorn prepares budgets on a quarterly basis. Each quarter consists of 13 weeks, with five working days per week.
2. Selling price is $56 per unit.
3. Treehorn incurs no costs other than those included in the cost card.
4. It is Treehorn's policy to maintain an inventory of finished goods at the end of each quarter equal to five days' demand of the next quarter.
5. Because of its perishable nature it is not possible to hold raw material inventory.
6. Forecast sales units for the next five quarters are:

Quarter: 1	1,950,000 units
Quarter: 2	2,275,000 units
Quarter: 3	3,250,000 units
Quarter: 4	2,275,000 units
Quarter: 5	1,950,000 units

Required:

(a) Produce the following budgets for EACH of the quarters 1, 2, 3 and 4:

(i) A sales budget showing sales volume in units and sales revenue in $;

(ii) A production budget in units, showing opening and closing inventories, sales and production;

(iii) A purchases budget showing purchases in kg and $.

(b) At the beginning of quarter 1 Treehorn's raw material supplier informs them that due to restrictions on the manufacture of the material, the supply to Treehorn will be restricted to 6,600,000 kg per quarter for the foreseeable future, starting from quarter 1. Although it is not possible to hold inventory of this raw material, Treehorn can carry inventory of finished goods at any level it chooses. Treehorn aims to maximise its profits.

Required:

(i) Using this new information prepare a revised production budget, in units, for EACH of quarters 1, 2, 3 and 4 showing opening and closing inventories, sales and production that will allow Treehorn to maximise its profits.

(ii) Suggest two ways in which Treehorn could overcome the problems caused by the restriction in material supply.

[Question # 3]

Barzini Co is experiencing a shortage of the highly skilled labour that it uses to produce its only product, the Sollozzo. It wishes to prepare budgets for the year ending 31 December 2011. The standard cost card for the Sollozzo for 2011 and other relevant information are given below.

Standard cost card
Product: the Sollozzo
Usage: Per unit Cost
Cost per unit

	$
Direct material A (6 kg $2 per kg)	12·00
Skilled labour (2 hours $25 per hour)	50·00
Unskilled labour (4 hours $15 per hour)	60·00
Prime cost	122·00
Variable production overhead (6 hours $5 per hour)	30·00
Fixed production overhead (6 hours $4 per hour)	24·00
Standard full cost of production	**$176·00**

Notes relevant to budget preparation:

(i) Direct material A is freely available.

(ii) 20 skilled workers are employed. Each is contracted to work for 40 hours per week for 48 weeks per year and in addition will work overtime, up to a maximum of 8 hours per week, for a premium of 50% per hour.

(iii) There is no shortage of unskilled labour and all of their hours will be paid at basic rate.

(iv) The standard fixed overhead absorption rate was set based upon 150,000 standard labour hours per year.

(v) The Sollozzo will be sold at $250 per unit, and demand at this price is estimated to be 30,000 units per annum.

(vi) Barzini Co carries no inventory of raw materials or finished goods at any time.

Required:

(a) Construct a budget for skilled labour for the year ending 31 December 2011, assuming that the maximum amount of overtime is worked. Your budget should show basic hours, overtime hours, basic pay and overtime premium paid.

(b) Assuming that the principal budget factor for Barzini Co is 46,080 skilled labour hours, and that the company wishes to maximise its profits, calculate the following budgeted figures for the year ending 31 December 2011:

- **(i)** Production in units;
- **(ii)** Unskilled labour (in hours and $);
- **(iii)** Direct material usage (in kg and $);
- **(iv)** Sales (in units and $).

(c) Prepare a budgeted income statement for the year ending 31 December 2011.

(d) Suggest two ways by which a company could overcome shortages of skilled labour.

[Question # 4]

The Clemenza Co is a long established hotel business, which operates 10 luxury hotels located in capital cities throughout the world. It has an international reputation for excellence. The company management structure comprises three main board directors (a chairman, a managing director and a finance director) and 10 hotel general managers. Recently Clemenza Co appointed a new managing director who, in an attempt to increase profitability, made the following changes to the company's budgeting system:

(i) Budgets for each hotel were to be set by and approved by the managing director and finance director. Hotel general managers were required to achieve all sales and cost targets included in the budgets. Previously hotel managers had drafted their own budgets, which, subject to main board approval, became the budgets for the period.

(ii) Large increases in profitability were required and as a consequence budget targets became more difficult. This was despite the adverse market conditions faced by hotel operators around the world.

(iii) Hotel restaurant cost budgets (mainly ingredients and staff costs) were reduced by 20% as compared to previous years. Hotel general managers' salary packages were altered to include a large element of performance related pay which was linked to the achievement of cost budgets.

Required:

Explain three potential problems with the new managing director's approach to budgeting.

[Question # 5]

AB Ltd. manufactures two products, A and B and sells them through two divisions, north and south. For the purpose of submission of Sales Budget to the budget committee the following information is available. Budgeted Sales for the current year were,

Product A: north 4,000 units @ Rs.9 each, south 6,000 units @ Rs.9 each
Product B: north 3,000 units @ Rs.21 each, south 5,000 @ Rs.21 each

Actual sales for the current year were,

Particulars	North	South
Product A	5,000 units @ Rs.9 each	7,000 units @ Rs.9 each
Product B	2,000 units @ Rs.21 each	4,000 units @ Rs.21 each

Adequate market studies reveal that Product A is popular but under priced. It is observed that if the price of A is increased by Re.1 it will still find a ready market. On the other hand, B is overpriced to customers and the market could absorb more if sales price of B is reduced by Re.1. The management has agreed to give effect to the above price changes.

From the information based on these price changes and reports from salesmen, the following estimates have been prepared by divisional managers. Percentage increase in sales over current budget is,

Particulars	North	South
Product A	+ 10%	+ 5%
Product B	+ 20%	+ 10%

With the help of an intensive advertisement campaign, the following additional sales over the estimated sales of divisional managers are possible. Additional sales above the estimated sales of divisional managers.

Particulars	North	South
Product A	600	700
Product B	400	500

You are **required** to prepare a budget for sales incorporating the above estimates and also show the budgeted sales and actual sales for the current year.

[Question # 6]

A factory engaged in manufacturing plastic toys is working at 40% capacity and produces 10, 000 toys per month. The present cost break up for one toy is as under.

Material:	Rs.10
Labor:	Rs.3
Overheads:	Rs.5 [60% fixed]

The selling price is Rs.20 per ton. If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the price of material.

You are **required** to prepare a statement showing the profits/losses at 40%, 50% and 90% capacity utilizations.

[Question # 7]

A Ltd. manufactures a single product P with a single grade of labor. The sales budget and finished goods stock budget for the 1st Quarter ending on 30th June 2008 are as follows.

Sales	:	1,400 units
Opening finished units	:	100 units
Closing finished units	:	140 units

The goods are imported only when production work is complete and it is budgeted that 10% of finished work will be scrapped. The standard direct labor content of the product P is 3 hours. The budgeted productivity ratio for direct labor is 80% only. The company employs 36 direct operatives who are expected to average 144 working hours each in the 1st quarter.

You are **required** to prepare,

I] Production Budget
II] Direct Labor Budget and
III] Comment on the problem that your direct labor budget reveals and suggest how this problem might be overcome.

[Question # 8]

Prepare a **Cash Budget** from the following information for ABC Ltd.

Particulars	Quarter # 1	Quarter # 2	Quarter # 3	Quarter # 4
Opening Cash	10000	-	-	-
Collection from customers	125000	150000	160000	221000
Payments:				
Purchase of Material	20000	35000	35000	54200
Other Expenses	25000	20000	20000	17000
Salaries & Wages	90000	95000	95000	109200
Income tax	5000	-	-	-
Machinery Purchase	-	-	-	20000

The company desires to maintain a cash balance of Rs.15, 000 at the end of each quarter. Cash can be borrowed or repaid in multiples of Rs.500 at an interest rate of 10% p.a. Management does not want to borrow cash more than what is necessary and wants to repay as early as possible. In any event, loans cannot be extended beyond a quarter. Interest is computed and paid when principal is repaid. Assume that borrowing takes place at the beginning and repayments are made at the end of the quarter.

[Question # 9]

ABC Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of Rs.60, 000 per month utilize only 60% capacity of the plant. Sales Manager assures that with a reduction of 10% in the price, he would be in a position to increase the sales by about 25% to 30%. The following data are available.

Selling price	:	Rs.10 per unit
Variable cost	:	Rs.3 per unit
Semi variable cost	:	Rs.6, 000 fixed plus Rs.0.50 per unit

Fixed cost: Rs.20, 000 at present level estimated to be Rs.24, 000 at 80% output

You are **required** to,

- Prepare a statement showing the operating profit at 60%, 70% and 80% levels of capacity utilization at current selling price and at proposed selling price
- The percentage increase in the present output which will be required to maintain the present profit margin at the proposed selling price.

[Question # 10]

S Ltd is engaged in manufacturing and sale of footwear. The company sells its products through company operated retail outlets as well as through distributors. The management is in the process of preparing the budget for the year 2012 on the basis of following information:

(i) The marketing director has provided the following annual sales projections:

	No. of units	Retail price range
Men	1,200,000	Rs.1,000 – 4,000
Women	500,000	Rs.800 – 2,500

The previous pattern of sales indicates that 60% of units are sold at the minimum price; 10% units are sold at the maximum price and remaining 30% at a price of Rs.2,000 and Rs.1,200 per footwear for men and women respectively.
(ii) It has been estimated that 30% of the units would be sold through distributors who are offered 20% commission on retail price. The remaining 70% will be sold through company operated retail outlets.
(iii) The company operates 22 outlets all over the country. The fixed costs per outlet are Rs.1.2 million per month and include rent, electricity, maintenance, salaries etc.
(iv) 5% of the sale units through company retail outlets are cut size foot wears on which 40% discount is allowed to the customers.
(v) The company keeps a profit margin of 120% on variable cost (excluding distributors' commission and discount on cut size foot wears) while calculating the retail price.
(vi) Fixed costs of the factory and head office are Rs.45 million and Rs.15 million per month respectively.

Required: Prepare budgeted profit and loss account for the year 201 2.

[Question # 11]

Northland's major towns and cities are maintained by local government organisations (LGO), which are funded by central government. The LGOs submit a budget each year which forms the basis of the funds received. You are provided with the following information as part of the 2010 budget preparation.

Overheads

Overhead costs are budgeted on an incremental basis, taking the previous year's actual expenditure and adding a set % to allow for inflation. Adjustments are also made for known changes. The details for these are:

Overhead cost category 2009 cost ($) Known changes Inflation adjustment between 2009 and 2010
Property cost = 120,000 None +5%
Central wages 150,000 Note 1 below +3%
Stationery 25,000 Note 2 below 0%

Note 1: One new staff member will be added to the overhead team; this will cost $12,000 in 2010
Note 2: A move towards the paperless office is expected to reduce stationery costs by 40% on the 2009 spend

Road repairs

In 2010 it is expected that 2,000 metres of road will need repairing but a contingency of an extra 10% has been agreed. In 2009 the average cost of a road repair was $15,000 per metre repaired, but this excluded any cost effects of extreme weather conditions. The following probability estimates have been made in respect of 2010:

Weather type	predicted Probability	Increase in repair cost
Good	0·7	0
Poor	0·1	+10%
Bad	0·2	+25%

Inflation on road repairing costs is expected to be 5% between 2009 and 2010.

New roads

New roads are budgeted on a zero base basis and will have to compete for funds along with other capital projects such as hospitals and schools.

Required:

(a) Calculate the overheads budget for 2010.
(b) Calculate the budgets for road repairs for 2010.
(c) Explain the problems associated with using expected values in budgeting by an LGO and explain why a contingency for road repairs might be needed.
(d) Explain the process involved for zero based budgeting.

[Question # 12]

Some commentators argue that: 'With continuing pressure to control costs and maintain efficiency, the time has come for all public sector organisations to embrace zero-based budgeting. There is no longer a place for incremental budgeting in any organisation, particularly public sector ones, where zero-based budgeting is far more suitable anyway.'

Required:

(a) Discuss the particular difficulties encountered when budgeting in public sector organisations compared with budgeting in private sector organisations, drawing comparisons between the two types of organisations.
(b) Explain the terms 'incremental budgeting' and 'zero-based budgeting'.
(c) State the main stages involved in preparing zero-based budgets.
(d) Discuss the view that 'there is no longer a place for incremental budgeting in any organisation, particularly public sector ones,' highlighting any drawbacks of zero-based budgeting that need to be considered.

[Question # 13]

You have recently been appointed as an assistant management accountant in a large company, PC Co. When you meet the production manager, you overhear him speaking to one of his staff, saying: 'Budgeting is a waste of time. I don't see the point of it. It tells us what we can't afford but it doesn't keep us from buying it. It simply makes us invent new ways of manipulating figures. If all levels of management aren't involved in the setting of the budget, they might as well not bother preparing one.'

Required:

(a) Identify and explain SIX objectives of a budgetary control system.
(b) Discuss the concept of a participative style of budgeting in terms of the six objectives identified in part (a).

[Question # 14]

Noble is a restaurant that is only open in the evenings, on SIX days of the week. It has eight restaurant and kitchen staff, each paid a wage of $8 per hour on the basis of hours actually worked. It also has a restaurant manager and a head chef, each of whom is paid a monthly salary of $4,300. Noble's budget and actual figures for the month of May was as follows:

		Budget	Actual
Number of meals		1,200	1,560
		$	$
Revenue:	Food	48,000	60,840
	Drinks	12,000	11,700
		60,000	72,540
Variable costs:			
	Staff wages	(9,216)	(13,248)
	Food costs	(6,000)	(7,180)
	Drink costs	(2,400)	(5,280)
	Energy costs	(3,387)	(3,500)
		(21,003)	(29,208)
Contribution		38,997	43,332
Fixed costs:			
	Manager's and chef's pay	(8,600)	(8,600)
	Rent, rates and depreciation	(4,500)	(4,500)
Operating profit		**25,897**	**30,232**

The budget above is based on the following assumptions:

1. The restaurant is only open six days a week and there are four weeks in a month. The average number of orders each day is 50 and demand is evenly spread across all the days in the month.
2. The restaurant offers two meals: Meal A, which costs $35 per meal and Meal B, which costs $45 per meal. In addition to this, irrespective of which meal the customer orders, the average customer consumes four drinks each at $2·50 per drink. Therefore, the average spend per customer is either $45 or $55 including drinks, depending on the type of meal selected. The May budget is based on 50% of customers ordering Meal A and 50% of customers ordering Meal B.
3. Food costs represent 12·5% of revenue from food sales.
4. Drink costs represent 20% of revenue from drinks sales.
5. When the number of orders per day does not exceed 50, each member of hourly paid staff is required to work exactly six hours per day. For every incremental increase of five in the average number of orders per day, each member of staff has to work 0·5 hours of overtime for which they are paid at the increased rate of $12 per hour. You should assume that all costs for hourly paid staff are treated wholly as variable costs.
6. Energy costs are deemed to be related to the total number of hours worked by each of the hourly paid staff, and are absorbed at the rate of $2·94 per hour worked by each of the eight staff.

Required:

(a) Prepare a flexed budget for the month of May, assuming that the standard mix of customers remains the same as budgeted.

(b) After preparation of the flexed budget, you are informed that the following variances have arisen in relation to total food and drink sales:

Sales mix contribution variance	$1,014 Adverse
Sales quantity contribution variance	$11,700 Favourable

Required:
BRIEFLY describe the sales mix contribution variance and the sales quantity contribution variance. Identify why each of them has arisen in Noble's case.

(c) Noble's owner told the restaurant manager to run a half-price drinks promotion at Noble for the month of May on all drinks. Actual results showed that customers ordered an average of six drinks each instead of the usual four but, because of the promotion, they only paid half of the usual cost for each drink. You have calculated the sales margin price variance for drink sales alone and found it to be a worrying $11,700 adverse. The restaurant manager is worried and concerned that this makes his performance for drink sales look very bad.

Required:
Briefly discuss TWO other variances that could be calculated for drinks sales or food sales in order to ensure that the assessment of the restaurant manager's performance is fair. These should be variances that COULD be calculated from the information provided above although no further calculations are required here.

[Question # 15]

Wollongong wishes to calculate an operating budget for the forthcoming period. Information regarding products, costs and sales levels is as follows:

Product	A	B
Materials required		
X (kg)	2	3
Y (litres)	1	4
Labour hours required		
Skilled (hours)	4	2
Semi-skilled (hours)	2	5
Sales level (units)	2000	1500
Opening stocks (units)	100	200

Closing stock of materials and finished goods will be sufficient to meet 10% of demand. Opening stocks of material X was 300 kg and for material Y was 1000 litres. Material prices are £10 per kg for material X and £7 per litre for material Y. Labour costs are £12 per hour for the skilled workers and £8 per hour for the semi skilled workers.

Required:

Produce the following budgets:

(a) Production (units);
(b) Materials usage (kg and litres);
(c) Materials purchases (kg, litres and £); and
(d) Labour (hours and £).

[Question # 16]

A division of Bud plc is engaged in the manual assembly of finished products F1 and F2 from bought-in components. These products are sold to external customers. The budgeted sales volumes and prices for Month 9 are as follows:

Product	Units	Price
F1	34 000	£50.00
F2	58 000	£30.00

Finished goods stockholding budgeted for the end of Month 9, is 1000 units of F1 and 2000 units of F2, with no stock at the beginning of that month. The purchased components C3 and C4 are used in the finished products in the quantities shown below. The unit price is for just-in-time delivery of the components; the company holds no component stocks.

	Component	
Product	C3	C4
F1 (per unit)	8 units	4 units
F2 (per unit)	4 units	3 units
Price (each)	£1.25	£1.80

The standard direct labour times and labour rates and the budgeted monthly manufacturing overhead costs for the assembly and finishing departments for Month 9 are given below:

Product	Assembly	Finishing
F1 (per unit)	30 minutes	12 minutes
F2 (per unit)	15 minutes	10 minutes
Labour rate (per hour)	£5.00	£6.00
Manufacturing overhead cost for the month	£617 500	£204 000

Every month a predetermined direct labour hour recovery rate is computed in each department for manufacturing overhead and applied to items produced in that month. The selling overhead of £344 000 per month is applied to products based on a predetermined percentage of the budgeted sales value in each month.

Required:

(a) Prepare summaries of the following budgets for Month 9:

(i) Component purchase and usage (units and value);
(ii) Direct labour (hours and value);
(iii) Departmental manufacturing overhead recovery rates;
(iv) Selling overhead recovery rate;
(v) Stock value at the month-end.

(b) Tabulate the standard unit cost and profit of each of F1 and F2 in Month 9.

(c) Prepare a budgeted profit and loss account for Month 9 which clearly incorporates the budget values obtained in (a) above.

(d) Explain clearly the implications of the company's treatment of manufacturing overheads, i.e. computing a monthly overhead rate, compared to a predetermined overhead rate prepared annually.

[Question # 17]

A redundant manager who received compensation of £80 000 decides to commence business on 4 January, manufacturing a product for which he knows there is a ready market. He intends to employ some of his former workers who were also made redundant but they will not all commence on 4 January. Suitable premises have been found to rent and second-hand machinery costing £60 000 has been bought out of the £80 000. This machinery has an estimated life of five years from January and no residual value.

Other data

1. Production will begin on 4 January and 25% of the following month's sales will be manufactured in January. Each month thereafter the production will consist of 75% of the current month's sales and 25% of the following month's sales.

2. Estimated sales are

	(Units)	(£)
January	Nil	Nil
February	3200	80 000
March	3600	90 000
April	4000	100 000
May	4000	100 000

3. Variable production cost per unit

	(£)
Direct materials	7
Direct wages	6
Variable overhead	2
	15

4. Raw material stocks costing £10 000 have been purchased (out of the manager's £80 000) to enable production to commence and it is intended to buy, each month, 50% of the materials required for the following month's production requirements. The other 50% will be purchased in the month of production. Payment will be made 30 days after purchase.

5. Direct workers have agreed to have their wages paid into bank accounts on the seventh working day of each month in respect of the previous month's earnings.

6. Variable production overhead: 60% is to be paid in the month following the month it was incurred and 40% is to be paid one month later.

7. Fixed overheads are £4000 per month. One quarter of this is paid in the month incurred, one half in the following month, and the remainder represents depreciation on the second-hand machinery.

8. Amounts receivable: a 5% cash discount is allowed for payment in the current month and 20% of each month's sales qualify for this discount. 50% of each month's sales are received in the following month, 20% in the third month and 8% in the fourth month. The balance of 2% represents anticipated bad debts.

You are **required** to:

(a) **(i)** prepare a cash budget for each of the first four months, assuming that overdraft facilities will be available;
(ii) State the amount receivable from customers in May;

(b) Describe briefly the benefits to cash budgeting from the use of a particular type of software package.

[Question # 18]

The Viking Smelting Company established a division, called the reclamation division, two years ago, to extract silver from jewellers' waste materials. The waste materials are processed in a furnace, enabling silver to be recovered. The silver is then further processed into finished products by three other divisions within the company. A performance report is prepared each month for the reclamation division which is then discussed by the management team. Sharon Houghton, the newly appointed financial controller of the reclamation division, has recently prepared her first report for the four weeks to 31 May. This is shown below:

Performance Report Reclamation Division 4 weeks to 31 May

	Actual	Budget	Variance	Comments
Production (tonnes)	200	250	50 (F)	a
	(£)	(£)	(£)	
Wages and social security costs	46 133	45 586	547 (A)	Overspend
Fuel	15 500	18 750	3 250 (F)	
Consumables	2 100	2 500	400 (F)	
Power	1 590	1 750	160 (F)	
Divisional overheads	21 000	20 000	1 000 (A)	Overspend
Plant maintenance	6 900	5 950	950 (A)	Overspend
Central services	7 300	6 850	450 (A)	Overspend
Total	**100 523**	**101 386**	**863 (F)**	

A (A) = adverse, (F) = favourable

In preparing the budgeted figures, the following assumptions were made for May:

- the reclamation division was to employ four teams of six production employees;
- each employee was to work a basic 42-hour week and be paid £7.50 per hour for the four weeks of May;
- social security and other employment costs were estimated at 40% of basic wages;
- A bonus, shared amongst the production employees, was payable if production exceeded 150 tonnes. This varied depending on the output achieved;
    1. if output was between 150 and 199 tonnes, the bonus was £3 per tonne produced;
    2. if output was between 200 and 249 tonnes, the bonus was £8 per tonne produced;
    3. if output exceeded 249 tonnes the bonus was £13 per tonne produced;
- the cost of fuel was £75 per tonne;
- consumables were £10 per tonne;
- power comprised a fixed charge of £500 per four weeks plus £5 per tonne for every tonne produced;
- overheads directly attributable to the division were £20 000;

- plant maintenance was to be apportioned to divisions on the basis of the capital values of each division;
- The cost of Viking's central services was to be shared equally by all four divisions.

You are the deputy financial controller of the reclamation division. After attending her first monthly meeting with the board of the reclamation division, Sharon Houghton arranges a meeting with you. She is concerned about a number of issues, one of them being that the current report does not clearly identify those expenses and variances which are the direct responsibility of the reclamation division.

Task 1

Sharon Houghton asks you to prepare a **flexible budget report** for the reclamation division for May in a form consistent with responsibility accounting. On receiving your revised report. Sharon tells you about the other questions raised at the management meeting when the original report was presented. These are summarized below:

(i) Why are the budget figures based on two-year-old data taken from the proposal recommending the establishment of the reclamation division?
(ii) Should the budget data be based on what we were proposing to do or what we actually did do?
(iii) Is it true that the less we produce the more favorable our variances will be?
(iv) Why is there so much maintenance in a new division with modern equipment and why should we be charged with the actual costs of the maintenance department even when they overspend?
(v) Could the comments, explaining the variances, be improved?
(vi) Should all the variances be investigated?
(vii) Does showing the cost of central services on the divisional performance report help control these costs and motivate the divisional managers?

Task 2

Prepare a **memo** for the management of the reclamation division. Your memo should:

(a) Answer their queries and justify your comments;
(b) Highlight the main objective of your revised performance report developed in Task 1 and give two advantages of it over the original report

[Question # 19]

You work as the assistant to the management accountant for Henry Limited, a medium-sized manufacturing company. One of its products, product P, has been very successful in recent years, showing a steadily increasing trend in sales volumes. Sales volumes for the four quarters of last year were as follows:

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Actual sales volume (units)	420 000	450 000	475 000	475 000

A new assistant has recently joined the marketing department and she has asked you for help in understanding the terminology which is used in preparing sales forecasts and analysing sales trends. She has said: 'My main problem is that I do not see why my boss is so enthusiastic about the growth in product P's sales volume. It looks to me as though the rate of growth is really slowing down and has

actually stopped in quarter 4. I am told that I should be looking at the deseasonalised or seasonally adjusted sales data but I do not understand what is meant by this.' You have found that product P's sales are subject to the following seasonal variations:

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Seasonal variation (units)	+25 000	+15 000	0	–40 000

Task 1

(a) Adjust for the seasonal variations to calculate deseasonalised or seasonally adjusted sales volume (i.e. the trend figures) for each quarter of last year.

(b) Assuming that the trend and seasonal variations will continue, forecast the sales volumes for each of the four quarters of next year.

Task 2

Prepare a memorandum to the marketing assistant which explains:

(a) What is meant by seasonal variations and deseasonalised or seasonally adjusted data;

(b) How they can be useful in analysing a time series and preparing forecasts. Use the figures for product P's sales to illustrate your explanations.

Task 3

Using the additional data below, prepare a further memorandum to the marketing assistant which explains the following:

(a) Why fixed budgets are useful for planning but flexible budgets may be more useful to enable management to exercise reflective control over distribution costs,

(b) *Two* possible activity indicators which could be used as a basis for flexing the budget for distribution costs,

Additional data:

The marketing assistant has now approached you for more help in understanding the company's planning and control systems. She has been talking with the distribution manager, who has tried to explain how flexible budgets are used to control distribution costs within Henry Limited. She makes the following comment. 'I thought that budgets were supposed to provide a target to plan our activities and against which to monitor our costs. How can we possibly plan and control our costs if we simply change the budgets when activity levels alter?' Product Q is another product which is manufactured and sold by Henry Limited. In the process of preparing budgetary plans for next year the following information has been made available to you.

1. Forecast sales units of product Q for the year = 18 135 units.

2. Closing stocks of finished units of product Q at the end of next year will be increased by 15% from their opening level of 1200 units.

3. All units are subject to quality control check. The budget plans are to allow for 1% of all units checked to be rejected and scrapped at the end of the process. All closing stocks will have passed this quality control check.

4. Five direct labour hours are to be worked for each unit of product Q processed, including those which are scrapped after the quality control check. Of the total hours to be paid for, 7.5% are budgeted to be idle time.

5. The standard hourly rate of pay for direct employees is £6 per hour.

6. Material M is used in the manufacture of product Q. One finished unit of Q contains 9 kg of M but there is wastage of 10% of input of material M due to evaporation and spillage during the process.

7. By the end of next year stocks of material M are to be increased by 12% from their opening level of 8000 kg. During the year a loss of 1000 kg is expected due to deterioration of the material in store.

Task 4

Prepare the following **budgets** for the forthcoming year:

(a) Production budget for product Q, in units;
(b) Direct labour budget for product Q, in hours and in £;
(c) Material usage budget for material M, in kg;
(d) Material purchases budget for material M, in kg.

Task 5

The supplier of material M was warned that available supplies will be below the amount indicated in your budget for Task 4 part (d) above. Explain the implications of this shortage and suggest *four* possible actions which could be taken to overcome the problem. For each suggestion, **identify any problems** which may arise.

[Question # 20]

Data

Rivermede Ltd makes a single product called the Fasta. Last year, Steven Jones, the managing director of Rivermede Ltd, attended a course on budgetary control. As a result, he agreed to revise the way budgets were prepared in the company. Rather than imposing targets for managers, he encouraged participation by senior managers in the preparation of budgets. An initial budget was prepared but Mike Fisher, the sales director, felt that the budgeted sales volume was set too high. He explained that setting too high a budgeted sales volume would mean his sales staff would be de-motivated because they would not be able to achieve that sales volume. Steven Jones agreed to use the revised sales volume suggested by Mike Fisher. Both the initial and revised budgets are reproduced below complete with the actual results for the year ended 31 May.

Rivermede Ltd – budgeted and actual costs for the year ended 31 May

Fast Variances production and sales	Original budget	Revised budget	Actual budget	Variance from revised budget results	
(units)	24000	20000	22000	2000	(F)
	(£)	(£)	(£)	(£)	
Variable costs					
Material	216000	180000	206800	26800	(A)
Labour	288000	240000	255200	15200	(A)
Semi-variable costs					
Heat, light and power	31000	27000	33400	6400	(A)
Fixed costs					
Rent, rates and depreciation	40000	40000	38000	2000	(F)
	575000	487000	533400	46400	(A)

Assumptions in the two budgets

1. No change in input prices
2. No change in the quantity of variable inputs per Fasta.

As the management accountant at Rivermede Ltd, one of your tasks is to check that invoices have been properly coded. On checking the actual invoices for heat, light and power for the year to 31 May, you find that one invoice for £7520 had been incorrectly coded. The invoice should have been coded to materials.

Task 1

(a) Using the information in the original and revised budgets, identify:

- The variable cost of material and labour per Fasta;
- The fixed and unit variable cost within heat, light and power.

(b) Prepare a flexible budget, including variances, for Rivermede Ltd after correcting for the miscoding of the invoice.

Data

On receiving your flexible budget statement, Steven Jones states that the total adverse variance is much less than the £46 400 shown in the original statement. He also draws your attention to the actual sales volume being greater than in the revised budget. He believes these results show that a participative approach to budgeting is better for the company and wants to discuss this belief at the next board meeting. Before doing so, Steven Jones asked for your comments.

Task 2

Write a **memo** to Steven Jones. Your memo should:

(a) *Briefly* explain why the flexible budgeting variances differ from those in the original statement given in the data to task 1;

(b) Give *two* reasons why a favourable cost variance may have arisen other than through the introduction of participative budgeting;

(c) Give *two* reasons why the actual sales volume compared with the revised budget's sales volume may not be a measure of improved motivation following the introduction of participative budgeting.

[Question # 21]

DATA

Happy Holidays Ltd sells holidays to Xanadu through newspaper advertisements. Tourist are flown each week of the holiday season to Xanadu, where they take a 10- day touring holiday. In 2000, Happy Holidays began to use the least-squares regression formula to help forecast the demand for its holidays. You are employed by Happy Holidays as an accounting technician in the financial controller's department. A colleague of yours has recently used the least squares regression formula on a spreadsheet to estimate the demand for holidays per year. The resulting formula was:

$$y = 640 + 40x$$

where: y is the annual demand and x is the year. The data started with the number of holidays sold in 1993 and was identified in the formula as year 1. In each subsequent year the value of x increases by 1 so, for example, 1998 was year 6. To obtain the *weekly* demand the result is divided by 25, the number of weeks Happy Holidays operates in Xanadu.

Task 1

(a) Use the least-squares regression formula developed by your colleague to estimate the weekly demand for holidays in Xanadu for 2001.

(b) In preparation for a budget meeting with the financial controller, draft a *brief* note. Your note should identify *three* weaknesses of the least-squares regression formula in forecasting the weekly demand for holidays in Xanadu.

DATA

The budget and actual costs for holidays to Xanadu for the 10 days ended 27 November 2000 is reproduced below.

Happy Holidays Ltd Cost Statement
10 days ended 27 November 2000

	Fixed budget (£)	Actual (£)	Variances (£)
Aircraft seats	18 000	18 600	600 A
Coach hire	5 000	4 700	300 F
Hotel rooms	14 000	14 200	200 A
Meals	4 800	4 600	200 F
Tour guide	1 800	1 700	100 F
Advertising	2 000	1 800	200 F
Total costs	**45 600**	**45 600**	**0**

Key: A = adverse, F = favourable

The financial controller gives you the following additional information:

Cost and volume information

- Each holiday lasts 10 days;
- Meals and hotel rooms are provided for each of the 10 days;
- The airline charges £450 per return flight per passenger for each holiday but the airline will only sell seats at this reduced price if Happy Holidays purchases seats in blocks of 20;
- The costs of coach hire, the tour guide and advertising are fixed costs;
- The cost of meals was budgeted at £12 per tourist per day;
- The cost of a single room was budgeted at £60 per day;
- The cost of a double room was budgeted at £70 per day;
- 38 tourists travelled on the holiday requiring 17 double rooms and 4 single rooms;

Sales information

- The price of a holiday is £250 more if using a single room.

Task 2

Write a **memo** to the financial controller. Your memo should:

(a) Take account of the cost and volume information to prepare a revised cost statement using flexible budgeting and identifying any variances;

(b) State and justify which of the two cost statements is more useful for management control of costs;

(c) Identify *three* factors to be taken into account in deciding whether or not to investigate individual variances.

[Question # 22]

A garment manufacturing company is facing cash flow problem and is planning to avail a running finance facility on need basis. Following are the monthly sales forecasts and estimation of material and labour costs:

Month	Sales Forecasts	Rs. 000. Material and Labour Costs
November 2010	360	160
December 2010	360	180
January 2011	720	252
February 2011	1080	1764
March 2011	1440	612
April 2011	720	468
May 2011	720	324
June 2011	180	80
July 2011	360	120

Collection estimates of Marketing department are as follows:

I. within the month of sale - 10%
II. in the month following the sale - 75%
III. in the second month following the sale - 15%

Payments of material and labour are made during the following month in which these costs have been incurred.

Administrative salaries will amount to approximately Rs.60,000 per month.

Monthly lease payments under short-term lease contract will be Rs.20,000.

A progressive payment of Rs.400,000 must be paid in April 2011 for new equipment.

Other monthly and periodical estimations:

I. Miscellaneous expenses Rs.6,000.
II. Depreciation charges of Rs.40,000 upto March 2011 and Rs.44,000 from April, 2011.
III. Advance Income Tax of Rs.50,000 due in the month of March and June, 2011.

Cash and bank balances on January 01, 2011 will be Rs.140,000 and same will be required to maintain throughout the period.

Required:

(a) Prepare a monthly cash budget for first 6 months of 2011, in a columnar format.

(b) Offer your comments and suggestions on borrowing and/ or short term deposits for the company.

[Question # 23]

The budgeted balance sheet as on March 31, 2011 of Haroon Limited is as follows:

Assets and Equities	Cost	Accumulated Depreciation	Written Down Value	Rs. '000'
Non-current assets:				
Property, plant and equipment:				
Land and building	500,000	–	500,000	
Plant, machinery and equipment	124,000	84,500	39,500	
Motor vehicles	42,000	16,400	25,600	565,100
Current assets:				
Inventories:				
Raw materials (50,000 kgs)				4,320
Finished goods (55,000 units)				10,450
Accounts receivable				18,080
Cash and bank balances				6,790
Total assets				604,740
Share Capital and Reserves:				
Issued, subscribed and paid-up capital				500,000
Unappropriated profit				100,840
Total shareholders equity				600,840
Current liabilities:				
Accounts payable for materials				3,900
Total equity and liabilities				604,740

Estimation for next three months	April	May	June
• Selling units	40,000	42,000	48,000
• Production units	35,000	37,500	45,000
• Purchase of raw materials (kgs)	40,000	40,000	42,500

	Rs.
• Direct labour and variable overheads per unit.	130
• Selling price per unit.	438
• Purchase cost of raw materials per kg.	90
One (01) kg is required for producing each finished unit.	
• Cash & bank balances as on June 30, 2011.	16,913,000
• Profit for the quarter ended June 30, 2011.	9,835,000

The company uses the FIFO method for inventory valuation. Finished goods are valued on the basis of variable costing. All purchases of materials and sales are on credit. Customers are allowed two (02) months credit and suppliers of materials are paid after one month of purchase. There is no work-in process inventory. The company expected to obtain a short-term bank loan of Rs.114 million in April, 2011 to meet capital expenditure in May 2011.

Machinery of Rs.112 million will be capitalized in May 2011. Depreciation for next 3 months, including new machinery, is estimated as follows:

	Rs .000.
Machinery and equipment	15,733
Motor vehicles	3,500

Required:

Prepare the following for the quarter ended June 30, 2011:

(i) Monthly and quarterly variable production cost budget.

(ii) Projected balance sheet as on June 30, 2011 (show separate workings for inventories and accounts receivable)

GENERAL

[Question # 1]

Vito Co wishes to analyse the behaviour of its costs. The following information is available.

Year	Average index value *	Output (units)	Total cost ($)
2007	150	1,500,000	12,450,000
2008	180	1,600,000	15,840,000
2009	70	1,700,000	6,510,000
2010 (forecast)	80	1,800,000	7,840,000

* these are values of a price index appropriate to costs in Vito Co's industry

Required:

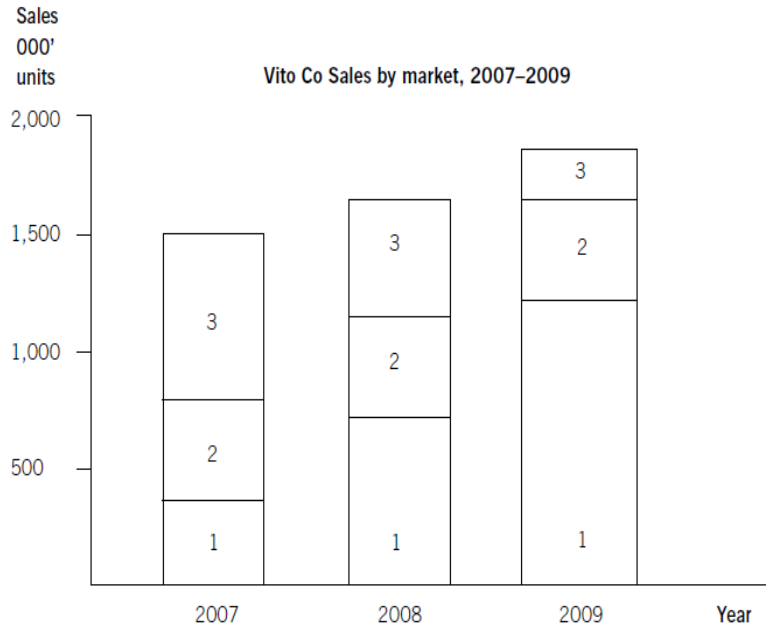
(a) Use the industry price index to restate Vito Co's total costs for each year in terms of 2010 price levels.

(b) Using the graph paper provided, draw a graph to represent the relationship between output and total cost expressed in 2010 price levels.

(c) Use the high low technique to estimate the fixed and variable elements of Vito Co's total cost expressed in 2010 price levels.

(d) Forecast Vito Co's total cost for 2011 when output is forecast to be 2,000,000 units and the industry price index is expected to rise to 95.

(e) The company accountant has produced the following component bar chart analysing Vito Co's sales revenue over its three markets, 1, 2 and 3.



Required:

Identify three trends in Vito Co's sales revenue apparent from the bar chart.

[Question # 2]

The Western is a local government organisation responsible for waste collection from domestic households. The new management accountant of The Western has decided to introduce some new forecasting techniques to improve the accuracy of the budgeting. The next budget to be produced is for the year ended 31 December 2010.

Waste is collected by the tonne (T). The number of tonnes collected each year has been rising and by using time series analysis the new management accountant has produced the following relationship between the tonnes collected (T) and the time period in question Q (where Q is a quarter number. So Q = 1 represents quarter 1 in 2009 and Q = 2 represents quarter 2 in 2009 and so on)

$$T = 2{,}000 + 25Q$$

Each quarter is subject to some seasonal variation with more waste being collected in the middle quarters of each year. The adjustments required to the underlying trend prediction are:

Quarter	Tonnes
1	–200
2	+250
3	+150
4	–100

Once T is predicted the new management accountant hopes to use the values to predict the variable operating costs and fixed operating costs that The Western will be subjected to in 2010. To this end he has provided the following operating cost data for 2009.

Volume of waste	Total operating cost in 2009 (fixed + variable)
Tonnes	$'000s
2,100	950
2,500	1,010
2,400	1,010
2,300	990

Inflation on the operating cost is expected to be 5% between 2009 and 2010.

Required:

(a) Calculate the tonnes of waste to be expected in the calendar year 2010.
(b) Calculate the variable operating cost and fixed operating cost to be expected in 2010 using regression analysis on the 2009 data and allowing for inflation as appropriate.

Many local government organisations operate incremental budgeting as one of their main budgeting techniques. They take a previous period's actual spend, adjust for any known changes to operations and then add a % for expected inflation in order to set the next period's budget.

(c) Describe two advantages and two disadvantages of a local government organisation funded by taxpayer's money using incremental budgeting as its main budgeting technique.

[Question # 3]

Savitt Ltd manufactures a variety of products at its industrial site in Ruratania. One of the products, the LT, is produced in a specially equipped factory in which no other production takes place. For technical reasons the company keeps no stocks of either LTs or the raw material used in their manufacture. The costs of producing LTs in the special factory during the past four years have been as follows:

	1998 (£)	1999 (£)	2000 (estimated) (£)	(2001) (£)
Raw materials	70 000	100 000	130 000	132 000
Skilled labour	40 000	71 000	96 000	115 000
Unskilled labour	132 000	173 000	235 000	230 000
Power	25 000	33 000	47 000	44 000
Factory overheads	168 000	206 000	246 000	265 000
Total production costs	**£435 000**	**£583 000**	**£754 000**	**£786 000**
Output (units)	160 000	190 000	220 000	180 000

The costs of raw materials and skilled and unskilled labour have increased steadily during the past four years at an annual compound rate of 20%, and the costs of factory overheads have increased at an annual compound rate of 15% during the same period. Power prices increased by 10% on 1 January 1999 and by 25% on the 1 January of each subsequent year. All costs except power are expected to increase by a further 20% during 2002. Power prices are due to rise by 25% on 1 January 2002.

The directors of Savitt Ltd are now formulating the company's production plan for 2002 and wish to estimate the costs of manufacturing the product LT. The finance director has expressed the view that 'the full relevant cost of producing LTs can be determined only if a fair share of general company overheads is allocated to them'. No such allocation is included in the table of costs above.

You are **required** to:

(a) Use linear regression analysis to estimate the relationship of total production costs to volume for the products LT for 2002 (ignore general company overheads and do *not* undertake a separate regression calculation for each item of cost),
(b) Comment on the view expressed by the finance director.

Ignore taxation.

MATERIAL

[Question # 1]

After inviting tenders, two quotations are received as follows.

- Supplier A: Rs.2.20 per unit
- Supplier B: Rs.2.10 per unit plus Rs.2000 fixed charges irrespective of the units ordered.

Calculate the order quantity for which the purchase price per unit will be the same. Considering all factors regarding production requirements and availability of finance, the purchase officer wants to place an order for 15, 000 units. Which supplier should he select?

[Question # 2]

A large local government authority places orders for various stationery items at quarterly intervals. In respect of an item of stock coded A32, data are:

Annual usage quantity	5000 boxes
Minimum order quantity	500 boxes
Cost per box	£2

Usage of material is on a regular basis and on average, half of the amount purchased is held in inventory. The cost of storage is considered to be 25% of the inventory value. The average cost of placing an order is estimated at £12.50. The chief executive of the authority has asked you to review the present situation and to consider possible ways of effecting cost savings. You are **required** to:

(a) Tabulate the costs of storage and ordering item A32 for each level of orders from four to twelve placed per year;
(b) Ascertain from the tabulation the number of orders which should be placed in a year to minimize these costs;
(c) Calculate the percentage saving on the annual cost which could be made by using the economic order quantity system;
(d) Suggest *two* other approaches which could be introduced in order to reduce the present cost of storage and ordering of stationery.

[Question # 3]

A company is reviewing its stock policy, and has the following alternatives available for the evaluation of stock number 12 789:

(i)	Purchase stock twice monthly,	100 units
(ii)	Purchase monthly,	200 units
(iii)	Purchase every three months,	600 units
(iv)	Purchase six monthly,	1200 units
(v)	Purchase annually,	2400 units.

It is ascertained that the purchase price per unit is £0.80 for deliveries up to 500 units. A 5% discount is offered by the supplier on the whole order where deliveries are 501 up to 1000, and 10% reduction on the total order for deliveries in excess of 1000. Each purchase order incurs administration costs of £5. Storage, interest on capital and other costs are £0.25 per unit of average stock quantity held.
You are required to advise management on the optimum order size.

OVERHEAD

[Question # 1]

A machine was purchased on 1st January, 2007 for Rs. 5 lakhs. The total cost of all machinery inclusive of the new machine was Rs. 75 lakhs. The following further particulars were available.

Expected life of the machine	–	10 years
Scrap value at the end of the life	–	Rs. 5,000
Repairs and maintenance for the machine during the year		Rs. 2,000
Expected number of working hours of the machine per year		4,000
Insurance premium annually for all machines		Rs. 4,00
Power consumption for the machine per hour @ Rs. 5 @ per unit =		25 units
Area occupied by the machine	–	100 sq feet
Area occupied by other machines	–	1,500 sq. feet
Rent per month of the department		Rs. 800
Lighting charges for 20 points for the whole department out of which three points are for the new machine	–	Rs.120 per month

Compute the machine hour rate for the machine.

[Question # 2]

A machine shop cost centre contains three machines of equal capacities. Three operators are employed on each machine, payable Rs. 20 per hour each. The factory works for forty eight hours in a week which includes 4 hours set up time. The work is jointly done by operators. The operators are paid fully for the forty eight hours. In additions they are paid a bonus of 10 per cent of productive time. Costs are reported for this company on the basis of thirteen four weekly period. The company for the purpose of computing machine hour rate includes the direct wages of the operator and also recoups the factory overheads allocated to the machines. The following details of factory overheads applicable to the cost centre are available:

1. Depreciation 10% per annum on original cost of the machine. Original cost of the each machine is Rs. 52,000.
2. Maintenance and repairs per week per machine is Rs. 60.
3. Consumable stores per week per machine are Rs. 75.
4. Power : 20 units per hour per machine at the rate of 80 paise per unit.
5. Apportionment to the cost centre : Rent per annum Rs. 5,400, Heat and Light per annum Rs. 9,720, and foreman's salary per annum Rs. 12,960.

Required:

(i) Calculate the cost of running one machine for a four week period.
(ii) Calculate machine hour rate.

[Question # 3]

Machinery was purchased from a manufacturer who claimed that his machine could produce 36.5 tonnes in a year consisting of 365 days. Holidays, break-down, etc., were normally allowed in the factory for 65 days. Sales were expected to be 25 tonnes during the year and the plant actually produced 25.2 tonnes during the year. You are **required** to state the following figures:

(a) Rated capacity
(b) Practical capacity
(c) Normal capacity
(d) Actual capacity

RECONCILIATION

[Question # 1]

Prepare a Reconciliation Statement from the following particulars:

Particulars	**Amount**
Profit as per cost accounts	291, 000
Works overheads under-recovered	19, 000
Administration overheads under – recovered	45, 500
Selling overheads over - recovered	39, 000
Overvaluation of opening stock in cost accounts	30, 000
Overvaluation of closing stock in cost accounts	15, 000
Interest earned during the year	7, 500
Rent received during the year	54, 000
Bad debts written off during the year	18, 000
Preliminary expenses written off during the year	36, 000
Profit as per financial accounts	288,000

SOLUTIONS

DECISION MAKING

[*Solution* # 01]

The long-term monthly saving or cost can be calculated by identifying the relevant costs, ignoring the effect of the notice required on certain of the contracts. The labour costs and the fixed overheads are not relevant. They would be incurred even if the department is closed.

Relevant cost of internal printing

	Rs: *per month*
Customised paper (80*50)	4,000
Fluorescent ink (400*1.80)	720
Other paper and material	2,850
Machine rental	4,500
Variable overhead (4*120)	480
Total relevant cost of internal printing	**12,550**
Cost of external printing services	(9,000)
Monthly saving from closure	**3,550**
Therefore the offer from the external supplier should be accepted, resulting in a monthly saving of Rs: 3,550.	

This saving would only be made in the long term, once all of the relevant notice periods have expired. In the immediate short term, some costs would still be incurred because of the need to give notice of cancellation. It is possible to demonstrate the effect of this by charting in which month each saving will be made. In the following table, 'month 1' is taken to mean 'one month from now'.

Relevant savings and revenues

	Month 1	***Month 2***	***Month 3***	***Month 4***
	Rs:	**Rs:**	**Rs:**	**Rs:**
Customized paper (note 1)	-	-	-	4,000
Revenue from sale of excess paper	1,600	1,600	1,600	-
Fluorescent ink (note 2)	-	720	720	720
Revenue from sale of excess ink	200	-	-	-
Other paper and materials (note 3)	2,850	2,850	2,850	2,850
Machine rental (note 4)	-	-	4,500	4,500
Variable overhead (note 3)	480	480	480	480
Relevant savings and revenues	5,130	5,650	10,150	12,550
External cost	9,000	9,000	9,000	9,000
Saving/(excess cost) from closure	**(3,870)**	**(3,350)**	**1,150**	**3,550**

Note that the monthly saving settles down at the 'long-term' amount of Rs: 3,550 once all of the notice periods have expired.

Notes

1. The saving on customised paper will not be made until month 4, because 3 months' notice is required and the company is obliged to purchase the paper. However, if printing is ceased immediately the paper could be re-sold for Rs: 1,600 per month.
2. The saving on fluorescent ink will not be made until month 2 because the company will be obliged to purchase it for the first month. If printing is ceased immediately the ink could be re-sold for Rs: 200 for 1 month.
3. The other material costs and the variable overheads are relevant from month 1, because they can be avoided as soon as the department closes.
4. The machine rental will only be saved from month 3 onwards, because it must be paid for anyway for the next 2 months.

[*Solution* # 02]

Tip: Identify relevant costs and revenues associated with each of the four alternatives.

(a) Renewal of Croydon lease gives profit of Rs: 600,000
Franchise Croydon production gives profit of Rs: 515,000
Transfer production to Luton gives profit of Rs: 700,000
Transfer production to Southend gives profit of Rs: 725,000*
*Profit-maximizing option.

Option 1 – Renew Croydon site lease

	Rs: 000
Renew Croydon site lease – additional rent	(50)
Revised profit (650 * 50)	600

Option 2 – Franchise Croydon production

If the Croydon site is shut the central fixed costs will not be saved.

Impact on sales	(1,000)
Impact on variable costs	475
Impact on fixed site costs	375
Commission income (1.5% of sales)	15
	(135)
Revised profit (650 * 135)	515

Option 3 – Shut Croydon and switch production to Luton

Again, the central fixed costs will not be saved, but the fixed site costs will be saved and are therefore relevant to the decision. The assumption is made that the sales revenue and variable cost from Croydon will be transferred to the Luton site. Therefore these two items are not affected by the decision and are not included in the calculation of revised profit.

Impact on Croydon fixed site costs	375
Additional costs – Luton	(250)
Transport costs (7.5% of sales)	(75)
	50
Revised profit (650 * 50)	700

Option 4 – Shut Croydon and switch production to Southend

Impact on Croydon fixed site costs	375
Additional costs – Southend	(200)
Additional transport costs Southend (10% of sales)	(100)
	75
Revised profit (650 * 75)	725

(b) Relevant strategic factors which are beyond the scope of analysis in (a) above include:

- impact on workforce and labour relations;
- impact on company's standing with customers;
- reduction in company's total production capacity;
- increased vulnerability to local events at remaining sites.

[*Solution* # 03]

Tips

- Remember pre-separation costs are common costs and therefore irrelevant to the decision.
- When a decision on whether or not to further process is to be made; the relevant costs are incremental costs and revenue.

(a) Profit statement for the three joint products

	A	*B*	*C*	*Total*
	Rs:	**Rs:**	**Rs:**	**Rs:**
Sales	5,000	4,800	4,800	14,600
Less--				
Pre-sep. costs	4,000	2,400	3,200	9,600
Post-sep. costs	2,000	1,200	800	4,000
Profit/ (loss)	(1,000)	1,200	800	1,000

(b) JP Ltd apportions pre-separation costs according to the physical measure – on the weight of output of each joint product. Another method available is apportioning according to market value of the joint products. Both methods are arbitrary and do not provide management with accurate apportionment of costs. It is impossible to calculate accurately the amount of pre-separation costs to be charged to individual joint products. They must therefore be looked at in total rather than on an individual product basis.

(c) The decision on whether or not to further process should be based on a comparison of incremental sales revenue and incremental costs, and not on information that includes an arbitrary apportionment of costs.

Product	*Incremental Revenue*	*Incremental Costs*	*Incremental profit/(loss)*
	Rs:	**Rs:**	**Rs:**
A	2,500	*2,000*	*500*
B	*600*	*1,200*	*(600)*
C	*1,200*	*800*	*400*
			300

Therefore, further process A and C and sell B at the point of separation.

[*Solution* # 04]

Tips

- A straightforward question with three decision options. Evaluate each option using relevant costs and revenue.
- Candidates frequently do not show clear workings for this type of question. A large proportion of the marks are awarded for the workings, not the final statement.

(a)

Relevant savings and revenue			
	25,000 units	***35,000 units***	***Shut down***
	Rs:	**Rs:**	**Rs:**
Sales revenue	225,000	262,500	-
Material B	*6,250*	-	*37,500*
Sale of machinery	22,500	21,500	25,000
Total revenue/savings	**253,750**	**284,000**	**62,500**
Relevant costs			
Material A disposal	2,500	1,500	5,000
Purchase material B	-	7,500	-
Labour	62,500	100,000	-
Variable overhead (excl. depreciation)	40,000	56,000	-
Advertising campaign	25,000	35,000	-
Manager's salary	20,000	20,000	-
Redundancy pay	-	-	25,000
Total relevant costs	**150,000**	**220,000**	**30,000**
Net savings	**103,750**	**64,000**	**32,500**

Workings

Relevant savings and revenue			
	25,000 units	***35,000 units***	***Shut down***
	Rs:	**Rs:**	**Rs:**
1 - Sales revenue			-
No. of units	25,000	35,000	
Selling price	Rs: 9.00	Rs: 7.50	
Sales revenue	**Rs: 225,000**	**Rs: 262,500**	
2. Savings made on material B			
Surplus available	5,000	-	30,000
Saving per litre	Rs: 1.25		Rs: 1.25
Total saving	**Rs: 6,250**	**-**	**Rs: 37,500**
3. Sale of machinery			
Current market price	Rs: 25,000	Rs: 25,000	Rs: 25,000
Reduction in value	Rs: 2,500	Rs: 3,500	-
Sale proceeds	**Rs: 25,000**	**Rs: 21,500**	**Rs: 25,000**
4. Disposal cost of material A			
Quantity to be disposed of	25,000	15,000	50,000

Cost of disposal	**Rs: 2,500**	**Rs: 1,500**	**Rs: 5,000**
5. Purchase cost of material B			
Production requirement	25,000	35,000	
No. of litres to be purchased	-	5,000	-
Purchase cost		**Rs: 7,500**	
6. Labour costs			
Normal labour costs	Rs: 62,500	Rs: 62,500	
Contract labour	-	Rs: 37,500	
	Rs: 62,500	**Rs: 100,000**	
1. Variable overhead @ Rs: 1.60 per unit* *Variable overhead/unit	Rs: 40,000	Rs: 56,000	
Total variable overhead	100,000		
less depreciation	(20,000)		
	80,000		
Variable overhead/unit *	Rs: 80,000		
	50,000		
	= Rs: 1.60 per unit		
8. Manager's salary	Relevant		
9. Redundancy pay	Relevant		
10. General fixed overheads and non-production overheads	Not relevant		

(b) An opportunity cost is the value which represents the cost of the next best alternative or the benefit forgone by accepting one course of action in preference to others when allocating scarce resources.
If there is only one scarce resource, decisions can be made by ranking alternatives according to their contributions per unit of the scarce resource. However, in reality, there will be many scarce resources, and different alternatives will use alternative combinations of those scarce resources. In these situations opportunity costs are used to identify the optimum use of those resources.

[*Solution* # 05]

Tip = This answer shows different ways of calculating the answer – of course, only one is required. The answer presents only one view: some items could be treated differently, so other solutions would be acceptable in an examination.

(a) Current pottery data

	Hours
Hours worked per person per four-week month (40 hours * 4 weeks)	160
Hours worked per person per annum (40 hours * 48 weeks)	1,920
Total hours available per annum (20 staff * 1,920 hours)	38,400
Capacity currently not being used per annum - 40%	15,360
Staff working elsewhere -25%	
Staff currently available for use per annum – 15%	5,760

Contribution from normal production:

	Tableware per set		*Tiles per 100*	
	Rs:	**Rs:**	**Rs:**	**Rs:**
Sales price		*50*		*200*
Material cost	*10*		*20*	
Labour cost	*10*		*50*	
Variable overhead	*10*		*50*	
		30		*120*
Contribution		***20***		***80***
No. of hours to produce : Rs: 10/Rs: 10.42 : Rs: 50/Rs: 10.42		**0.96**		**4.80**

Average contribution per hour based on standard mix:

	Hours	***Contribution***	***Contribution per hr***
		Rs:	**Rs:**
Tiles – 600	*28.8*	*480*	*16.67*
Tableware - 20 sets	*19.2*	*400*	*20.83*
Total	***48.0***	***880***	

Average contribution per hour = Rs: 880/48 = Rs: 08.33

Fish-and-chip shops contract

No. of batches = 5 shops * 20,000 tiles ÷ 100 tiles = 1,000

	Hours	***Hours***
Hours required = 1,000 batches * 4.8 hours		4,800
Supplied by:		
Hours currently available in next 6 months:		
5,760 * 24/48	2,880	
Plus two men decorating showroom		
(16 weeks available to work): (2 * 1,920) * 16/48	1,280	
		4,160
Hours still needed		**640**

The 640 hours can be found by stopping the two staff decorating the showroom (2 * (1,920 hours * 8/48 weeks) = 640 hours) and getting in a contractor, costing Rs: 5,000. The salaries of the two staff amount to 640 hours * Rs: 10.42 = Rs: 6,669. By employing a contractor D will save Rs: 1,669. (As the salaries are included in the contribution calculation that follows, only the net saving is included.)

	Rs:
Contribution = 1,000 batches * [Rs: 80 - (5% * Rs: 200)]	70,000
Add: cost saving	1,669
Net gain	**71,669**

Contribution per hour = Rs: 71,669 ÷ 4,800 = Rs: 14.93

Contribution per hour in a normal year = Rs: 70,000 ÷ 4,800 = Rs: 14.58

(The other option of paying overtime is possible but this will generate an additional cost and so is not calculated.

Alternative treatment

Cost of 640 hours using overtime:
Overtime possible: 15 staff * 6 hours * 24 weeks = 2,160 hours
Overtime needed for contract for 6 months, i.e. 640 hours.
Cost of overtime = 640 hours * overtime rate Rs: 10.42 * 150% = Rs: 10,003
Contribution generated without the 640 hours under question:

	Rs:	Rs:
Sales revenue 1,000 batches * (Rs: 200 - 5%)		190,000
Less:		
Materials and variable overhead:		
1,000 batches * Rs: 70	70,000	
Wages: 4,160 hours * Rs: 10.42	43,347	
		(113,347)
		76,653

Option 1 – contractor for shop to gain extra 640 hours:
Contribution as above less payment to contractor: Rs: 76,653 - Rs: 5,000 = Rs: 71,653
Option 2 – work overtime to gain extra 640 hours:
Contribution as above less overtime: Rs: 76,653 - Rs: 10,003 = Rs: 66,650

Z plc contract

Cost of work on swimming pool: (3 staff * 40 hours * 24 weeks) * Rs: 10.42 = Rs: 30,010

This is cheaper than making a donation.
The opportunity cost of giving up small contracts is Rs: 18.33 per hour (after charging labour cost). The cost of hiring new labour is only Rs: 10.42 per hour (excluding hiring cost, which is only Rs: 500). The cost of working overtime is Rs: 15.63 per hour. Therefore hiring new staff is the cheapest option, followed by working overtime. This also helps to keep the existing products/business going.

1)		
		Hours
40,000 sets * 0.96 hours		38,400
Hours available this year if all staff working in pottery	*15,360*	
Eight new staff * 1,920 hours	15,360	(30,720)
Therefore, hours still required		7,680
Less:		
Overtime – existing staff (20 * 6 hours * 24 weeks)	2,880	
new staff (8 _ 6 hours _ 24 weeks)	1,152	(4,032)
Remainder must be taken from small contracts		**3,648**
2)		
Contribution:	**Rs:**	**Rs:**
40,000 sets * (Rs: 20 - (15% * Rs: 50) = Rs: 12.50)		500,000
Add: saving on contractor for showroom		1,669
		501,669

Less - additional costs:		
Rent forgone	10,000	
Extra fixed costs	3,000	
Moulds	15,000	
Contractor for swimming pool	35,000	
Recruitment costs for eight staff	4,000	
Overtime premium 4,032 hours * Rs: 10.42 * 50%	21,007	
Lost contribution on small contracts: Rs: 18.33 * 3,648 hours	66,868	
		(154,875)
Net gain		**346,794**
Both contracts are feasible and profitable.		

(b) Z plc contract

			Hours
Maximum available hours without overtime (28 staff * 1,920)		53,760	
Less - Z plc contract			38,400
Hours available for normal production – only		**15,360**	
	Rs:		Rs:
Comparable contribution in a normal year			500,000
Less: fixed costs	3,000		
Rent forgone	10,000		(13,000)
			487,000

487,000 ÷ 38,400 hours = **Rs: 12.68**

Recommendation

Assuming that D expects that normal sales will pick up in the future, and that he is comfortable with the present size of the pottery, it is suggested that he accepts the fish-and-chip shop contract. The following points need to be considered:

Tiles for fish & chip shops

- This is a profitable contract which can be met without exceeding the pottery's existing capacity. D would actually save money by getting a contractor in to decorate.
- The additional profit generated is Rs: 71,669 and the contribution per hour is Rs: 14.93, compared with an average contribution on normal production of Rs: 18.33 per hour.
- Whether D will wish to accept further contracts in future years will depend on whether there is sufficient spare capacity. The contribution per hour next year will be Rs: 14.58. This is less than the contribution on existing work and so should be pursued only if there is spare capacity.

Z plc contract

- This generates a net gain of Rs: 346,794. This is a considerable amount, but the extra amount of work that it places on D must be considered.
- There is also the possibility that D may not be able to re-let the premises immediately the contract is completed. However, the rent lost is small in comparison to the gain on the contract.
- If further contracts were available, D would be unwise to accept them – assuming that the pottery was working near capacity by this time – as the business does not have adequate capacity to meet the normal production and the contract. The contribution per hour on the contract in a normal year would be only Rs: 12.68.

- Acceptance of the very large Z plc contract would have an effect on the nature of D's business. The company would change into a manufacturer for a department store and would have little say over future designs, etc.
- There is also the worry that the pottery might become reliant on Z plc at some stage because of the large volume of work done for the company. If, in future, Z plc withdrew the contract or reduced the price it was willing to pay, D's business could be in considerable difficulty.

[*Solution* # 06]

See answer in the question.

[*Solution* # 07]

This is in regular use. Any units of the material that are held in inventory will have to be replaced for other work if they are used for the contract. The relevant cost is their replacement cost. Relevant cost = replacement cost = 5,000 kilograms ×Rs: 2.10 =Rs: 10,500.

[*Solution* # 08]

This is not in regular use. There are 1,500 kilograms in inventory, and unless they are used for the contract they will be sold as scrap. The contract would need 2,000 kilos, so an additional 500 kilograms would have to be purchased. The relevant cost of material Y for the contract would be as follows:

	Rs:
Material held in inventory (scrap value)	1,800
New purchases (500 ×Rs: 5)	2,500
Total relevant cost of Material Y	**4,300**

The scrap value of the 1,500 kilos already purchased is their scrap value. This is the benefit that would be lost if the materials are used for the contract instead of using them for the next-most beneficial use (which is to sell them as scrap).

[*Solution* # 09]

This is not in regular use. There are 500 kilograms in inventory, and if they are not used for the work, they will either by sold as scrap (for Rs: 3 per kilo) or used in a different operation, which would save purchases of 500 kilos of material P at Rs: 4 per kilo. The relevant cost is the higher of these two values – 500 kilos ×Rs: 4 =Rs: 2,000 – because this is how the materials should be used if they are not used for the work under consideration.

[*Solution* # 10]

Skilled labour is in restricted supply and using labour for the job will mean that other work that earns Rs: 30 per hour will be lost.

	Rs:
Cost of labour hours (20 hours ×Rs: 30)	600
Contribution forgone – an opportunity cost: (20 hours ×Rs: 40)	800
Total relevant cost of skilled labour	**1,400**

[*Solution* # 11]

Grade A labour is in restricted supply. Grade B labour time is available and would otherwise be paid for as idle time. The relevant labour costs are therefore as follows.

	Rs:
Grade A labour: basic pay (8 hours ×Rs: 20)	160
Grade A labour: opportunity cost (8 hours ×Rs: 40)	320
Grade B labour: no incremental cost	0
Relevant cost of labour	**480**

[*Solution* # 12]

Department 1. There is spare capacity in department 1 and no additional cash expenditure would be incurred on labour if the contract is undertaken. Relevant cost =Rs: 0.

Department 2. There is restricted labour capacity. If the contract is undertaken, there would be a choice between:

- Overtime work at a cost of Rs: 18 per hour ($12 plus overtime premium of 50%) – this would be an additional cash expense, or
- Diverting the labour from other work, and losing contribution of Rs: 4 per hour – cost per hour =Rs: 12 basic pay + contribution forgone Rs: 4 =Rs: 16 per hour.

It would be better to divert the work force from other work, and the relevant cost of labour is therefore 100 hours ×Rs: 16 per hour =Rs: 1,600.

Department 3. There is restricted labour capacity. If the contract is undertaken, labour would have to be diverted from making product Z which earns a contribution of Rs: 10 per labour hour. This is an opportunity cost of labour if the contract work is undertaken. The relevant cost of the labour in department 3 is:

	Rs:
Labour cost (300 hours ×Rs: 20)	6,000
Contribution forgone (300 hours ×Rs: 10)	3,000
Total relevant cost, Department 3	9,000

Summary of relevant costs of labour:

	Rs:
Department 1	0
Department 2	1,600
Department 3	9,000
	10,600

[*Solution* # 13]

The machine is obviously in regular use. The relevant cost of the machine is therefore its replacement cost Rs: 45,000.

Note the following points.

- The purchase price of Rs: 20,000 is not a relevant cost. It is a sunk cost that was incurred in the past.
- Net book values are not relevant costs. They do not represent cash flows or disposal values. In this example the NBV of Rs: 4,000 is not a relevant cost.
- The net disposal value of Rs: 3,000 is only relevant if the machine will not be replaced and has no alternative use.

[*Solution* # 14]

a. Where labor must be hired from outside the organization, the relevant cost of labor will be the variable costs incurred. Relevant cost of labor on new contract = 15 hours @ Rs. 6 = Rs. 90.
b. It is assumed that the 5 hours spare capacity will be paid anyway, and so if these 5 hours are used on another contract, there is no additional cost to LW plc.

	Rs.
Direct labor (10 hours @ Rs. 6)	60
Spare capacity (5 hours @ Rs. 0)	0
	60

Contribution earned per unit of Product L produced = Rs. 22. If it requires 5 hours of labor to make one unit of product L, the contribution earned per labor hour = Rs. 22/5 = Rs. 4.40.

		Rs.
Direct labor (15 hours @ Rs. 6)	90	
Contribution lost by not making product L (Rs. 4.40 x 15 hours)	66	
		156

It is important that you should be able to identify the relevant costs which are appropriate to a decision.

[Solution # 15]

In part (b) do not be tempted to use unit rates to calculate the new level of fixed costs. The current level of fixed costs is £600,000 per period. This will increase by £700,000.

- Also in part (b), notice that the shift premium applies only to the technicians working on the additional shift. It does not apply to all technicians ' wages.
- In part (c) you may have thought of other, equally valid, factors to be considered. In an examination, if you are asked for three factors do not waste valuable time by suggesting more than three.

(a) Profit statement for current 12,000 capacity

	£000
Sales (12,000 tests @ £300/test)	3,600
Direct materials (12,000 tests @ £115/test)	(1,380)
Direct labour (12,000 tests @ £30/test)	(360)
Variable overhead (12,000 tests @ £12/test)	(144)
Contribution	1,716
Fixed costs (12,000 tests @ £50/test)	(600)
Profit	**1,116**

(b) Profit statement for 18,000 capacity, with additional shift

		£000
Sales (18,000 tests @ £300/test)		5,400
Direct materials (18,000 tests @ £92/test)		(1,656)
Direct labour (12,000 tests @ £30/test)	(360)	
(6,000 tests @ £45/test)	(270)	(630)

Variable overhead (18,000 tests @ £12/test)	(216)
Contribution	2,898
Fixed costs	(1,300)
Profit	**1,598**

(c) Three other factors that should be considered are:

- Will the increase in demand continue in the long run, or is it short-lived? If it is thought that it will continue in the long run, management should consider expanding its permanent workforce so that shift premiums can be avoided.
- Will the quality of the test decrease if more tests are carried out in the same time period? Also, purchasing materials at a 20 per cent discount may indicate a decrease in the quality of the materials.
- The elasticity of demand for the test. If demand is relatively inelastic, it may be more economic to increase the price of the test.

[Solution # 16]

Accept or reject decisions

Sales revenue	(1)	36,000
Costs:		
Material X	(2)	(200)
Material Z	(3)	4,200
Labour	(4)	11,000
Variable overhead	(5)	3,600
Depreciation	(6)	–
Fixed overheads	(7)	–
Lost scrap proceeds	(8)	3,000
		(21,600)
Net Relevant Contribution		**14,400**

Conclusion: the proposal should be accepted as it makes a positive contribution of $14,400 based on relevant costs.

(1) Revenue earned as a result of producing and selling T.
(2) No other use for X in business, but $200 disposal costs are saved by using X to make Ts.
(3) Z is used in the business and will have to be replaced for $0.175 x 2 x 12,000 = $4,200. Assuming inventories can be bought at this price.
(4) Opportunity cost of using labour = contribution foregone + cost of labour
= $1,000 + $10,000 = $11,000
(5) Variable overhead is only incurred when units are made.
 relevant cost = 12,000 x $0.30
(6) Depreciation is not a cash flow and not relevant
(7) These fixed overheads will be incurred regardless of whether or not Ts are made, therefore cost is not relevant.
(8) If machine is used, instead of scrapped the business loses $(7,000 – 4,000) of scrap proceeds.

However, the following non-financial factors also need to be considered:

(a) The likelihood of a more profitable proposal being received;

(b) Whether repeat orders would be expected at the same price in future years;

(c) Whether the company's present customers can be differentiated from this special order price.

[Solution # 17]

	$
Lost contribution (3 * $22)	66
Less: costs not saved	
– labour (3 * $30)	90
– Variable overheads (3 * $18)	54
	210

[Solution # 18]

Relevant Costing Statement

	Note	$
Aluminium plating	(1)	240
Rivets	(2)	50
Skilled labour	(3)	1,320
Semi-skilled labour	(4)	–
Overheads	(5)	–
		1,610
Administration overhead	(6)	–
Total relevant cost		1,610
Profit	(7)	–
Minimum price		**1,610**

Notes

(1) Aluminium is in regular use therefore it needs to be replaced. Value at current purchase price Relevant cost = 20m * $12 = 240

(2) Rivets = opportunity cost is lost scrap proceeds 100 * 50p = $50

(3) Skilled labour

Cheaper to work overtime as $24/hr is less than $36/hr (16 + 20)

		$
40 hrs @ $24	=	960
10 hrs @ $36	=	360
		1,320

(4) Semi skilled labour: Relevant cost = nil (spare capacity)

(5) Overheads – relevant cost is nil. Incurred anyway regardless of this job.

(6) Administration costs will be incurred anyway regardless of whether or not the job is accepted therefore not relevant.

(7) Profit mark up not relevant as question asks for a minimum price. A minimum price is one which just covers the total of the relevant costs.

[Solution # 19]

	Component	
	C1	**C2**
(a) Variable cost of production ($ per unit)	12.50	17.50
(b) Outside supplier cost ($ per unit)	(18.50)	(25.90)
Extra cost of buying-in ($ per unit)	6.00	8.40
	÷	÷
(c) Machine hours (number per unit)	2.00	3.00
Extra cost of buying-in ($ per machine hour)	**3.00**	**2.80**

Priority should be given to the production of component C1 in order to minimise the extra cost of buying-in.

(d) Production:
Component - C1 75 units (75 units x 2.0 machine hours/unit = 150 machine hours)
Component - C2 50 units [(300 – 150 machine hours) ÷ 3 machine hours per unit]

[Solution # 20]

The following statement is prepared in order to answer various questions.

Particulars	A	B
Sale Price (per unit)	100	120
Less- variable cost per unit		
Direct material	10	15
Direct Labor	15	10
Direct Expenses	5	6
Variable Overhead	15	20
Contribution	55	69
	÷	÷
Limiting factor	3	2
Contribution Per Scarce factor (Per Machine Hour)	**18.33**	**34.5**
Contribution Per Scarce factor (Per Material)	**27.5**	**23**

Profitability of each product in each of the following situations:

I] Total sales potential in units is limited: In this situation, the product with higher contribution per unit will be preferred as it will be more profitable to promote the same. Product B earns higher contribution per unit than product B as shown in the table and hence it will be more profitable in such situation.
II] Total sales potential in value is limited: Product with higher profit/volume ratio will be more profitable in such situation. Product B will be more profitable as its profit volume ratio is higher than that of A.

III] Raw material is in short supply: Product A will be more profitable in such situation as it earns higher contribution per kg of raw material.
IV] Production capacity in machine hours is limited: In such case, product B will be more profitable as it earns higher contribution per machine hour.

B] Optimum product mix if raw material is in short supply:

Raw Material availability is 10 000 kg, in such situation, it will be necessary to decide the priority between Product A and Product B. As mentioned in III above, if raw material is in short supply, Product B will be more profitable than Product A. The following statement is prepared to show the optimum product mix.

Product in order of priority	Units	Raw Material per unit	Total requirement of Raw Material	Contribution per unit	Total Contribution
A	3500	2 kg	7000	55	192500
B	1000*	3 kg	3000 #	69	69000
Total Contribution					261500
Less – Fixed Costs					
A:	17500**				
B:	35000***				52500
Profit					**209000**

Total raw material availability is 10 000 kg out of which 7000 is used for A as it has the priority due to higher contribution per kg. Balance 3000 kg is available for producing product B.
***** In the balance 3000 kg, 1000 units of B are possible as the requirement is 3 kg per unit.
****** Fixed cost per unit is given Rs.5 for product A, hence total fixed cost for A is Rs.17,500
******* Fixed cost per units is Rs.10 for B and hence total fixed cost for B is Rs.35,000

[*Solution* # 21]

In the example, the direct labour hour is the key factor or constraint. The availability of the same is only 14000 labour hours and hence the priority of the products will have to be decided as all the product cannot be produced equal to the maximum quantity. The contribution per direct labour hour will be criteria for determining the priority. In the following table the contribution per unit and per direct labour hour is shown.

1] Statement showing Contribution per Direct Labour Hour and Priority of Production

Particulars	A	B	C	D	E
Sale Price (per unit)	70	92	95	110	180
Less- variable cost per unit					
Direct material	20	24	32	40	60
Direct Labor	10	12	12	16	20
Variable Overhead	5	6	6	8	10

Contribution	35	50	45	46	90
	÷	÷	÷	÷	÷
Limiting factor	0.67	0.8	0.8	1.06	1.33
Contribution Per Scarce factor (Per Direct labor Hour)	**52.23**	**62.5**	**56.25**	**43.39**	**67.66**
Ranking	**4**	**2**	**3**	**5**	**1**

***** Direct labour hours for each product is computed by dividing the direct labor cost per unit of each product by direct labor rate per hour, which is Rs.15.

The next step in the problem is to work out the amount of profit as per the production plan prepared by the company. This computation is shown in the next statement.

2] Statement showing Amount of Profit as per Production Plan of the company

Particulars	**A**	**B**	**C**	**D**	**E**
No of Units to be sold	3000	4000	4000	3000	2400
Contribution	35	50	45	46	90
Total contribution	105000	200000	180000	138000	216000
Less- Total Fixed Cost	45000	72000	72000	72000	72000
Profit	**60000**	**128000**	**108000**	**66000**	**144000**

3] Statement showing Production Plan for Optimizing Profit

Product in order of priority	**Units**	**No of hours required**	**Contribution per unit**	**Total Contribution**
E	4000	5334	90	360000
B	6000	4800	50	300000
C	3331 (bal)	2665	45	149895
A	1000	667	35	35000
D	500	534	46	23000

Amount of maximum profit = Total Contribution – Total Fixed Cost
= Rs.8, 67,895 – Rs.3, 33,000 = Rs.5, 34, 895

****** Number of units X labour hours per unit

[*Solution* # 22]

The following statement is prepared to compute the contribution per unit and for deciding best production plan in each case. There are limiting factors like raw material and direct labour. For deciding the best production plan, priority of the products will have to be decided by computing the contribution per unit of the key factor. Accordingly the following statements are prepared.

I] Raw Material availability is 12, 100 kg

Statement Showing Contribution per kg.of Raw Material

Particulars	A	B	C
Sale Price (per unit)	20	16	10
Less- variable cost per unit			
Direct material	6	4	2
Direct Labor	3	3	1.50
Variable Overhead	2	1	1
Contribution	9	8	5.50
	÷	÷	÷
Limiting factor	0.6	0.4	0.2
Contribution Per Scarce factor (Per Direct Material Hour)	**15**	**20**	**27.50**
Ranking	**3**	**2**	**1**

2] Statement showing Best Production Plan: Raw Material Availability Constraint

Product in order of priority	Units	Raw Material Per Unit	Total raw Material (kg)	Contribution per unit	Total Contribution
C	20000	0.2	4000	5.50	110000
B	12000	0.4	4800	8	96000
A	5500	0.6	3300 *	9	49500
Total			12000		255500
Less – Fixed Cost					138000
Profit					**117500**

- Total availability of raw material is 12100 kg as given in the problem. Total 8800 kg are consumed for producing the maximum production of C & B & hence the balance quantity of 3300 kg is used to produce 5500 kg of product A.

3] Statement showing Contribution per Direct labor Hour:

Particulars	A	B	C
Contribution	9	8	5.50
	÷	÷	÷
Limiting factor	0.2	0.2	0.1
Contribution Per Scarce factor (Per labor Hour)	**45**	**40**	**55**
Ranking	**2**	**3**	**1**

4] Statement showing Best Production Plan: Direct labor Hour Constraint

Product in order of priority	Units	Raw Material Per Unit	Total raw Material (kg)	Contribution per unit	Total Contribution
C	20000	0.1	2000	5.50	110000
B	10000	0.2	2000	9	90000
A	5000	0.2	1000*	8	40000
Total			5000		240000
Less – Fixed Cost					138000
Profit					**102000**

- Balance labour hours after producing C & A to the maximum possible extent.

5] Statement showing Profit Volume ratio

Particulars	A	B	C
Sale Price per unit	20	16	10
Contribution	9	8	5.50
Profit Volume Ratio	**45%**	**50%**	**55%**
Ranking	**3**	**2**	**1**

6] Best Production Plan when sale of one product can be increased by spending Rs: 20000/- on advertising.

Product	Units	Contribution per unit	Total Contribution
A	10000	9	90000
B	12000	8	96000
C	25000 *	5.50	137500
Total Contribution			323500
Less – Fixed Cost			158000
Profit			**165500**

* Sales of any one product can be increased by 25% by spending additional amount on advertising Rs.20,000. In such situation, the product with highest profi t/volume ratio can be promoted and hence production and sales of product C should be increased by 25% as the profi t/volume ratio for the same is highest. Thus the production and sale units will be 25% higher, i.e. 20 000 + 25% of 20 000 = 25 000 units.

[*Solution* # 23]

1] The original budget for the year 2008-09 is prepared as shown below.

Original Monthly Budget for the Year 2008-09

Particulars	A	B	C	Total
Sale Units	8000	4000	6000	
Sale Price (per unit)	40	80	100	
Less- variable cost per unit				
Direct material	20	48	40	
Direct Labor (dept 1)	5	10	20	
Direct Labor (dept 2)	8	4	12	
Variable Overhead	3	3	7	
Contribution per unit	4	15	21	
Total Contribution	32000	60000	126000	218000
Less - Fixed Cost				150000
Profit				**68000**

2] Optimum product mix after taking the action plan into consideration: For determining the optimum product mix, the following working is done.

1] Ranking of product as per revised figure.

Particulars	A	B	C
Sale Units	12000	6000	10000
Sale price (per unit)	40	80	100
Less - Discount	1 [2.5%]	7 [8.75%]	1 [1%]
Revised sale Price	39	73	99
Less- Variable cost per unit	36	65	79
Contribution per unit	3	8	20
	÷	÷	÷
Direct Labor Hour (dept 1)	1	2	4
Contribution Per Hour (dept 1)	**3**	**4**	**5**
Ranking	**3**	**2**	**1**

2] Direct Labor hour capacity of deptt 1

Product	Sale Units	DLH per unit	Total Hours in deptt 1
A	8000	1	8000
B	4000	2	4000
C	6000	4	24000
Total hours			40000
Additional Hours			15000
Total revised Capacity Hours			**55000**

3] Statement of Optimum Product Mix

Product	Units	Hour in deptt 1	Hours Utilized
C	10000	4	40000
B	6000	2	12000
A	3000	1	3000*
Total			**55000**

- After producing product C & B to the maximum possible extent as per the market demand, balance hours available for A are 3000 in which 3000 units of A can be produced.

4] Statement showing Optimum Monthly Profit

Product	Units	Contribution per unit	Total Contribution
C	10000	20	200000
B	6000	8	48000
A	3000	3	9000
Total Contribution			257000
Less – Fixed Cost			168000
Profit			**89000**

3] Impact of Overtime Working:

I] Total hours in department 2 as per original budget

Product A	: 8000 units * 2 hrs in dept. 2	=	16, 000 hours
Product B	: 4000 units * 1 hr in dept. 2	=	4, 000 hours
Product C	: 6000 units * 3 hrs in dept. 2	=	18, 000 hours
Total hours available in dept. 2		=	**38, 000 hours** (original budget)

If the optimal product mix is worked out as shown in Statement III in answer to question 2 above, the required hours in department 2 will be as follows:

Product C	: 10, 000 units * 3 hrs per unit in dept 2	=	30, 000 hours
Product B	: 6, 000 units * 1 hr per unit in dept 2	=	6, 000 hours
Product A	: 3, 000 units * 2 hrs per unit in dept 2	=	6, 000 hours
Thus total number of hours required in dept 2		=	**42, 000 hours**

Overtime working will be required for hours beyond 40 000 hours, i.e. for 2000 hours
The overtime premium will be 2000 hours * Rs.8 [double rate] = Rs.16, 000
Thus the amount of profit will be reduced to Rs.89, 000 – Rs.16, 000 = Rs.73,000

[*Solution* # 24]

I] In order to decide about which proposal should be accepted, the contribution per machine hour, which is a limiting factor, will have to be worked out. The product, which will yield higher contribution per machine hour, will have to be promoted for maximizing the profits. The following statement is prepared for this purpose:

Statement showing Comparative Analysis of the two Export Proposals

Particulars	Offer from Canada for = A	Offer from Middle East for = B
Export Price (per unit)	17.50	15.50
Less- variable cost per unit		
Direct material	2	4
Direct Labor	4	4
Special Packing Charges	0.50	0.50
Variable Selling & Admin Expenses	3.20	2
Variable Overhead	3	1
Contribution	4.80	3.20
	÷	÷
Limiting factor	2.50	1.50
Contribution Per Scarce factor (Per Machine Hour)	**1.92**	**2.13**
Ranking	**2**	**1**

It is clear from the above statement that product B yields higher contribution per machine hour and hence offer from Middle East should be accepted as compared to the offer from Canada.

* Machine hours per unit are computed as under.

Product A: Factory overheads per unit Rs.5, machine hour rate Rs.2, factory overheads are absorbed on the basis of machine hours and hence the machine hours per unit of A are Rs. 5/2.5 = 2.5
Product B: Factory overheads per unit Rs.3, machine hour rate Rs.2, hence the machine hours per unit of B are Rs. 3/2 = 1.5 hrs

II] ***Overall Profitability:*** For showing overall profitability units of product A sold in domestic market and units of product B sold in domestic market as well as in the export market of Middle East will have to be taken into consideration. The following statement is prepared to show the overall profitability.

Statement showing Overall Profitability

Particulars	A	B
Sale Units	600	867*
Sales Value	600 *23 = **13800**	400 * 19 = 7600 & 467 *15.50 = 7239** Total = **14839**
Less – Variable Cost		
Direct material	1200	3468
Direct Labor	2400	3468
Special Packing Charges	-	234
Variable Selling & Admin Expenses	1920	1734
Variable Overhead	1800	1561
Contribution	6480	4374
Less – Fixed Cost #	4080	1680
Profit	2400	2694

***** Units of product B are computed in the following manner:
Machine hrs per unit of A = 2.5 [as shown above] * 600 units = 1500 hrs
Machine hrs per unit of B = 1.5 [as shown above] * 400 units = 600 hrs
Thus total machine hrs used = 1500 + 600 = 2100 hrs, these hours represent 75% capacity as given in the example and so for 100% capacity the number of machine hours used will be 2100/75 * 100 = 2800 hrs. Thus additional 700 hrs will be available for the export offer in which 467 units of B will be produced. [1.5 hrs for 1 unit]

****** The selling price for B in the export market is Rs.15.50 per unit.

Fixed overheads for both the products consist of factory overheads and selling and administration overheads.

[*Solution* # 25]

The machine hours required for one unit of Z are 15 [for A, 4, B, 5 and C, 6, Total 15]. Total availability of machine hours is 12, 000 and so, 12, 000/15 = 800 units of Z can be produced from these hours. The following statements are prepared.

I] Statement Showing the Current Profit

Output and sales of Product Z = 800 units

Particulars	Rs
Sale Price per unit	300
Variable Cost per unit	218
Contribution	82
Total Contribution (800*82)	65600
Less - Fixed Cost	50000
Profit	**15600**

Statement of Additional Cost per hour if components are purchased from market

Particulars	A	B	C
Market price per unit	64	75	110
Less – Variable Cost	48	60	80
Additional cost of purchasing per unit	16	15	30
Hours saved by purchasing	4	5	6
Additional cost per hour saved	16/4 = 4	15/5 = 3	30/6 = 5

It can be seen from the above statement that additional cost per unit if the component is purchased from outside is Rs.3 for B which is the least cost. The demand is expected to be 25% more in the next month. The utilization of machine hours will be planned in such a manner that A and C can be produced to the maximum possible extent from the available machine hours and B can be partially produced and partially purchased from the open market. The following statement is prepared to show this computation.

II] Statement showing the utilization of Machine Hours:

Component C : Maximum units 1000 : Machine hours required: 6000
Component A : Maximum units 1000 : Machine hours required: 4000
Component B : Units to be manufactured 400 : Machine hours: 2000 *
Balance units of B i.e. 600 [1000 – 400] can be purchased from the market.

* 2000 are the balance of machine hours available to produce B, C and A are produced to the maximum possible extent as permitted by the demand as the additional cost of purchase per unit is the highest for C and followed by A.

III] Statement of Profit as per suggestion given in II

Particulars	Amount	Amount
Sales Value (1000*300)		300000
Cost of making 1000 units of C @ Rs: 80	80000	
Cost of making 1000 units of A @ Rs: 48	48000	
Cost of making 400 units of B @ Rs: 60	24000	
Cost of making 600 units of B @ Rs: 75	45000	

Assembly Cost of Z (1000 units @ Rs:30)	30000	
Total Variable Cost		(227000)
Contribution		**73000**
Less – Fixed Cost		(50000)
Profit		**23000**

[*Solution* # 26]

I] Statement showing Present Cost and Profit

Particulars	A	B	TOTAL
Production & sales	**30000**	**20000**	**50000**
Sales Value	360000	400000	760000
Less – Variable Cost:			
Direct Material	60000	80000	140000
Direct labor	90000	100000	190000
Factory Overhead	45000	50000	95000
Admin & Selling Overhead	30000	30000	60000
Contribution	**135000**	**140000**	**275000**
Less – Fixed Cost			155000
Profit			**120000**

II] Statement showing Cost and Profit after Diversification

Particulars	A	B	C
Capacity Levels	**60%**	**60%**	**40%**
Production & Sales	**18000**	**12000**	**30000**
Sales Value	216000	240000	420000
Less – Variable Cost:			
Direct Material	36000	48000	75000
Direct labor	54000	60000	90000
Factory Overhead	27000	30000	45000
Admin & Selling Overhead	18000	18000	30000
Contribution	**81000**	**84000**	**180000**
Total Contribution			345000
Less – Fixed Cost (95000+60000)			155000
Profit			**190000**

Recommendation: The Company should implement the proposed diversification as it has resulted into increase in the profit from Rs.120, 000 to Rs.190, 000

[Solution # 27]

Statement Showing Comparative Profits

Particulars	Continuing operations at 50% capacity Rs.	Shut Down of Factory Rs.
Sales	990000	--
Variable Costs		
Direct material	300000	
Direct Labor	400000	
Production Overhead*	60000	
Administration Overhead*	20000	
Selling & Distribution Overhead*	30000	
Contribution	180000	
Less - Fixed Cost**	380000	220000
Settlement Cost	-	150000
Maintenance of Plant	-	20000
Overhauling Costs	-	80000
Net Income	(200000)**	(470000)

Recommendation: It is not advisable for the company to suspend operations as shut down loss is higher than the loss associated with continued operations.

* The overheads given in the example are semi variable. It is essential to divide them fixed and variable. The working required for division of the same is shown below.

Amount (Rs.)

Overhead Types	Budgeted Capacity 60% capacity	Budgeted Capacity 80% capacity	Difference at 20% capacity showing variable expenses	Capacity difference at 1%	Total Variable Overhead 60% capacity	Fixed Overhead
Production	252000	276000	24000	1200	72000	180000
Administration	124000	132000	8000	400	24000	100000
Selling & Distribution	136000	148000	12000	600	36000	100000

Note:
The variable overheads shown in the table are at 60% capacity. In the example it is given that the company is operating at 50% capacity and hence it is necessary to compute the variable overheads at 50% capacity. This computation is shown below.

Production overheads: 50/60 * 72, 000	= Rs.60, 000
Administration: 50/60 / 24, 000	= Rs.20, 000
Selling and distribution overheads: 50/60 * 36, 000	= Rs.30, 000
Total variable overheads	**= Rs.1, 10, 000**

** Fixed overheads: Rs.3, 80, 000 as shown in the last column of the above table.
*** Net income = Contribution – Fixed cost

[*Solution* # 28]

Relevant costs of 200,000 units i.e. 100,000 kgs

				Rs
Direct Material-A		100,000*0.5*300		15,000,000
Direct Material-B		100,000*110		11,000,000
Parking		200,000*30		6,000,000
Skilled Labour				
	Hours required	5/100*100,000=5,000		
	4,500*70			315,000
	500*35			17,500
Unskilled Labour				
	Hours required	10/100*100,000=10,000		
	10,000*45			450,000
Total Relevant cost				**32,782,500**
Add: 25% profit			8,195,625	
Total Sales Value				**40,978,125**
Sales price per pack (200,000 pack)				**205**

[*Solution* # 29]

	Reasons	Rs.
Paper	– Book value is irrelevant because it is a sunk cost, as there is no other use replacement would not occur so the opportunity cost or scrap sale proceeds is the relevant value.	2,500
Ink	– Since this involves a future cost if the work is undertaken the purchase price should be used. Since the remaining inventory has no foreseeable use it has no value so the entire purchase cost is used.	3,000
Skilled labour	– Since the weekend working is caused if the work is undertaken the full cost is relevant: 125 hours @ Rs.4 per hour = Rs.500 125 hours @ Rs.5 per hour = Rs.625	1,125
Unskilled labour	– The weekend work results in 50 hours time off in lieu, this with the 75 other hours worked totals 125 hours which is less than 200 hours of idle time which are already being paid for, thus there is no incremental cost.	Nil
Variable OH	– This is a future cost which will be incurred if the work is undertaken	1,400
Printing press	– The depreciation is a past cost and should be ignored, however, the use of the press has an opportunity cost. If this work is undertaken then the press is not available for hire. The opportunity cost is the contribution which would be earned from hiring: 200 hours @ (Rs.6 – Rs.3)	600
Production fixed Costs	– As these costs are unaffected by the decision they should be ignored.	Nil
Estimating costs	– These costs are past or sunk costs and should be ignored.	Nil
Minimum price		**8,625**

[*Solution* # 30]

1 **T Co**

(a) Cost statement	$	Note
Lunch	0	1
Engineers' costs	500	2
Technical advisor	480	3
Site visits	0	4
Training costs	125	5
Handsets	2,184	6
Control system	7,600	7
Cable	1,300	8
Total cost	12,189	

Notes

Note 1: Lunch

This past cost is a 'sunk cost' and should therefore be excluded from the cost statement. It has already arisen and is therefore not incremental.

Note 2: Engineers' costs

Since one of the engineers has spare capacity, the relevant cost of his hours is Nil. This is because relevant costs must arise as a future consequence of the decision, and since his wage will be paid regardless of whether he now works on the contract for Push Co, it is not an incremental cost.

The situation for the other two engineers is slightly different. Their time is currently fully utilised and earning a contribution of $5 per hour each. This is after deducting their hourly cost which, given a salary of $4,000 per month each, is $25 per hour ($4,000/4 x 40). However, in one week's time – when they would otherwise be idle – they can complete Contract X and earn the contribution anyway. Therefore, the only relevant cost is the penalty of $500 that will be payable for the delay on Contract X.

Note 3: Technical advisor

Since the advisor would have to work overtime on this contract, the relevant cost is the overtime rate of $60 ($40 x 1·5) per hour. This would total $480 for the whole job.

Note 4: Site visits

This is a cost paid directly by Push Co to a third party. Since it is not a relevant cost for T Co, it has been excluded.

Note 5: Training costs

Since the trainer is paid a monthly salary irrespective of what work he does, this element of his cost is not relevant to the contract, since it is not incremental. However, the commission of $125 will arise directly as a consequence of the decision and must therefore be included.

Note 6: Handsets

Although T Co has 80 of the 120 handsets required already in inventory, they are clearly in regular use in the business. Therefore, if the 80 are used on this contract, they will simply need to be replaced again. Consequently, the relevant cost for both the 40 that need to be bought and the 80 already in inventory is the current purchase price of $18·20 each. 120 x $18·20 = $2,184.

Note 7: Control system

The historic cost of Swipe 1, $5,400, is a 'sunk' cost and not relevant to this decision. However, since the company could sell it for $3,000 if it did not use it for this contract, the $3,000 is an opportunity cost here. The current market price for Swipe 1 of $5,450 is totally irrelevant to the decision as T Co has no intention of replacing Swipe 1, since it was bought in error. In addition to the $3,000, there is a

modification cost of $4,600, bringing the total cost of converting Swipe 1 to $7,600. This is still a cheaper option than buying Swipe 2 for $10,800, therefore the company would choose to do the modification to Swipe 1. The cost of $10,800 of a new Swipe 2 system is therefore irrelevant now.

Note 8: Cable

The cable is in regular use by T Co, therefore all 1,000 metres should be valued at the current market price of $1·30 per metre. The $1·20 per metre is a sunk cost and not relevant.

(b) Relevant costing principles

Relevant costs are those costs that change as a result of making a particular decision. In simple terms, a relevant cost is a future cash flow arising as a direct consequence of a decision. In order for a cost to be relevant to a decision, it must therefore meet all three of these criteria:

Future – any costs which have already been incurred are regarded as 'sunk' costs and will prevent a cost from being considered relevant.

Cash flow – the cost must be a cash flow and not just an accounting adjustment, such as a provision for a debt or depreciation. Also, cash flows that are the same for all alternatives are not relevant.

Direct consequence – this criteria means that the cash flow must be incremental. For example, if a cost has already been committed to, then it will arise irrespective of whether the decision goes ahead. It will not therefore meet the 'direct consequence' criteria.

Opportunity cost – this is the value of the best alternative that is foregone as a result of making a decision. In the case of the telephone system that Push Co needs for the contract, the foregone sales proceeds of $3,000 are an example of an opportunity cost since, by using the system for this contract, Push Co foregoes these sales proceeds.

Significance of minimum price calculated

The cost calculated in part (a) is a starting point only, showing the minimum cost that could be charged to the customer. If T Co charged this price, it would be no better or worse off than if it did not carry out the work, i.e. it would make no profit or loss. This means that T Co would not be rewarded for the risk that it takes in completing the work, unless some kind of a mark-up is also incorporated. Also, other costs – such as the lunch of $400 – whilst not incremental to the decision now, have been incurred. Ideally, therefore, T Co should seek to recover them. It could also be that, for example, in one week's time, when the engineers are busy completing the delayed contract X, another opportunity comes up that the company has to reject because the engineers are busy on Contract X. Therefore, with hindsight, it would be seen that there was an opportunity cost associated with using the engineers on this work and delaying contract X. Furthermore, none of the business's overheads have been considered in the cost statement and, in the long term, these would need to be covered. It is clear, therefore, that the relevant cost calculated in part (a) is only a starting point for T Co to use when deciding how to price the contract. The purpose of accepting contracts is to make profit and increase shareholder wealth. This will only be done if a price higher than the relevant cost of the contract is charged. In setting this price, however, T Co also needs to give consideration to the fact that it hopes to attract future work from Push Co. The price needs to be attractive enough for the customer to return in the future.

[*Solution* # 31]

The asset has no other use and would not be replaced if it is disposed of. The options are to sell the equipment and earn $12,000 or not to sell it and earn nothing. The relevant cost is $12,000.

[*Solution* # 32]

The asset has no other use and will not be replaced. If the contract is undertaken, the company will lose the opportunity to sell the equipment for $4,000. In addition, it would have to pay disposal costs of $2,000 at the end of the three months. The total relevant cost is therefore $4,000 + $2,000 = $6,000. (The net book value is totally irrelevant.)

[*Solution* # 33]

A total of 900 hours would have to be found by either working overtime at a cost of $15 × 150% = $22.50 per hour, or diverting labour from other work that earns a contribution of $5 per hour after labour costs of $15 per hour. The opportunity cost of diverting labour from other work is therefore $20 per hour. This is less than the cost of working overtime. If the contract is undertaken, labour will therefore be diverted from the other work. It is assumed that the 500 hours of free labour time (idle time) available would be paid for anyway, even if the contract is not undertaken. The relevant cost of these hours is therefore $0.

Relevant cost of labour	**$**
500 hours	0
900 hours (× $20)	18,000
Total relevant cost of labour	**18,000**

[Solution # 34]

(a)	**(£)**
Purchase price of component from supplier	50
Additional cost of manufacturing (variable cost only)	34
Saving if component manufactured	**16**

The component should be manufactured provided the following assumptions are correct:

(i) Direct labour represents the *additional* labour cost of producing the component.
(ii) The company will not incur any additional fixed overheads if the component is manufactured.
(iii) There are no scarce resources. Therefore the manufacture of the component will not restrict the production of other more profitable products.

(b) **(i)** Additional fixed costs of £56 000 will be incurred, but there will be a saving in purchasing costs of £16 per unit produced. The break-even point is 3500 units (fixed costs of £56 000/£16 per unit saving). If the quantity of components manufactured per year is less than 3500 units then it will be cheaper to purchase from the outside supplier.

(ii) The contribution per unit sold from the existing product is £40 and each unit produced uses 8 scarce labour hours. The contribution per labour hour is £5. Therefore if the component is manufactured, 4 scarce labour hours will be used, resulting in a lost contribution of £20. Hence the relevant cost of manufacturing the components is £54, consisting of £34 incremental cost plus a lost contribution of £20. The component should be purchased from the supplier.

(c) The book value of the equipment is a sunk cost and is not relevant to the decision whether the company should purchase or continue to manufacture the components. If we cease production now, the written-down value will be written off in a lump sum, whereas if we continue production, the written down value will be written off over a period of years. Future cash outflows on the equipment will not be affected by the decision to purchase or continue to manufacture the components.

[Solution # 35]

(a) ***Calculation of minimum selling price:***

			(£)
Direct materials:	Steel	*a*	55.00
Brass Fittings		*b*	20.00
Direct Labour:	Skilled	*c*	300.00
	Semi-skilled	*d*	—
Overhead		*e*	7.50
Estimating time		*f*	—
Administration		*g*	–
Relevant cost of the order			**382.50**

Notes:

A Using the materials for the order will result in them having to be replaced. Therefore future cash outflows will increase by £55.

B Future cash outflows of £20 will be incurred.

C The required labour hours can be obtained by reducing production of another product involving a lost contribution before deducting the labour cost of £21 (£13 + £8) per hour (note that the labour cost will be incurred for all alternatives and therefore is not an incremental cash flow). Alternatively, the company can pay additional wages involving overtime of £300 (25 hours × £12). Therefore the latter course of action is the most economical and the incremental cash flows from undertaking the order will be £300.

D No incremental cost is involved since the alternative is paid idle time.

E The only incremental cost is power consisting of 10 hours at £0.75 per hour.

F Estimating time is a sunk cost.

G Administration does not involve any incremental cash flows.

(b) Factors to be considered include:

(i) Time period for repeat orders, the number of repeat orders and the likely demand;
(ii) The cash flows generated from the alternative use of the capacity;
(iii) Competition to obtain future orders from Exe plc;
(iv) Estimated price quotations from competitors.

(c) ***Limiting factor presentation:***

	Product X	Product Y
Product contribution	£10	£20
Kg of material used per product	1	4
Contribution per kg	**£10**	**£5**

Thus scarce materials should be allocated to Product X since it yields a contribution of £5 per kg in excess of the contribution derived from Product Y.

Opportunity cost approach:

	Product X	Product Y
Product contribution at acquisition cost	£10	£20
Lost contribution from alternative use:		
1 kg allocated to Y at £5 per kg	(£5)	
4 kg allocated to X at £10 per kg		£40
Cash flow impact per product	+£5	–£20
Cash flow impact per kg	**+£5 (£5/1 kg)**	**–£5 (£20/4 kg)**

The above analysis shows that X yields a contribution of £5 per kg when taking alternative uses of the materials into consideration. Producing Product Y results in the contribution being reduced by £5 per kg taking into account the alternative use of the materials. This is consistent with the limiting factor approach which indicates that the company is £5 per kg better off using the materials for X or £5 per kg worse off from using the materials for Y.

[Solution # 36]

(a) (i)

	Product I (£000)	Product II (£000)	Product III (£000)	Total (£000)
Sales	2475	3948	1520	7943
Contribution	1170	1692	532	3394
Attributable fixed costs	(275)	(337)	(296)	(908)
General fixed costs *a* –	(520)	(829)	(319)	(1668)
	(795)	(1166)	(615)	(2576)
Profit	**375**	**526**	**(83)**	**818**
	£1.6/unit	£1.40/unit	(£0.04/unit)	

Note

A General fixed costs are allocated to products at 21% of total sales revenue (£1668/£7943)

(ii) If Product III is discontinued it is assumed that variable costs and attributable (i.e. specific) fixed costs are avoidable. It is assumed that general fixed costs are common and unavoidable to all products and will remain unchanged if Product III is discontinued. However, it is possible that some general fixed costs may be avoidable in the longer term. The revised profits if Product III is discontinued will be:

		(£000s)
Contribution of Products I and II	(£1170 + £1692)	2862
Attributable fixed costs	(£275 + £337)	(612)
General fixed costs		(1668)
Profit		**582**

Profits will decline by £236 000 (£818 * £582) if Product III is discontinued because A Ltd will no longer obtain a contribution of £236 000 (£532 * £296) towards general fixed costs.

(iii) Extra sales of 15 385 units (£80 000 additional fixed costs£5.20 unit contribution) will be required to cover the additional advertising expenditure. It is assumed that existing fixed costs will remain unchanged.

(iv) The revised unit contribution will be £3.45 (£9.45/£6).

Required sales
£1 692 000 (existing total contribution)
£3.45 revised unit contribution
1692000 (existing total contribution) /3.45 (revised unit contribution)= 490 435 units (an increase of 30.4% over the budgeted sales of 376 000 units)

(b) The following factors will influence cost behaviour in response to changes in activity:

(i) The magnitude of the change in activity (more costs are likely to be affected when there is a large change in activity).
(ii) Type of expense (some expenses are directly variable with volume such as direct materials, whereas others are fixed or semi-fixed).
(iii) Management policy (some expenses are varied at the discretion of management, e.g. advertising).
(iv) The time period (in the long term, all costs can be changed in response to changes in activity whereas in the short term, some costs, e.g. salaries of supervisors, will remain unchanged).

[Solution # 37]

Task 1: **(a) and (b)**

Selling price	£60	£70	£80	£90
Sales volume (units)	25 000	20 000	16 000	11 000
	(£ per unit)	(£ per unit)	(£ per unit)	(£ per unit)
Direct material	14.00	14.00	14.00	16.10 (£14 × 115/100)
Direct labour	13.00	13.00	11.70 (90%)	11.70
Variable production overhead	4.00	4.00	4.00	4.00
Sales commission (10% of selling price)	6.00	7.00	8.00	9.00
Total variable cost per unit	37.00	38.00	37.70	40.80
Contribution per unit	23.00	32.00	42.30	49.20
	£000	£000	£000	£000
Total contribution	575	640	676.8	541.2
Fixed costs:				
Production overhead (25 000 × £8)	200	200	190	190
Selling and distribution (25 000 × £3)	75	70	70	70
Administration (25 000 × £2)	50	50	50	50
Total fixed costs	325	320	310	310
Total annual profit	**250**	**320**	**366.8**	**231.2**

Task 2

(a) A selling price of £80 maximises company profits at £366 800 per annum.

(b) Factors to be considered include:

(i) The effect on morale arising from a large reduction in direct labour and the resulting redundancies.

(ii) If competitors do not increase their prices customers may migrate to competitors in the long term and long-term annual profits may be considerably less than the profits predicted in the above schedule. The migration of customers may also enable competitors to reap the benefits of economies of scale thus resulting in their having lower unit costs than Rane Ltd.

Task 3

(a) The products should first be ranked according to their contribution per component used.

	Product A	**Product B**	**Product C**	**Product D**
	£ per unit	**£ per unit**	**£ per unit**	**£ per unit**
Selling price	14	12	16	17
Variable costs	(11)	(11)	(12)	(12)
Contribution	**3**	**1**	**4**	**5**
Number of components used per unit	2 (£4/£2)	1 (£2/£2)	3 (£6/£2)	4 (£8/£2)
Contribution per component	£1.50	£1.00	£1.33	£1.25
Ranking	**1**	**4**	**2**	**3**

The scarce components should be allocated as follows:

Product	**Units**	**Components used**	**Balance unused**
A	4000	8 000	14 400
C	3600	10 800	3 600
D	900	3600	
		22 400	

(b) Profit to be earned next period:

Product	**Units**	**Contribution per unit (£)**	**Total (£)**
A	4000	3	12 000
C	3600	4	14 400
D	900	4	500
Total contribution			30 900
Fixed costs			(8000)
Profit			**2290**

[Solution # 38]

(a) Before finding out the profit for 2010, it is necessary to work out the contribution per Kg for various products:

	PRODUCTS			
	Washing Powder	Detergent Powder	Bleaching Powder	Rust Remover
Selling price	Rs.65.25	Rs.110.25	Rs.132.75	Rs.192.00
Less: Variable costs				
Direct materials	18.00	40.50	31.50	72.00
Direct labour	22.50	30.00	54.00	72.00
Variable overheads	6.75	15.00	18.00	19.50
	47.25	85.50	103.50	163.50
Contribution (1 – 2)	18.00	24.75	29.25	28.50

Existing spare capacity of 10,000 Kg has to be utilized by increasing production of Bleaching Powder to 35,000 Kg (due to highest contribution).

	Products				
	Washing Powder	Detergent Powder	Bleaching Powder	Rust Remover	Total
Revised production (Kg)	20,000	5,000	35,000	15,000	
Contribution per Kg	18.00	24.75	29.25	28.50	
Total contribution	360,000	123,750	1,023,750	427,500	1,935,000
Fixed overhead	225,000	75,000	675,000	540,000	(1,515,000)
Profit	135,000	48,750	348,750	(112,500)	420,000

(b) Statement showing the profitability of the products during 2011

	Washing Powder	Detergent Powder	Bleaching Powder	Rust Remover	Total
Production (Kg)	20,000	30,000	35,000	15,000	
Contributions per Kg	18.00	24.75	29.25	28.50	
Less: 10% increase in DM cost	1.80	4.05	3.15	7.20	
Revised contribution per Kg	16.20	20.70	26.10	21.30	
Total contribution (1 x 4)	324,000	621,000	913,500	319,500	2,178,000
Fixed overheads	225,000	180,000	675,000	540,000	1,620,000
Profit (5 – 6)	99,000	441,000	238,500	(220,500)	558,000

(c) Desired contribution:

	Rs.
Fixed cost	1,620,000
Desired profit	420,000
	2,040,000
Less: Contribution from Washing power, Bleaching powder & Rust remover	1,557,000
Contribution desired from Detergent powder	483,000
Quantity of Detergent powder to be sold (Rs.483,000/ Rs.20.70*)	23,333

* Contribution per Kg from Detergent powder

[Solution # 39]

(a) Machine Capacity required:

Product	Production in units	Lab. Hours per unit (W-1)	Total Hours Required
Refrigerators	7,500	4	30,000
Air Conditioners	12,500	6	75,000
Deep Freezer	10,000	3	30,000
Machine Capacity required			135,000
Machine Capacity available			111,000
Shortfall in hours			24,000

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Subcontractor's price (Rs.000)	75.00	56.00	73.00
Company's own variable cost (Rs.000)	61.00	50.00	65.50
Cost of subcontracting (Rs.000)	14.00	6.00	7.50
Machine hours saved	4.00	6.00	3.00
Cost per machine hour saved	3.50	1.00	2.50

Therefore ZAY &Co. should subcontract the quantity of Air Conditioners' product upto the extent of 24,000 hours of machine time in assembly department, i.e. 4,000 units of Air Conditioners.

Working -1 Labour Hours Per Unit

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Cost per unit in Assembling Dept.	10.00	15.00	7.50
Cost per hour	2.50	2.50	2.50
Labour Hours Per Unit	4.00	6.00	3.00

(b) Budgeted profitability statement for the year 2011:

Product	Production	Cont. Margin Working -2	Total Cont. Margin
Refrigerators	7,500	24	180,000
Air Conditioners	12,500	12	150,000
Deep Freezer	10,000	14.5	145,000
Total			475,000
Less: Cost of subcontracting	4,000	6	24,000
Total contribution			451,000
Less: Fixed overheads			256,000
Budgeted Profit for year 2011			195,000

Working -2 Contribution Margin (CM) Per Unit

Particulars	Refrigerators	Air Conditioners	Deep Freezers
Selling Price Per Unit	85.00	62.00	80.00
Less. Variable Cost			
Material	45.00	27.00	50.00
Labour in Assembling Dept.	10.00	15.00	7.50
Labour in Packing Dept.	6.00	8.00	8.00
Total Variable Cost	61.00	50.00	65.50
Contribution Margin (CM) Per Unit	24.00	12.00	14.50

(c) The production of Air Conditioners is subcontracted because it is the product having the lowest cost per unit of limiting factor (i.e. machine hours) saved.

SUGGESTED ANSWER

[Solution # 40]

(a) Differential Costing:

Differential Cost is the change in cost which takes place because of the adoption of an alternate course of action necessitated by change in sales volume, product mix or change in method of production or make or buy decision.

If change in cost occurs due to change in level of activity, differential cost is referred to as incremental in case of increase in output and decrement cost in case of decrease in output.

Difference between differential costing and marginal costing.

Marginal cost and differential cost are same when there is no change in fixed cost on account of increase or decrease in output.

Under the marginal costing fixed costs are not added to get the marginal cost of product whereas differential cost analysis takes into consideration the changes in fixed costs due to change in output.

Differential cost is helpful in taking managerial decision and is not recorded in accounting records. On the other hand marginal cost may be incorporated in the accounting records.

Marginal costs are calculated on the basis of contribution approach whereas differential cost may be ascertained on the basis of both absorption costing as well as marginal costing.

In the marginal costing contribution margin is the basic yardstick of evaluating marginal decisions whereas in differential cost analysis differential costs are compared with the increase or decrease of revenues.

(b) Maxon Chemicals Limited.

Particulars	Product 'A'	Product 'B'	Total
Sales after further processing (Product 'A' 2/3 & Product 'B' 1/3)	650,000	325,000	975,000
Sales before further processing (1000 units @ Rs.750/= each, Product 'A' 2/3 & Product 'B' 1/3)	500,000	250,000	750,000
Incremental revenue	150,000	75,000	225,000
Less: Additional Processing Cost			
Additional Material	78,750	27,000	105,750
Additional Labour	28,500	10,000	38,500
Additional OH @ 150% of Labour	42,750	15,000	57,750
Incremental cost	150,000	52,000	202,000
Net incremental revenue	-	23,000	23,000

Recommendation:

From the above it is clear that Product 'B' should be processed further because it has net incremental revenue of Rs.23,000/=. Whether Product 'A' should be processed further or not, investigation into non-cost factors should be taken into consideration as its further processing has no effect on over all profitability of Maxon Chemicals Limited.

[Solution # 41]

Particulars	Age-Group Pre-Primary	Primary	Secondary
Current Selling Price	105.00	125.00	130.00
Reduction in Raw Material Cost			
W - (Qty @ Rs.3.00 per kg for 10 units)	4.50	6.00	12.00
X - (Qty @ Rs.5.50 per kg for 10 units)	5.50	2.75	8.80
Y - (Qty @ Rs.2.25 per kg for 10 units)	1.13	1.35	3.83
Z - (Qty @ Rs.4.75 per kg for 10 units)	9.50	7.13	8.55
Total reduction in raw material cost	20.63	17.23	33.18
Increase in direct labour cost			
D. Lab hrs per units x Rate increased	12.50	12.00	22.50
Net saving in cost	8.13	5.23	10.68
I Proposal A 90% of net savings in cost	7.32	4.71	9.61
Say	7	5	10
II – Proposal B 80% of savings in raw mat.	16.50	13.78	26.54
Less 90% increase labour cost	11.25	10.80	20.25
Net saving	5.25	2.98	6.29
Say	5	3	6
III – Proposal C 75% of savings in raw mat.	15.47	12.92	24.89
Say	15	13	25

Particulars		Age-Group Pre-Primary	Primary	Secondary
Current selling price (Rs.)		**105**	**125**	**130**
(i) **Revised selling price (Rs.)**				
Prop. – A	Current selling price less proposed reduction as recommended by plan	98	120	120
Prop. – B		100	122	125
Prop. – C		90	112	105
(ii) **Revised profit (Rs.)**				
Prop. – A	Current profit + net saving in cost - (current selling price - revised selling price)	16	20	26
Prop. B		18	22	31
Prop. C		8	12	11
(iii) **Revised profitability percentage (%)**				
Prop. A	Revised profit / revised selling price X 100	16%	17%	22%
Prop. – B		18%	18%	25%
Prop. – C		9%	11%	10%

[Solution # 42]

(a)

The Shopping Mall
Planning for the next year

	Peak	Mid	Low	Total
Days	90	120	150	360
Stalls	950	750	500	2,200
Visitors	18	15	12	45
Per Stall Charges (Rs.)	80	90	110	
Refreshment Visitor %	10%	30%	30%	
Restaurant Visitor %	30%	50%	70%	
Refreshment CM per Visitor (Rs.)	3	3	3	
Restaurant CM per Visitor (Rs.)	3.75	5	7.5	
Total visitors	1,539,000	1,350,000	900,000	3,789,000
Total Stalls	85,500	90,000	75,000	250,500
Stall Revenue	85,500,000	72,000,000	41,250,000	198,750,000
Visitor related cost (Rs.12 per Visitor)	18,468,000	16,200,000	10,800,000	45,468,000
Stall Cost	6,840,000	8,100,000	8,250,000	23,190,000
Avoidable other Fixed Cost	22,500,000	30,000,000	37,500,000	90,000,000
Total Stall Cost	47,808,000	54,300,000	56,550,000	158,658,000
Stall Contribution	**37,692,000**	**17,700,000**	**(15,300,000)**	**40,092,000**
Refreshment Contribution	461,700	1,215,000	810,000	2,486,700
Refreshment Fixed Cost	500,000	666,667	833,333	2,000,000
Refreshment Contribution	**(38,300)**	**548,333**	**(23,333)**	**486,700**
Restaurant Contribution	1,731,375	3,375,000	4,725,000	9,831,375
Restaurant Fixed Cost	1,350,000	1,800,000	2,250,000	5,400,000
Restaurant Contribution	**381,375**	**1,575,000**	**2,475,000**	**4,431,375**
Total Contribution	**38,035,075**	**19,823,333**	**(12,848,333)**	**45,010,075**
Unavoidable other fixed Cost	7,500,000	10,000,000	12,500,000	30,000,000
Net Contribution	**30,535,075**	**9,823,333**	**(25,348,333)**	**15,010,075**
Shopping Mall Annual Fixed Cost				(20,000,000)
Shopping Mall Annual Profit				**(4,989,925)**

(b) Action that management should take:

The statement shows that overall the shopping mall makes a loss. However further analysis shows that certain actions could make the shopping mall profitable.

The statement shows that the shopping mall makes a significant loss during the low season and therefore if it were to be closed for this part of the year the shopping mall would then be profitable.

Furthermore the refreshment service is only profitable during the mid season so if the service were to be closed during the other seasons of the year this would also add to the shopping mall's profitability.

(c) However, there are other factors to be considered before making the above short term changes. If the refreshment service were to be closed for parts of the year could it easily be re-opened just for the mid season or if it were to be closed entirely would this encourage more visitors to use the restaurant?

If the shopping mall were to be closed in the low season would the shopping mall retain its popularity during the other parts of the year or would its regular visitors feel that the shopping mall was not customer focused and only interested in its own profits thus reducing the shopping mall's demand in other seasons?

[Solution # 43]

Minimum price for the offer at 10% margin:!

Working:

		Amount
Fabric (5,000 x 12.50)		62,500
Dye and Chemical (2,000 x 9)		18,000
Other direct cost (150,000 - 30,000)		120,000
Labor Cost		
(425 x 12)	5,100	
(75 x 11)	825	
Total		5,925
Machine Cost (400 x 7)		2,800
Total Relevant Cost		209,225
Profit Margin		20,923
Price to be offered		230,148

Note:

1. Fabric will be at replacement cost as it regular in use.
2. Dyes and chemical will be totally expensed out.
3. Other direct cost will be after overall advantage.
4. Machine lease cost is irrelevant.
5. Fixed cost is irrelevant.

[Solution # 44]

		$		$
Sales revenue at new price level: 30,000 × $19	570,000			
Sales revenue at current price level: 24,000 × $20		480,000		
Incremental revenue				90,000
Total materials cost at new price level: 30,000 × $4 × 90%		108,000		
Total materials cost at current price level: 24,000 × $4	96,000			
Incremental cost of materials			(12,000)	
Incremental cost of labour at basic rate of pay: 6,000 units × $3		18,000		
Overtime premium for 2,000 units: 2,000 × $3 × 50%	3,000			
Total incremental cost of labour				(21,000)
Other variable costs: incremental costs: 6,000 units × $1				(6,000)
Incremental fixed cost expenditure $(260,000 – 250,000)				(10,000)
Incremental profit				**41,000**

Conclusion: By reducing the price to $19, annual profits would increase by $41,000. On the basis of profitability, the sales price should be reduced.

Other factors could affect the decision:

- Profit might be increased even more if the sales price is changed to a different amount, say $18.
- Management needs to be satisfied that the company has the capacity to produce the larger volume of output without loss of production efficiency or quality.
- The recommendation that the price should be reduced assumes that the estimate of sales demand at $19 per unit is reliable. If competitors respond by reducing their prices by a similar amount, there might be little or no sales volume increase, and profits might fall rather than increase.

[Solution # 45]

Statement showing the sales price per unit for 20,000 units		
Total net profit required		1.67,300
Add: Fixed cost to be incurred		
Present Fixed cost (3.125 + 0.6)* 60,000	2,23,500	
Add: 10% increase	22,350	2,45,850
Total Contribution Required (A)		4,13,150
Add: Variable Cost of 80,000 units		
Material cost (3.50 + 0.021)	3.71	
Direct Labour (1.25 + 0.10)	1.35	
V (P) overheads	3.125	
V (A) overheads	0.20	
	8.385	
	80,000	6,70,800
Total sales required (A+B)		10,83,950
Less: sales value of 60,000 units (60,000*14.3)		(8,58,000)
		2,25,950

Selling price per unit 2,25,950 / 20,000 = 11.2975 or 11.30

[Solution # 46]

I) Fixed Cost	30,000
NP	(10,000)
Total Contribution	20,000
Sales Qty	10,000
Contribution per unit	2
BEP (30,000/2)	15,000

(i) There is a (0.45) probability that the sales would be below 15,000 units and therefore there is 0.45 probability that the company would continue to make losses

(ii)

Fixed Cost	30,000
NP	6,000
Total Contribution	36,000
Contribution per unit	2
Qty to be sold (units)	18,000

There is a 0.25 probability that the sales could be 18,000 units. Therefore, there is a 0.25 probability that profit could be Rs.6,000.

(iii)

Fixed Cost	30,000
NP req	20,000
Total Contribution Req.	32,000
Contribution per unit	2
Qty to be sold (units)	16,000

There is a 0.75 probability that the sales could be 16,000 or less therefore there is 0.75 Probability that the profit could be at the most 2,000

[Solution # 47]

(a) Statement Showing total Qty to be sold and the Break even Point		
	Splash	Flash
Budgeted sales	7,20,000	3,50,000
Selling price per unit	2.4	3.5
Total Qty to be sold	300,000	1,00,000
BEP Qty (60%)	1,80,000	60,000

(b) The Budgeted Reduction in Fixed Cost		
	Splash	Flash
Total Budgeted Sales	7,20,000	3,50,000
Net Profit	6,920	17,500
Margin of Safety 40% of sales	2,88,000	1,40,000
P/V ratio = (NP/MOS)	24%	12.5%
Budgeted Contribution (Sales * P/v Ratio)	1,72,800	43,750
Budgeted Fixed Cost (Contribution – NP)	1,03,680	26,250
Given Fixed Cost	1,08,000	27,000
Reduction in Fixed Cost	4,320	750

OR

	Splash	Flash
(BEP/MOS)	1.5	1.5
Budgeted Net Profit	69,120	17,500
Budgeted Fixed Cost	1,03,680	26,250
Given Fixed Cost	1,08,000	27,000
Budgeted Reduction	4,320	750

[Solution # 48]

(1) Evaluation of proposal to replace product Z with product S.
a: net profit if we continue with product Z.

X	(5,00,000*40%/20)*(20-10)	1,00,000
Y	(5,00,000*35%/25)*(25-25)	70,000
Z	(5,00,000*25%/30)*(30-18)	50,000
Total contribution		2,20,000
(-) Fixed Cost		1,50,000
Net Profit		70,000

b) Net profit if we replace with S

X	(4,50,000*50%/20)*10	1,12,500
Y	(4,50,000*30%)/25*10	54,000
Z	(4,50,000*20%)/28*14	45,000
Total contribution		2,11,500
(-) Fixed Cost		1,60,000
Net Profit		51,500

The company should continue with product Z because the replacement of 'Z' with 'S' would result in reduction net profit.

2) Statement showing the overall breakeven point of the 2 alternatives.

	XYZ	XYZ
Contribution	2,20,000	2,11,500
Sales	5,00,000	4,50,000
Fixed cost	1,50,000	1,60,000
BEP 50/22*1,50,000	3,40,909	3,40,426

The above calculation are based on the presumption, in addition to the usual presumptions that the sales of products X, Y & Z would always be in the ratio of Rs.40:35:25 and that of X, Y & Z would be in the ratio of 50:30:20

[Solution # 49]

1) Evaluation of proposal

Contribution 50,000 (6 – 4.8)		60,000
Less: Relevant Cost		
Money to be spent		
Fixed Cost	20,000	
Contribution to be Cost (1)	Nil	(20,000)
Net Gain		40,000

Proposal is acceptable.
Note: 1 As shown below, there is adequate idle machine capacity for taking up the production of 50,000 toys which means there would be no loss of contribution as a result of acceptance of this proposal.

No. of Machine hours available	10,000
(-) No. of Machine hours required for bottles (3,75,000/50)	(75,000)
Idle Capacity	2,500 hrs
No. of Machine hours required for toys (50,000/20)	(2,500)hrs
Total	Nil

2) Evaluation of Proposal Relevant revenue

Contribution 50,000 (6 – 4.8)		60,000
Less: Relevant Cost		
Money to be spent		
Fixed Cost	20,000	
Contribution to be Cost (1)	75,000	(95,000)
Net Relevant Loss		(35,000)

The offer is not acceptable.
Note: (1) The additional demand for 1,25,000 bottles would require additional 2,500 machine hours which at present the idle capacity. If the toy offer is accepted , then the contribution we would have earned from the sale of 1,25,000 bottles.
(1,25,000 (1 – 0.4) = 75,000] would be lost

3) If, instead of buying the toys we manufacture them then additional
Fixed cost 2, 00,000 /
Reduction in variable P.U (5.6 – 4.8) 0.8
Minimum quantity to be produced i.e Cost BEP 25,000 toys
Minimum idle machine hours required = 25,000/20 = 1,250 hours.

4) Statement showing the profit lost as a result of demand estimation error
A) Relevant net profit that would have been earned had the error had not been made.

Bottles (1) (4,20,000 * 0.6)	2,70,000
Toys (1) (50,000 * 0.4)	20,000
Total	2,90,000

B) Net Profit actually earned given that the error was made.

Bottles (1) (4,20,000 * 0.6)	2,70,000
Toys Mfg [32,000*(6-4.8)] – 20,000	18,400
Bottles bought (18,000*0.4)	7,200
	2,77,600

(A-B) = 2,90,000 – 2,77,600
Net profit = 12,400 Lost

OR

Bottles (1)	(4,20,000 * 0.6)	(18,000)
Toys	32,000	
Cost BEP	(25,000)	
	7,000	
Cost savings p.u (5.6 – 4.8)	0.8	5,600
Net profit lost		12,400

Note:1 If the demand had been rightly estimated at 4,50,000 bottles, then the company would have reserved 9,000 machine hours, bottles being more profitable than toys. As a result the company would have thought of having been left with 1,000 idle machine hours. This being les than 1,250 machine hours, which is minimum idle capacity required to produce toy in our factory, the company would not have produced all 50,000 toys from the associate company.

[Solution # 50]

Note-1: Irrelevant Cost.

(a)	Cost to date	59,455
(b)	Payment	7,250
(c)	Fixed overhead-Abs	
(d)	Surcharge-Abs	
(e)	Mode of payment-credit period allowed.	

		P_1		P_2		P_3
		Nature of work	**Special**	**Standard**		**Special**
		Rs.		**Rs.**		**Rs.**
Revenue (Offer by A)		68,400		62,500		52,000
Less: Cash Discount		--	1,250		--	
Net revenue		68,400		61,250		52,000
Less: Sales commission (3%, 2% & 3%)		2,052		1,225		1,560
(a)	Cash inflow	66,348		60,025		50,440
	Cash outflow:					
	Material	6,200		2,850		--
	Labour	4,200		3,300		--
	Variable overhead	2,100		1,650		--
(b)	Total	12,500		7,800		--
Net income (a-b)		**53,848**		**52,225**		**50,440**

(b) In the above calculation the highest income 53,848 is on the basis of Selling price fixed by Auer Ltd. (Seller) which is not yet accepted by K. So, the net income is not a real figure. Hence, present best alternative of this special machine is to following proposal 2 were current best income is Rs. 52,225 so when K Ltd. Makes a counter offer then our calculation should be based on Variable cost of proposal 1

Opportunity cost: Sales commission payable @ 3%.

Hence, the minimum price at which the counter from K Ltd. Can be accepted is
Rs. (12,500+52,225)/97% = Rs. 66,727/- (approx).

(c) The absorbed fixed overhead has no effect in case of price quotation of a special offer only discretionary Fixed overhead this purpose.

[Solution # 51]

Details of relevant costs with explanations:

(i) Market Research Survey expenses of Rs. 50,000 is sunk cost and hence not relevant for the decision on hand.

(ii) **Raw materials:**

(a) Posh is used regularly and stocks are replaced as they are used. Therefore, its Posh: 50,000 metres×Rs. 2.50 = Rs. 125,000.

(b) 100,000 metres of Flash are required for the output of "Superb". There are already 60,000 meters in stock as a result of overbuying for an earlier contract purchased @ Rs. 3.30 per meter, and 40,000 meters additionally would be purchased at the current replacement cost of Rs. 2.80 per meter. If "Superb" were not produced, the company would have sold 60,000 meters of Flash at Rs. 1.10. This is an opportunity foregone and relevant. Hence

Flash: -	**Rs.**
Incremental cost (40,000 metres×Rs. 2.80)	112,000
Opportunity cost (60,000 metres×Rs. 1.10)	66,000
	178,000

(c) 25,000 metres of splash would be specially purchased for the output

Splash 25,000 metres×Rs. 5.50 = Rs. 137,500

(iii) **Labour:**

To manufacture 50,000 units of "Superb"

Skilled labour required: 50,000×1/4 = 12,500 hours and

Unskilled labour required: 50,000×2 = 100,000 hours

Wage rate for skilled labour is Rs. 3 per hour. If "Superb" were not manufactured and the skilled labour were not transferred, they would have given a clean contribution of Rs. 1.50 per hour. This is the cost of an opportunity foregone: Therefore:

Cost of skilled labour:	Rs.
Cost of deployment (12,500×Rs. 3)	37,500
Add: Opportunity cost (12,500×Rs. 1.50)	18,750
	56,250

Unskilled labour:

No work has suffered and no extra cost is involved hence cost of unskilled labour: zero

Foreman:	Rs.
Annual salary	15,000
Less: Pension saved	6,000
Effective cost	9,000

(iv) **Machinery:**

- MT 4 machines are used and replaced regularly. The difference of the replacement cost between start and end of the year is relevant. Hence, MT 4 cost of using: Rs. 15,000
- MT 7 machine is not in vogue and will be sold now or in near future. The fall in its resale value represents the relevant cost. Hence, cost of using MT 7: Rs. 11,000 –Rs. 8,000 = Rs. 3,000

(v) **Overheads:**

Fixed overheads have been recovered fully from existing production. So its rate of recovery is not relevant.

Variable overheads: 50,000×Rs. 1.20 = Rs. 60,000

Cost sheet for 50,000 units of "Superb"

	Rs.	**Rs.**
Raw Materials:		
Posh	125,000	
Flash	178,000	

Splash	137,500	440,500
Labour:		
Skilled	56,250	
Unskilled	0	
Foreman	9,000	65,250
Machinery costs:		
MT 4	15,000	
MT 7	3,000	18,000
Variable overheads		60,000
Total cost		583,750
Profit (Rs. 900,000 –Rs. 583,750)		**316,250**
Sales revenue (50,000×Rs. 18)		900,000

[Solution # 52]

Comparative predicted income for two weeks

	Show "Blood Bath" For two weeks	Show "Blood Bath" for one week	Show "Appu on the Airbus" for two weeks for the following week
Attendance:			
Adults:	2,250	2,250	1,500
First week	2,000	1,500	1,500
Second week	5,250	3,750	3,000
Children:			
First week	-	-	500
Second week	-	500	500
Total attendance	**4,250**	**4,250**	**4,000**
Revenue:	**Rs.**	**Rs.**	**Rs.**
Sales of Tickets:			
Adults@ Rs. 2/-	8,500	7,500	6,000
Children @ Rs. 1.20	-	600	1,200
Sale of potato wafers & cakes @ Rs. 1.20 per patron	5,100	5,100	4,800
Total revenue: (A)	13,600	13,200	12,000
Costs (only relevant):			
Hire Charges of "Blood Bath"	1,500	900	-
Cost of potato wafers & Cakes (60% of their selling price)	3,060	3,060	2,880
Total relevant cost: (B)	4,560	3,960	2,880
Profit: {(A) – (B)}	9,040	9,240	9,120

It is seen from the above statement that the most profitable course of action is to show each film for one week. Hence, the manager should arrange to show "Blood Bath" for one week and "Appu on the Airbus" for the following week.

Note: The hire charge for "Appu on the Airbus" and the fixed operating costs of Rs. 4,200 per week are irrelevant to this analysis as these are committed fixed costs.

[Solution # 53]

(a) Forward Foundry Ltd.
Revised monthly Labour & overhead cost budget
(After the acceptance of an order for 90,000 castings)

	Core Making	Melting and pouring	Moulding	Clearing & grinding	Total
	Rs.	Rs.	Rs.	Rs.	
Labour	16,750	25,000	9,600	7,740	59,090
Variable overhead	4,620	1,563	1,600	1,270	9,053
Fixed overhead	5,000	9,000	2,000	1,000	17,000
Total	**26,370**	**35,563**	**13,200**	**10,010**	**85,143**
Incremental fixed factory					1,000
Total labour and overheads cost					**86,143**

Working Notes:

(i) Current labour hours per month in each department are obtained by dividing the total labour and overheads by the figure of labour and overheads per direct labour hour as follows:

Core Making	Melting and pouring	Moulding	Clearing & grinding
Rs: 18,000 9 Hrs = 2,000 hrs	Rs: 26,000 6.50 Hrs = 4,000 hrs	Rs: 9,000 6 Hrs = 1,500 hrs	Rs: 6,500 5.2 Hrs = 1,250 hrs

(ii) 90,000 castings spread over 6 months give a production of 15,000 castings per month. Incremental labour hours per month are got by multiplying the 15,000 castings by direct labour hours per casting as under:

Core Making	Melting and pouring	Moulding	Clearing & grinding
Rs: 15,000 * 0.09 = 1,350 hrs	Rs: 15,000 * 0.15 = 2,250 hrs	Rs: 15,000 * 0.06 = 900 hrs	Rs: 15,000 * 0.06 = 900 hrs

(iii) Wages rate per hour is found by dividing labour cost by direct labour hours as under:

Core Making	Melting and pouring	Moulding	Clearing & grinding
Rs: 10,000 2,000 Hrs = Rs: 5	Rs: 16,000 4,000 Hrs = Rs: 4	Rs: 6,000 1,500 Hrs = Rs: 4	Rs: 4,500 1,250 Hrs = Rs: 3.60

(iv) Revised monthly labour cost:

In Core making : Rs. 10,000 + (1,350×Rs. 5) = Rs. 16,750
In Melting & pouring : Rs. 16,000 + (2,250×Rs. 4) = Rs. 25,000
In Moulding : Rs. 6,000 + (900×Rs. 4)= Rs. 9,600
In cleaning & grinding : Rs. 4,500 + (900×Rs. 3.60) = Rs. 7,740

(v) Revised monthly variable overhead cost:

In core making, existing charges Rs. 3,000 plus Rs. 1.20×1,350 (incremental hours)
= Rs. 3,000 +Rs. 1,620 = Rs. 4,620
In the Melting and pouring department, it is 1/16 of labour cost. Hence revised variable overhead cost.
= Rs. 25,000×1/16 = Rs. 1,563
In moulding Department, existing charges Rs. 1,000 plus Rs. 0.30×900 (incremental hours)
= Rs. 1,000+ Rs. 270 = Rs. 1,270

(b) Determination of the lowest price at which quotation can be given for 90,000 castings without incurring a loss:

	Rs.	Rs.	Rs.
Materials cost: 15,000 casting per month @ Re. 1 each		15,000	
Labour and overhead cost:			
Revised budget (above)	86,143		
Less: Current budget			
(Rs. 18,000 +Rs. 26,000 +Rs. 9,000+Rs. 6,500)	59,500	26,643	
Total incremental cost for 15,000 castings			**41,643**

Lowest price at which quotation can be given for 90,000 castings:

Rs: 41,643 * 90,000 casting
15,000 Hrs
= Rs: 249,858

[Solution # 54]

Average investment in inventory under the given two alternatives is:

(i) (120,000 units×Rs. 9.80)/2 = Rs. 588,000
(ii) (10,000 units×Rs. 10)/2 = Rs. 50,000

Difference between the average investments in inventory under:
Alternatives (i) & (ii) is (Rs. 588,000 –Rs. 50,000) = Rs. 538,000

The concern can invest Rs. 538,000 at 10% and can earn Rs. 53,800 as interest annually. The sum of Rs. 53,800 is an opportunity foregone if alternative (i) is chosen. Hence Rs. 53,800 is the opportunity cost of the Rs. 120,000 units purchase order.

Note; Rs. 53,800 would not ordinarily be recorded in the accounting system, as it is a foregone cost.

[Solution # 55]

(a) Differential cost of the Job:

	Increase	Decrease
	Rs.	Rs.
Material cost	50,000	20,000
Labour cost	90,000	22,500
Additional overheads	10,000	---
Other expenses	-- 2,250	
Total	**150,000**	**44,750**

Net differential cost of the jobs: Rs. 105,250 (Rs. 150,000 –Rs. 44,750)

Note: Depreciation, rent, heat and light and power are not going to affect the costs.

(b) Full cost of the jobs:

	Rs.
Cost as above at (a) (i.e., increased costs)	150,000
Depreciation	9,000
Power	1,000
Rent	2,500
Heat & light	250
	162,750

(c) Opportunity cost of taking the order:

		Rs.	Rs.
Sales product A			62,500
Less:	Material	20,000	
	Labour	22,500	
	Power	1,000	
	Other expenses	2,250	45,750
			16,750

(d) Sunk cost of the jobs:

	Rs.
Depreciation	9,000
Power*	1,000
Rent	2,500
Heat & light	250
	12,750

* If a student treats power as a relevant cost, in that case it would not appear here.

Advice regarding the jobs:

Zed Ltd. should not accept the job as there will be a cash disadvantage of Rs. 42,750 as computed below:

	Rs.
Incremental revenue	
(5,000 units @ Rs. 25)	125,000
Less: Sale of product A	62,500
	62,500
Differential costs (a)	(105,250)
Cash disadvantage	**42,750**

[Solution # 56]

(i) Comparative statement showing the profitability of two alternatives

	Continue operation	Lease the building
	Rs.	Rs.
Annual sales	425,000	48,000 (@ 4,000 p.m.)
Less: Cost of goods sold (Excluding ownership costs)	382,000	---
Building ownership costs	20,000	20,000
Net income	**23,000**	**28,000**

Net income is Rs. 28,000 if the building is leased out and thus leasing is a profitable proposition.

(ii) Incremental or relevant cost approach.

Building ownership costs are not relevant as there is no change in these costs under both the alternatives. Therefore, the correct approach will be to consider to incremental cash inflows from the continuing operation.

	Rs.
Net cash flow from continuing the operation (Rs. 425,000 –Rs. 382,000)	43,000
Less: Income from leasing	48,000
Incremental loss from continuing operations	**(5,000)**

Therefore, company should not continue the operation

(iii) The opportunity cost approach

	Rs.
Total sale revenue	425,000
Less: Cost of goods sold	(382,000)
Opportunity cost of leasing	**(48,000)**

Therefore, the company should lease out the building **5,000**

[Solution # 57]

M/s Ranka Builders

Statement of relevant costs on the Acceptance of contract from Excel Ltd.

	(Rs. In lakhs)
Land cost (Refer to working note 1)	20
Drawings and design (Sunk cost)	--
Registration (incremental)	--
Materials: (Refer to working note 2)	
Cement & sand (Replacement)	8
Bricks & tiles (Opportunity)	5
Steel (Incremental)	10
Others	9
Labour:	
Skilled (opportunity)	14
Unskilled (incremental)	8
Supervisor's salary (Sunk cost)	--
Overheads:	
Discretionary - Relevant (avoidable)	4
Depreciation (Sunk cost)	--
Replacement cost of machine (Refer to working note 3)	7
Estimated profit foregone (Opportunity foregone in other project)	10
Total cost	**105**
Offer price	100
Loss	**5**

Decision: Reject the offer

Workings:

		(Rs. In lakhs)
1.	Total cost of 3 grounds of land	60
	Cost of 2 grounds of land will be borne by Excel Ltd.	40
	Cost of 1 ground of land will be borne by M/s. Ranka Builders	**20**

2. Others materials cost of Rs. 10 lakhs includes material worth Rs. 2 lakhs relating to interior decoration, which is a sunk cost, this material can be sold for Rs. 1 lakhs (Which is a relevant opportunity cost) and Rs. 8 lakhs material is an incremental cost. Hence total relevant cost of others material is Rs. 9 lakhs (Rs. 8 lakhs incremental + Rs. 1 lakh opportunity cost).

3. Since the equipment can also be used on this contract its current replacement price is Rs. 32 lakhs and after one year its cost will be Rs. 25 lakhs. Therefore the relevant opportunity cost of machine is: Rs. 7 lakhs {Rs. 32 lakhs –Rs. 25 lakhs}.

[Solution # 58]

Comparative Statement of Net Benefit resulting from each contract

	Contract AX Rs.	Contract BX Rs.
Materials X –in stock (Refer to working note 1)	48,600	---
Materials X – firm orders placed (Refer w. note 2)	68,400	
Materials X – not yet ordered (At current cost)	150,000	
Materials Y – in stock (Refer to working note 3)	---	124,000
Materials Z -- not yet ordered (At replacement cost)	--	178,000
Labour -- to be paid	215,000	275,000
Travel & other expenses (Future out flow)	17,000	14,000
Income from the hire of plant	(15,000)	---
Penalty for rescinding the contract 'AX' is relevant	---	70,000
Total Cost: (A)	484,000	661,000
Contract price: (B)	720,000	880,000
Expected net benefit: {(B) – (A)}	**236,000**	**219,000**

Working notes:

1. **Value of materials X in Stock:** (This can be used as substitute for other materials)
   = Rs. 54,000 × (90 ÷ 100) = Rs. 48,600
2. **Value of materials X for which firm order has been placed**
   = Rs. 76,000 × (90 ÷ 100) = Rs. 68,400
3. **Value of materials Y in stock**
   = 2 times × Rs. 62,000 = Rs. 124,000
4. **Irrelevant costs:** Following costs are irrelevant therefore, they have been ignored
   site manage cost – being fixed cost
   - Depreciation of plant
   - Interest on capital
   - Notional interest on the estimated working capital
   - Head office expenses allocated to contracts.

(ii) **Advise to the Management:** The Company should continue with Contract AX.

[Solution # 59]

(i) **Let us tabulate the results of the firm as under:**

Profitability of the firm

	Product			
	A	B	C	Total
Sales values (Rs.)	1,000,000	800,000	200,000	2,000,000
Contribution (%)	40%	30%	25%	34.5%*
Contribution (Rs.)	400,000	240,000	50,000	690,000
Fixed expenses (Rs.)	340,000	180,000	90,000	610,000
Net profit/(Loss) (Rs.)	**60,000**	**60,000**	**(40,000)**	**80,000**

* 690,000/2,000,000 *100 = 34.5% average

Under alternative (i), a comparison between the total profitability and the profitability without product 'C' is relevant, shown as under:

Particulars	Products A, B & C	Products A & B only	Difference
Sales values (Rs.)	2,000,000	1,800,000	2,000,000
Contribution (Rs.)	690,000	640,000	50,000
Fixed expenses (Rs.)	610,000	570,000	40,000
Net profit (Rs.)	**80,000**	**70,000**	**10,000**

It may be observed from the above table that discontinuance of product 'C' reduced the total profit from Rs. 80,000 to Rs. 70,000. In other words, product 'C' was yielding a contribution sufficient to cover more than the incremental fixed costs of Rs. 40,000 attributable to its manufacture.

(ii) Under alternative (ii), comparison between the profitability of product 'C' and product 'D' is relevant as under:

Particulars	Products A, B & C	Products A & B only
Sales values (Rs.)	2,000,000	2,000,000
Contribution (%)	25%	35%
Contribution (Rs.)	50,000	70,000
Fixed expenses (Rs.)	610,000	570,000
Net profit (Rs.)	**80,000**	**70,000**

Since product D yields a higher contribution, the total profitability will increase by Rs. 20,000. The fixed expenses remain constant. This is illustrated below:

	Product			
	A	B	C	Total
Sales values (Rs.)	1,000,000	800,000	200,000	2,000,000
Contribution (%)	40%	30%	25%	35.5%*
Contribution (Rs.)	400,000	240,000	70,000	710,000
Fixed expenses (Rs.)	340,000	180,000	90,000	610,000
Net profit/(Loss) (Rs.)	**60,000**	**60,000**	**(20,000)**	**100,000**

* 710,000/2,000,000 *100 = 35.5% average

Working Note:

Computation of contribution per unit of product and per machine hour

Products	P	Q	R
	Rs.	Rs.	Rs.
Selling price per unit	**350**	**420**	**370**
Less: Variable costs			
Direct materials per unit	100	120	90
Direct labour per unit	50	70	90
Variable overheads per unit	50	130	100
Total variable costs: (B)	200	320	280
Contribution per unit: (A –B)	150	100	90
Machine hours required per unit of production	15	5	3
Contribution per machine hour	**10**	**20**	**30**

[Solution # 60]

Something More Ltd.

Statement showing the production of R, Q and P in order of priority determined on the basis of contribution per machine hour, to maximize the profit at various levels of activity.

Product	P		Q		R		Total Contribution	Fixed Cost	Net Profit
Levels of Activity	Max. demand = 200 units		Max. demand = 125 units		Max. demand = 750 units				
(Machine hours)	Machine hours for max. demand = 3000 hours		Machine hours for max. demand = 625 hours		Machine hours for max. demand = 2250 hours				
	Units	Contribution	Units	Contribution	Units	Contribution			
		Rs.		Rs.		Rs.	Rs.	Rs.	Rs.
1800	-	-	-	-	600	54,000	54,000	15,000	39,000
2300	-	-	10	1,000	750	67,500	68,500	20,000	48,500
2800	-	-	110	11,000	750	67,500	68,500	26,000	52,500
3300	28*	4,200	125	12,500	750	67,500	84,200	33,000	51,200
3800	61*	9,150	125	12,500	750	67,500	89,150	39,000	50,150

* 28 and 61 units of product P consumes 420 and 915 machine hours respectively whereas actually 425 and 925 machine hours are available. As incomplete units can be sold only in the next period after they are completed, for these computations only complete units have been considered.

The most desirable level of activity to be pursued is at 2,800 machine hours to produce and sell 750 units of R and 110 units of Q. at this activity level profit is maximum, i.e., Rs. 52,500.

[Solution # 61]

(1.) **Revised cost estimates**

			Rs.
1)	Steel sheets (5000 kg. @ Rs. 12 per kg)	60,000	
2)	Steel Rods (1000 kg at Rs. 17 per kg)		17,000
3)	Bearings, Hardware items etc.	15,000	
4)	Labour cost		Nil
5)	Overheads:		
	Fabrication shop (500 hrs at Rs. 25)		12,500
	Welding shop (300 hrs at Rs. 16)		4,800
	Planning Engineers cost	Nil	
	Design Engineers cost		Nil
	Minimum		**109,300**

Reasons for changed figures:

a) Steel sheets are taken at current sale price as the stock is idle & has to sale @. Rs12
b) The opportunity cost of substitution is relevant cost in case of steel rods.
c) The wages of monthly rates workers are fixed costs. Fixed cost is not relevant.

d) Since fabrication shop does the job for outsiders, the price of Rs. 25/- charged to them is considered for the aforesaid calculations on the assumption that fabrication job is otherwise fully occupied.
e) For welding shop only incremental variable cost is relevant as it is not serving outsiders.
f) The planning and design engineers costs are not relevant being fixed costs.

2. The opportunity cost approach is preferred over conventional cost approach in certain situations since the conventional cost approach will always show higher cost and thus a higher price may ultimately cause loss of order. In practice, the opportunity cost approach is not favored by the management as it is contradictory to the established conventional approach. Difficulties also arise in currently ascertaining the opportunity costs. This approach has only a limited applicability in soliciting marginal orders or exploring new markets or introducing new products. In long run, price has to cover all cost elements and reasonable return on investment.

3. Opportunity cost approach is relevant in choice of alternatives or in make or buy decisions since the opportunity sought will in long run bring additional contribution towards fixed cost which otherwise would be lost.

[Solution # 62]

Alternative 1 – (Conversion versus immediate sales)

	Rs.	Rs.	Rs.
Sales revenue (900 units at Rs. 300 per unit) (Refer to working note 1)			270,000
Less: Relevant costs			
Material XY - opportunity cost (Refer to working note 2)	21,000		
Material A – (600 units @ Rs. 90 per unit) (Refer to working note 3)	54,000		
Material B –(1,000 units @ Rs. 45 per unit) (Refer to working note 4)	45,000	120,000	
Direct Labour:			
Unskilled – (5,000 hours @ Rs. 3 per hour)	15,000		
Semi-skilled	Nil		
Highly skilled – (5,000 hours @ Rs. 11) (Refer to working note 5)	55,000	70,000	
Variable overheads (15,000 hrs @ Re 1) (Refer to working note 6)		15,000	
Extra selling and delivery expenses	27,000		
Extra advertising	18,000	45,000	(250,000)
Fixed overheads (To remain same, not relevant)	Nil		
Excess of relevant revenues			**20,000**

Alternative 2 – (Adaptation versus immediate sale)

	Rs.	Rs.	Rs.
Saving on purchase of sub-assembly(Refer to working note 7)			
Normal spending –(1,200 units @ Rs. 900 per unit)		1,080,000	
Less: Revised spending – (900 units @ Rs. 1,050 per unit)		9,450,000	135,000
Less: Relevant costs			
Material XY opportunity cost (Refer to working note 2)	21,000		
Material C – (1000 units @ Rs. 37 per unit) (Refer to working note 8)	37,000		
Direct Labour:			
Unskilled – (4,000 hours @ Rs. 3 per hour)	12,000		
Semi-skilled	Nil		
Highly skilled – (4,000 hours @ Rs. 11) (Refer to working note 5)	44,000	56,000	
Variable overheads (9,000 hrs @ Re 1) (Refer to working note 6)		9,000	(123,000)
Fixed overheads (To remain same, not relevant)	Nil		
Excess of relevant revenues			**12,000**

Evaluation: The evaluation of two alternatives clearly shows that alternative 1, yields higher net revenue of Rs. 8,000 (Rs. 20,000 –Rs. 12,000). Hence because of higher net revenue of alternative 1, it is advisable to convert material XY into a specialized product.

Working:

- There will be additional sales revenue of Rs. 270,000 if alternative 1 is chosen.
- Acceptance of either alternative 1 or 2 will mean a loss of revenue of Rs. 21,000 from the sale of the obsolete material XY and hence it is an opportunity cost for both of the alternatives. The original purchase cost of Rs. 75,000 is a sunk cost and thus not relevant.
- Acceptance of Alternative 1 will mean that material A must be replaced at an additional cost of Rs. 54,000.
- Acceptance of Alternative 1 will mean diversion of material B from the production of product Z. The excess of relevant revenues over relevant cost for product Z is Rs. 180 (Rs. 390 –Rs. 210) and each unit of product Z uses four units of material B. The lost contribution (excluding the cost of material B which is incurred for both alternatives) will therefore be Rs. 45 for each unit of material B that is used for converting the obsolete materials into a specialized product.
- Unskilled labour can be matched exactly to the company's production requirements. Hence acceptance of either alternative 1 or 2 will causes the company to incur additional unskilled labour cost at Rs. 3 for each hour. It is assumed that the semi-skilled labour will be able to meet the extra requirements of either alternative at no extra cost to the company. Hence, cost of semi-skilled labour will not be relevant. Skilled labour is in short supply and can only be obtained by reducing the production of product L, resulting in a loss of contribution of Rs. 24 (given) or Rs. 6 per hour of skilled labour. Hence the relevant labour cost will be Rs. 6 (contribution lost per hour) + Rs. 5 (hourly rate of skilled labour) is Rs. 11 per hour.
- It is assumed that for each direct labour of input, variable overhead will increase by Re. 1, hence for each alternative using additional direct labour hours, variable overheads will increase.
- The cost of purchasing the sub-assembly will be reduced by Rs. 135,000 if the second alternatives are chosen and so these savings are relevant to the decision.
- The company will incur additional variable costs of Rs. 37 for each unit of material C that is manufactured, so the fixed overhead for material C viz. Rs. 18/- per unit is not a relevant cost.

PROCESS COSTING

[*Solution* # 01]

(a) The cost per litre is the same for all three joint products therefore the basis of the common cost apportionment is the number of litres output. This is an acceptable method for the purposes of external financial reporting since it is based on the cost incurred in the common process, however its usefulness for internal reporting is limited given that there is one process that is common to all three outputs.
It is necessary to apportion the common costs between the different products so that inventory values can be derived for each form of output in order to match sales with cost of sales for the purposes of external financial reporting.

(b) The sales values of the outputs from the common process total $540,250 and the total costs attributed to the outputs from the process total $482,375 therefore the common process is viable since it generates revenues in excess of costs. With regard to the viability of each individual product a comparison must be made between the incremental revenue from further processing and the further processing costs that are incurred. Thus:

Product	*Incremental revenue per litre*	*Incremental cost per litre*
M	2.15	1.75
N	1.25	0.95
P	0.65	0.85

Thus it can be seen that products M and N should be further processed whereas product P should be sold at the point of separation (i.e. after the common process). All three products are viable if this course of action is taken, however it is not viable to further process product P.

JOINT & BY-PRODUCT

[*Solution* # 01]

[a] Statement showing Cost of Joint Products at the Point of Separation

Particulars	Amount (Rs)
Raw Material : 10,000 kg @ Rs: 8 per kg	80,000
Direct Labor : 1000 hrs @ Rs: 20 per hour	20,000
Variable Overheads: 80% of variable overheads	16,000
Fixed Overheads	21,000
Total Cost	1,37,000
Less – Sales Value of by-product	2,000
Cost of joint product at the separation point	**1,35,000**

[b] Statement of Profit or Loss if the Products are sold without further Processing

Product	Qty	Proportion %	Joint Cost Allocation	Sales (kg)	Sales (Rs) *	Profit (Rs) #
A	5000	55.55	75,000	18	90,000	15,000
B	2500	27.78	37,500	20	50,000	12,500
C	1500	16.67	22,500	24	36,000	13,500
Total	**9000**	**100.00**	**1,35,000**		**1,76,000**	**41,000**

* : Sales figures are computed by multiplying the quantity by the sales per kg

\# : Profit is computed by deducting the joint cost from sales.

[c] Evaluation of Products to be Processed further for maximizing Profits

Product	Further Processing Costs	Incremental Revenue	Incremental Profit/Loss
A	6	10	**4**
B	7	6	**(1)**
C	8	10	**2**
D	3	2	**(1)**

Product A and C are giving incremental profit of Rs.4 and Rs.2 respectively if they are further processed and hence they can be processed further. Product B and D have loss if they are processed further. In this situation, they can be sold at split off point instead of further processing.

[*Solution* # 02]

I] Statement of Annual Income

Product	Sales	Share of Joint Costs *	Additional Processing Cost after split-off	Total Cost	Net Income
P	46	27.20	12	39.20	6.80
Q	4	1.28	2.4	3.68	0.32
R	1.60	1.28	-	1.28	0.32
S	12	9.28	0.40	9.68	2.32
Total	**63.60**	**39.04**	**14.80**	**53.84**	**9.76**

II] Statement of Annual Income if all Products are sold at Split-off Point

Particulars	Product P	Product Q	Product R	Product S	Total
Output Units	1,000,000	20,000	10,000	18,000	
Sales Value per unit	3	9	16	60	
Total Sales Value (Rs)	30	1.80	1.60	10.80	44.20
Joint Cost (Rs)	27.20	1.28	1.28	9.28	39.04
Net Profit	**2.80**	**0.52**	**0.32**	**1.52**	**5.16**

III] Suggestion:

If the company accepts alternative II, it is clear that the annual income will be reduced by Rs.4.60 lakhs as compared to alternative I and hence the following alternatives can be suggested.

- Product P and S can be sold after further processing as they earn more profit as compared to if sold at split off point.
- Product Q could be sold at the split off point as it earns more profit if sold at the split off point.
- Product R could be sold at split off point as it earns the same profit under both the alternatives.

IV] Statement Showing Annual Income Under Suggestions in III

Particulars	Product P	Product Q	Product R	Product S	Total
Sales Value	46	1.80	1.60	12	61.40
Less - Joint Cost	27.20 +12	1.28	1.28	9.28 +0.40	39.04 + 12.40
Total Cost	39.20	1.28	1.28	9.68	51.44
Net Income	**6.80**	**0.52**	**0.32**	**2.32**	**9.96**

It will be seen that the amount of profits has increased from Rs.9.76 lakhs in alternative I to Rs.9.96 lakhs and hence this option is recommended.

* The joint cost is apportioned to P,Q, R and S on the basis of Net Realizable Value as shown below.

Products	Sale Value	Additional Processing Cost	NRV at Split-off Point	Joint Cost Determination
P	46	12	34	39.04 *34/48.80 = 27.20
Q	4	2.40	1.60	39.04 *1.60/48.80 = 1.28
R	1.60	-	1.60	39.04 *1.60/48.80 = 1.28
S	12	0.40	11.60	39.04 *11.60/48.80 = 9.28
Total				**39.04**

[*Solution* # 3]

(a) Overtime is worked occasionally

	Job X321	Job X333	Job X156	Total
Total Hours	592	310	246	1148
Rs 8 per hr	4,736	2,480	1,968	9,184
Total job cost	**4,736**	**2,480**	**1,968**	**9,184**

(b) Overtime is worked at the request of the customer, all the wages including overtime premium will be charged to the jobs.

Effective Wage rates per hr	Rs
Normal time	8
Evening	12
Weekends	16

	Job X321	Job X333	Job X156	Total
Normal time	3,840	1,760	1,200	6,800
Evening	1,224	720	960	2,904
Weekends	160	480	256	896
Total job cost	**5,224**	**2,960**	**2,416**	**10,600**

[*Solution* # 4]

(i) Process R further if incremental revenues are greater than incremental costs.

	Rs.
Incremental costs	
- Process costs (90% of Rs.3,000)	2,700
- Other separable costs	500
- Opportunity cost (10 hours @ Rs.230)	2,300
Total incremental cost including opportunity cost	5,500
Incremental revenue 500 (Rs.10 – Rs.1.5)	4,250
Net loss of further processing of R	**1,250**

Result : Product R should be sold at the split off point.

(ii) R is sold at the split off point and production remains at 500 gallons. Therefore, R is not relevant to the decision at hand and it may be ignored.

Consider new output from the distillation plant.

P : 700 gallons
Q : 800 gallons
R : 500 gallons

Production of P falls by (1,000 – 700) 300 gallons
Production of Q increases by (800 – 500) 300 gallons

Product	P	Q
Relevant CM per gallon		
Processing cost	2.7	5.4
Other separable cost	2.0	1.0
Total relevant variable cost	4.7	6.4
Revenue per gallon	12.5	20.0
CM per gallon	**7.8**	**13.6**

Loss in contribution from P = 300 × Rs.7.8	(2,340)
Gain in contribution from Q = 300 × Rs.13.6	4,080
Extra cost of Q = 300 × Rs.1 =	(300)
Opportunity cost due to additional hours for P & Q	
3 hours x Rs.230 per hour	(690)
Net gain of new mix of P and Q	**750**

Recommendations: Produce P, Q and R in the ratio of 7:8:5 and sell R at the split off point.

[*Solution* # 5]

(a) Sniff should consider the following factors when making a further processing decision.

– Incremental revenue. The new perfume, once further processed, should generate a higher price and the extra revenue is clearly relevant to the decision.
– Incremental costs. A decision to further process can involve more materials and labour. Care must be taken to only include those costs that change as a result of the decision and therefore sunk costs should be ignored. Sunk costs would include, for example, fixed overheads that would already be incurred by the business before the further process decision was taken. The shortage of labour means that its 'true' cost will be higher and need to be included.
– Impact on sales volumes. Sniff is selling a 'highly branded' product. Existing customers may well be happy with the existing product. If the further processing changes the existing product too much there could be an impact on sales and loyalty.
– Impact on reputation. As is mentioned in the question, adding hormones to a product is not universally popular. Many groups exist around the world that protests against the use of hormones in products. Sniff could be damaged by this association.
– Potential legal cases being brought regarding allergic reactions to hormones.

(b) Production costs for 1,000 litres of the standard perfume

	$
Aromatic oils (10 ltrs x $18,000/ltr)	180,000
Diluted alcohol (990 ltrs x $20/ltr)	19,800
Material cost	199,800
Labour (2,000 hrs x $15/hr)	30,000
Total	**229,800**
Cost per litre	229·80
Sales price per litre	399·80

Lost contribution per hour of labour used on new products: ($399,800 – $199,800) ÷ 2,000 hrs = $100/hr

Incremental costs

	Male version		Female version	
		$		$
Hormone	2 ltr x $7,750/ltr	15,500	8 ltr x $12,000/ltr	96,000
Supervisor	Sunk cost	0	Sunk cost	0
Labour	500 hrs x $100/hr	50,000	700 hrs x $100/hr	70,000
Fixed cost	Sunk cost	0	Sunk cost	0
Market research	Sunk cost	0	Sunk cost	0
Total		**65,500**		**166,000**

Incremental revenues

	Male version		Female version	
		$		$
Standard	200 ltr x $399·80/ltr	79,960	800 ltr x $399·80	319,840
Hormone added	202 ltr x $750/ltr	151,500	808 ltr x $595/ltr	480,760
Incremental revenue		**71,540**		**160,920**
Net benefit/(cost)		**6,040**		**(5,080)**

The Male version of the product is worth further processing in that the extra revenue exceeds the extra cost by $6,040. The Female version of the product is not worth further processing in that the extra cost exceeds the extra revenue by $5,080. In both cases the numbers appear small. Indeed, the benefit of $6,040 may not be enough to persuade management to take the risk of damaging the brand and the reputation of the business. To put this figure into context: the normal output generates a contribution of $170 per litre and on normal output of about 10,000 litres this represents a monthly contribution of around $1·7m (after allowing for labour costs). Future production decisions are a different matter. If the product proves popular, however, Sniff might expect a significant increase in overall volumes. If Sniff could exploit this and resolve its current shortage of labour then more contribution could be created. It is worth noting that resolving its labour shortage would substantially reduce the labour cost allocated to the hormone added project. Equally, the prices charged for a one off experimental promotion might be different to the prices that can be secured in the long run.

(c) The selling price charged would have to cover the incremental costs of $166,000. For 808 litres that would mean the price would have to be:
166000+319840/808 liters = 601.29/liter **OR** about $60·13 per 100 ml.
This represents an increase of only 1·05% on the price given and so clearly there may be scope for further consideration of this proposal.

(d) Outsourcing involves consideration of many factors, the main ones being:

– Cost. Outsourcing often involves a reduction in the costs of a business. Cost savings can be made if the outsourcer has a lower cost base than, in this case, Sniff. Labour savings are common when outsourcing takes place.
– Quality. Sniff would need to be sure that the quality of the perfume would not reduce. The fragrance must not change at all given the product is branded. Equally Sniff should be concerned about the health and safety of its customers since its perfume is 'worn' by its customers

– Confidentiality. We are told that the blend of aromatic oils used in the production process is 'secret. This may not remain so if an outsourcer is employed. Strict confidentiality should be maintained and be made a contractual obligation.
– Reliability of supply. Sniff should consider the implications of late delivery on its customers.
– Primary Function. Sniff is apparently considering outsourcing its primary function. This is not always advisable as it removes Sniff's reason for existence. It is more common to outsource a secondary function, like payroll processing for example.
– Access to expertise. Sniff may find the outsourcer has considerable skills in fragrance manufacturing and hence could benefit from that.

[*Solution* # 6]

(a) The decision to open on Sundays is to be based on incremental revenue and incremental costs:

	Ref	$	$
Incremental revenue	W1		800,000
Incremental costs			
– Cost of sales	W2	335,000	
– Staff	W3	45,000	
– Lighting	W4	9,000	
– Heating	W5	9,000	
– Manager's bonus	W6	8,000	
– Total			406,000
Net incremental revenue			**394,000**

Conclusion
On the basis of the above it is clear that the incremental revenue exceeds the incremental costs and therefore it is financially justifiable.

(W1) Incremental revenue

Day	Sales	Gross profit	Gross profit	Cost of Sales
	$	%	$	$
Average	10,000	70%		
Sunday (+60% of average)	16,000	50%	8,000	8,000
Annually (50 days)	800,000		400,000	400,000
Current results (300 days)	3,000,000	70·0%	2,100,000	
New results	3,800,000	65·8%	2,500,000	

(W2) Purchasing and discount on purchasing

Extra purchasing from Sunday trading is $800,000 – $400,000	= $400,000
Current annual purchasing is $18,000 x 50	=$900,000
New annual purchasing is ($900,000 + $400,000) x 0·95	= $1,235,000
Incremental cost is $1,235,000 – $900,000	= $335,000
	(a $65,000 discount)

(W3) Staff costs
Staff costs on a Sunday are 5 staff x 6 hours x $20 per hour x 1·5 = $900 per day
Annual cost is $900 x 50 days = $45,000

(W4) Lighting costs
Lighting costs are 6 hours x $30 per hour x 50 days = $9,000

(W5) Heating costs
Heating cost in winter is 8 hours x $45 per hour x 25 days = $9,000

(W6) Manager's bonus
This is based on the incremental revenue $800,000 x 1% = $8,000 (or $160 per day)

(b) The manager's rewards can be summarized as follows:

Time off
This appears far from generous. The other staff is being paid time and a half and yet the manager does not appear to have this option and also is only being given time off in lieu (TOIL) at normal rates. Some managers may want their time back as TOIL so as to spend time with family or social friends; others may want the cash to spend. One would have thought some flexibility would have been sensible if the manager is to be motivated properly.
Bonus
The bonus can be calculated at $8,000 per annum (W6); on a day worked basis, this is $160 per day. This is less than that being paid to normal staff; at time and a half they earn 6 hours x $20 x 1·5 = $180 per day. It is very unlikely to be enough to keep the presumably better qualified manager happy. Indeed the bonus is dependent on the level of new sales and so there is an element of risk involved for the manager. Generally speaking higher risk for lower returns is far from motivating. The level of sales could of course be much bigger than is currently predicted. However, given the uplift on normal average daily sales is already +60%, this is unlikely to be significant.

(c) Discounts and promotion

When new products or in this case opening times are launched then some form of market stimulant is often necessary. B&P has chosen to offer substantial discounts and promotions. There are various issues here:
Changing buying patterns: It is possible that customers might delay a purchase a day or two in order to buy on a Sunday. This would cost the business since the margin earned on Sunday is predicted to be 20% points lower than on other days.
Complaints: Customers that have already bought an item on another day might complain when they see the same product on sale for much less when they come back in for something else on a Sunday. Businesses need to be strong in this regard in that they have to retain control over their pricing policy. Studies have shown that only a small proportion of people will actually complain in this situation. More might not, though, be caught out twice and hence will change the timing of purchases (as above).
Quality: The price of an item can say something about its quality. Low prices tend to suggest poor quality and *vice versa*.

B&P should be careful so as not to suggest that lower prices do not damage the reputation of the business as regards quality.

[Solution # 7]

(a) Normal loss (toxic waste) = 50 kg per 1000 kg of input (i.e. 5%)
Actual input = 10 000 kg
Abnormal loss = Actual toxic waste (600) less normal loss (500) = 100 kg

By-product R net revenues of £1750 are credited to the joint (main) process account and normal and abnormal losses are valued at the average cost per unit of output:

Net cost of production (35750-1750)/ Expected output of the joint products (8500 kg) = £4

The cost of the output of the joint products is £33 600 (8400 kg * £4) and this is to be allocated to the individual products on the basis of final sales value (i.e. 4800 kg * £5 = £24 000 for P and 3600 kg * £7 = £25 200 for Q):

P	=	£24 000/£49 200 - £33 600	=	£16 390
Q	=	£25 200/£49 200 - £33 600	=	£17 210

The main process account is as follows:

Main process account

	(kg)	(£)		(kg)	(£)
Materials	10 000	15 000	P Finished goods	4 800	16 390
Direct labour	—	10 000	Q Process 2	3 600	17 210
Variable overhead	—	4 000	By-product R	1 000	1 750
Fixed overhead	—	6 000	Normal toxic waste	500	—
Toxic waste disposal a/c		750	Abnormal toxic waste	100	400
	10000	**35750**		**10000**	**35750**

(b)

Toxic waste disposal (Creditors' account)

	(£)		(£)
Bank	900	Main process account	750
		Abnormal toxic waste	150
	900		**900**

Abnormal toxic waste account

Main process account	400	Profit and Loss Account	550
Toxic waste disposal account (100*1.50)	150		
	550		**550**

Process 2 account

	kg	(£)		kg	(£)
Main process Q	3600	17 210	Finished goods Q[b]	3 300	26 465
Fixed cost		6 000	Closing work-in-progress[b]	300	1 920
Variable cost		5 175[a]			
	3600	**28385**		**3600**	**28385**

Notes

a 3300 + (50% * 300) * £1.50 = £5175

b

	(£)	Completed units	WIP equiv. units	Total equiv. units	Cost per unit
Previous process cost	17 210	3300	300	3600	£4.78
Conversion cost	11 175	3300	150	3450	£3.24
					£8.02

	(£)
Completed units (3 300 units * £8.02)	26 465
WIP (300 * £4.78) + (150 * £3.24)	1 920
	28385

(c)

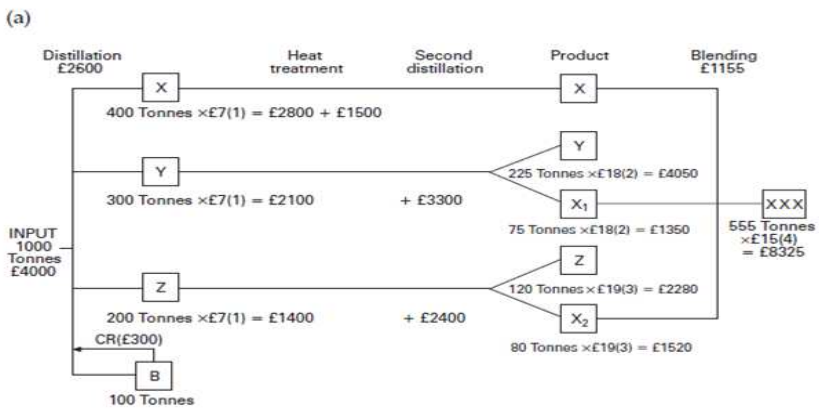
	(£)
Incremental sales revenue per kg from further processing (£7 - £4.30)	2.70
Incremental (variable) cost per kg of further processing	1.50
Incremental contribution per kg from further processing	**1.20**

	(£)
At an output of 3600 kg the incremental contribution is	4320
Avoidable fixed costs	3600
Net benefit	**720**

Break-even point = Avoidable Fixed Cost (3600)/ Incremental Unit Contribution (1.20) = 3000 kg

Further processing should be undertaken if output is expected to exceed 3000 kg per week.

[Solution # 8]



Workings

(*W1*)	(4000 + 2600 - 300)/900	=	£7
(*W2*)	(2100 + 3300)/300	=	£18
(*W3*)	(1400 + 2400)/200	=	£19
(*W4*)	(2800 + 1500 + 1155 + 1350 + 1520)/555	=	£15

(b)

Product	Output (tonnes)	Total cost (£)	Cost per tonne (£)
XXX	555	8325	15
Y	225	4050	18
Z	120	2280	19

(c) An alternative treatment is to credit the income direct to the profit and loss account rather than crediting the proceeds to the process from which the byproduct was derived.

[Solution # 9]

(a) You can see from the question that the input is 240 000 kg and the output is 190 000 kg. It is assumed that the difference of 50 000 kg is a normal loss in output which occurs at the start of processing. Therefore the loss should be charged to the completed production and WIP. By making no entry for normal losses in the cost per unit calculation the normal loss is automatically apportioned between completed units and WIP.

	Opening WIP	Current cost	Total cost	Completed WIP	Closing unit	Total equivalent value	Cost Per unit	WIP units
	(£)	(£)	(£)			(£)	(£)	
Materials	20000	75000	95000	160000	30000	190000	0.50	15000
Processing Costs	12000	96000	108000	160000	20000	180000	0.60	12000
			203000				**1.10**	**27000**
Completed units (160 000 units * £1.10)								176 000
								203 000

(b) This question requires a comparison of incremental revenues and incremental costs. Note that the costs of process 1 are irrelevant to the decision since they will remain the same whichever of the two alternatives are selected. You should also note that further processing 120 000 kg of the compound results in 240 000 kg of Starcomp.

	(£)	(£)
Incremental sales revenue:		
Starcomp (120 000 * 2 kg * £2)	480 000	
Compound (120 000 * £1.60)	192000	288 000
Incremental costs:		
Materials	120 000	
Processing costs	120000	240000
Incremental profits		**48000**

(c) The sales revenue should cover the additional costs of further processing the 40 000 kg compound and the lost sales revenue from the 40 000 kg compound if it is sold without further processing.

Additional processing costs:

	(£)
Materials (£160 000 - £120 000)	40 000
Processing costs (£140 000 - £120 000)	20 000
Lost compound sales revenue (40 000 * £1.60)	64000
	124000

Minimum selling price per kg of Starcomp = £124 000/40 000 kg * 2 = £1.55

[Solution # 10]

(a) *Profit and loss account*

	W (£)	X (£)	Z (£)	Total (£)
Opening stock	—	—	8 640	8 640
Production cost	189 060	228 790	108 750	526 600
Less closing stock	(14385)	(15070)	(15 010)	(44465)
Cost of sales	174 675	213 720	102 380	490 775
Selling and administration costs	24098	27 768	10 011	61877
Total costs	198 773	241 488	112 391	552 652
Sales	240975	277680	100110	618765
Profit/ (loss)	**42202**	**36192**	**(12281)**	**66113**

Workings

Joint process cost per kilo of output = £0.685 per kg (£509 640/744 000 kg)

Production cost for products W, X and Y:

Product W (276 000 kg * £0.685) = £189 060

X (334 000 kg * £0.685) = £228 790

Y (134 000 kg * £0.685) = £91 790

Closing stocks for products W and X:

Product W (21 000 kg * £0.685) = £14 385

X (22 000 kg * £0.685) = £15 070

Cost per kilo of product Z:

		(£)
Product Y (128 000 kg * £0.685)	=	87 680
Further processing costs		17 920
Less by-product sales (8000* £0.12)	=	(960)
		104640
Cost per kilo (£104 640/96 000 kg)		£1.09

Closing stock of product Z (10 000 kg * £1.09)	=	£10 900
Add closing stock of input Y (6000 * £0.685)	=	£4110
Closing stock relating to product Z		**£15010**

Production cost relating to final product Z:

		((£)
Product Y (134 000 kg * £0.685)	=	91790
Further processing costs		17920
Less by-product costs		(960)
		108750

(b) The joint costs are common and unavoidable to both alternatives, and are therefore not relevant for the decision under consideration. Further processing from an input of 128 000 kg of Y has resulted in an output of 96 000 kg of Z. Thus it requires 1.33 kg of Y to produce 1 kg of Z (128/96).

	(£)
Revenue per kilo for product Z	1.065 (£100 110/94 000 kg)
Sale proceeds at split-off point	
(1.33 * £0.62)	0.823
Incremental revenue per kg from further processing	0.242
Incremental costs of further processing	0.177 [(£17 920 - £960)/96 000]
Incremental profit from further processing	**0.065**

It is assumed that selling and administration costs are fixed and will be unaffected by which alternative is selected. The company should therefore process Y further into product Z and not accept the offer from the other company to purchase the entire output of product Y.

[Solution # 11]

(a)

(i) Apportionment of Joint Cost to A and B in proportion of Sales Value at Split-off Point

Sale Value of Product A	Sale Value of Product B
120,000 Kgs x Rs.8=Rs.960,000	60,000 Kgs x Rs.4=Rs.240,000

Therefore, the joint cost of Rs. 875,000 can be apportioned to products A and B in the ratio of 4:1

Product A	Rs.875,000	x	4/5	=	Rs.	700,000
Product B	Rs.875,000	x	1/5	=	Rs.	175,000

(ii) Statement Showing Cost per kg of each product indicating Joint Cost, Processing and Total Cost.

	Product A Total Rs.	100,000kgs Per Kg	Product B Total Rs.	120,000kgs Per Kg
Share in Joint Cost	700,000	7.00	175,000	1.46
Further Processing Cost	180,000	1.80	150,000	1.25
Total Cost	880,000	8.80	325,000	2.71

(iii) Statement Showing Product wise Profit for the period.

	Amount in Rs.	
	Product A	Product B
Sales (90,000 Kgs @10)	900,000	
(115,000 Kgs @4)		460,000
Add: Closing inventory at full cost as in above (ii)		
(10,000 Kgs @8.80)	88,000	
(5,000 Kgs @2.71)		13,542
Value of Production	988,000	473,542
Less: Share of Joint Cost	700,000	175,000
Further Processing Cost	180,000	150,000
Profit	108,000	148,542

(b) Comments to increase profitability

It is suggested that Product A should be sold at split-off point and Product B should be further processed before sale to increase profitability from the following analysis of further processing:

Incremental Profit = Incremental sales - Incremental cost

Product A [(100,000 Kgs x Rs. 10) -(120,000 Kgs x Rs. 8)] - Rs180,000 =Rs140,000 Loss

Product B [(120,000 Kgs x Rs. 4) - (60,000 Kgs x Rs. 4)] - Rs.150,000 = Rs.90,000 Profit

[Solution # 12]

(a) Gross quantity of input material required to be procured

Total output	4,800 tonnes
Add _ Scrap	
Moulding Dept. – 5%	240 tonnes
Machining Dept. 10%	480 tonnes
	5,520 tonnes

(b) Selection of sources of supplier and price, at which the inputs are to be procured

Comparative cost of procurement

Sources	Korea	China	Taiwan
Quantity to be supplied (tonnes)	3,600	4,000	5,520 (entire qty.)
Price (Rs. Million/ tonne)	0.30	0.275	0.32500
Less discount 5%			0.01625
Net price	0.30	0.275	0.30875
Add: Transport	0.01	0.015	
Landed cost	0.31	0.29	0.30875

The material accordingly will be procured as under:

		Rs/ Million
From China	4,000 @ Rs.0.29 million/ tonne	1160.00
From Korea	1,520 tonne @ Rs.0.31 million/ tonne	471.20
Total	5,520	1631.20

Average cost/ tonne being Rs.0.2955 million. Therefore Taiwan is costliest source, so it is ignored.

(c) Computation of annual profitability

	Total 4,800/ tonne Rs./ million	Per tonne Rs.
Material cost @ 0.2955/ tonne	1418.40	295,500
Add: Scrap @ 15%	212.76	44,325
	1631.16	33,825
Less: Realizable value of scrap		
Moulding dept: (4.800 x 0.05) tonne @ Rs.75,000/tonne	(18.00)	(3,750)
Machine dept: (4.800 x 0.10) tonne @ Rs.100,000/ tonne	(48.00)	(10,000)
Net material cost	1565.16	326,075
Labour:		
Moulding department	8.00	1,667
Machining department	24.00	5,000
	32.00	6,667
Overhead:		
Moulding department	32.00	6,667
Machining department	72.00	15,000
	104.00	21,667
Total cost of production	1701.16	354,409
Distribution cost (15% of production cost)	255.174	53,161
Total cost	1,956.334	407,570
Sales realization		
Northern Zone: 3,000 tonne @ Rs.750,000/ tonne	2,250.000	
Southern Zone: 1,800 tonne @ Rs.1,000,000/ tonne	1,800.000	
	4,050.000	843,750
Profit	2,093.666	436,180
Profit as % of sales.		51.70%

[Solution # 13]

(A) Selection of method for apportionment of joint cost
The output method is highly irrational and hence we decide not to follow it. Sales value method, using the real sales price at separation point or the net relative sales value as the case may be is the most reasonable and logical method and we decide to follow sales method.

B) Apportioned of joint cost to A & B products	
(i) NRV of A :	
Final sales value of C (35,000*18)	6,30,000
Less: P4 cost	(1,30,000)
NRV of C	5,00,000
S.V of D (15,000*14.4)	2,16,000
Final S.V of A	7,16,000
Less: P2 cost	(1,50,000)
NRV of A	5,66,000

(ii) NRV of B	
Final SV of E (47,500*15.2)	
Scrap quantity value (2,500*2)	
Total	7,27,000
Less: P3 & P6 cost	(2,05,000)
NPV of B	5,22,000

(iii) Apportioned of Joint cost	
A = [5,41,500*566/(566+522)	2,81,700
B = [5,41,500 *522/(566+522)	2,59,800

(iii) Apportioned of Joint cost to C & D	
(i) Calculation of Total Joint Cost	
P1 cost apportioned to A	2,81,700
P2 cost	1,50,000
Total	4,31,699

(ii) Apportioned of Joint cost	
C = [4,31,699*500/500+216	3,01,466
D = [4,31,699*216/500+216	1,30,233

(II) Depth of Processing D.	
If processing 15,000 (20.8-1.44)	96,000
Less: Additional cost	1,00,000
Relevant cost	(4,000)

Product 'D' should not processed further

(III) NP		
Sales C	35,000*18	
Sales D	5,000 * 14.4	
Sales E	17,500 * 15.2	
Scrap	2,500 * 2	
Total		15,73,000
Less: Cost incurred		
P1	5,41,500	
P2	1,50,000	
P3	1,08,000	
P4	1,30,000	
P6	97,000	10,26,500
		5,46,500

In Suggested both these aspects have been ignored.

[Solution # 14]

Particulars	Product 'A'		Product 'F'		Incremental Revenue/cost
	12,500 units		12,500 units		
	Per unit	Total	Per unit	Total	Total
	Rs.	Rs.	Rs.	Rs.	Rs.
Sales revenue	7.00	87,500	10.00	125,000	37,500
Less: Commission @ 10%	0.70	8,750	1.00	12,500	3,750
Net revenue (i)	6.30	78,750	9.00	112,500	33,750
Raw Materials	1.50	18,750	2.00	25,000	6,250
Labour & overheads	2.10	26,250	3.50	43,750	17,500
Additional fixed expenses	-	-	0.32	4,000	4,000
Total cost: (ii)	3.60	45,000	5.82	72,750	27,750
Profit: (i) –(ii)	**2.70**	**33,750**	**3.18**	**39,750**	**6,000**

The above table shows that by resorting to further processing of 12,500 units the company can earn an additional profit of Rs. 6,000 per month and hence the proposal is recommended.

Note: In the above problem it is likely that the company, instead of utilizing its capacity to make product 'F' may go in for a further increase in production of product 'A' to the extent possible. In such circumstances, the incremental profit of the second alternative should be compared with the incremental profit as obtained above.

[Solution # 15]

(a) Statement showing profit or loss of each product using weights as the basis of apportioning pre-

	Total	Product A	Product B	Product C
	Rs.	Rs.	Rs.	Rs.
Cost up to the point of separation In the ratio of (100:60:80) or (5:3:4)	96,000	40,000	24,000	32,000
cost after separation point	40,000	20,000	12,000	8,000
Total costs	136,000	60,000	36,000	40,000
Sales revenue	146,000	50,000	48,000	48,000
Profit/ (Loss)	**10,000**	**(10,000)**	**12,000**	**8,000**

(b) To ascertain optimal contribution, first, the incremental profit or loss from each product, if products are further processed after separation point is to be computed. The statement below shows the incremental profit or loss after further processing:

	Product A	Product B	Product C
Output (tonnes)	**100**	**60**	**80**
	Rs.	Rs.	Rs.
Incremental revenue from further processing	25,000 (500- 250)×100	6,000 (800- 700)×60	12,000 (600-450)×80

Less: incremental cost	20,000	12,000	8,000
Incremental profit (Loss)	**5,000**	**(6,000)**	**4,000**

It will be seen from above statement that there will be a loss of Rs. 6,000 if further processing of product B is done after the separation point. It is, therefore, recommended that product B should be sold at separation point. The optimal contribution based on this recommendation will be as follows:

Statement showing optimal contribution

	Product A	**Product B**	**Product C**
Output (tonnes)	**100**	**60**	**80**
	Rs.	**Rs.**	**Rs.**
Sales revenue	50,000 (100×Rs. 500)	42,000 (60×Rs. 700)	48,000 (80×Rs. 600)
Less: Post separation cost	20,000	--	8,000
Contribution	**30,000**	**42,000**	**40,000**

STANDARD COSTING

[Solution # 01]

(a) Ideal standard
No loss; therefore standard cost = 1 unit of direct materials at Rs: 4.50 per unit of material = Rs: 4.50 per unit of output.
(b) Attainable or current standard: allow for 10% loss
Standard input to produce one unit of = 1/0.9 units = 1.111 units. Therefore standard cost = 1.111 units of materials at Rs: 4.50 per unit = Rs: 5 per unit of output.

[Solution # 02]

Standard cost per slice of bread = Rs: 6/24 slices = Rs: 0.25
(a) Ideal standard: 2 slices × Rs: 0.25 = Rs: 0.50
(b) Current standard: 2/0.80 slices = 2.5 slices at Rs: 0.25 = Rs: 0.625
(c) Attainable or target standard: 2/0.9 = 2.22 slices at Rs: 0.25 = Rs: 0.555.
Note that the current and attainable standard costs include an allowance for wastage, and a material usage variance will occur only if the actual wastage rate differs from the standard wastage rate.

[Solution # 3]

Contribution per unit = 6.95 – (0.60 + 2.00 + 0.50) = 3.85

Operating Statement

				$
Budgeted contribution (6 *100 *$3.85)				2,310
Sales volume variance (W10)				115.5 (F)
Standard contribution for actual sales (630*$3.85)				2,425.5
Sales price variance (W9)				121.50 (F)
Cost variances		*$(F)*	*$(A)*	
Materials Price	(W1)	10		
Usage	(W2)	18		
Labour Rate	(W3)		150	
Idle time	(W4)		40	
Efficiency	(W5)	100		
Variable overheads				
Expenditure	(W6)		35	
Efficiency	(W7)	25		
		153	225	
Net cost variances				72 (A)
Actual contribution				$2,475
Fixed overheads				
Budgeted (6 × 100 × 1.25)				750
Expenditure variance	(W8)			(750)
Actual profit	(W11)			**1,725**

Workings

(1) Materials price	$
260 kg should cost ($1.50)	390
did cost	380
	10 (F)
(2) Materials usage	
630 meals should use (0.4)	252 kg
did use	240 kg
	12 kg (F)@ $1.50/kg standard $18 (F)
(3) Labour rate	
300 hours should cost (4)	$1,200
did cost	$1,350
	$ 150 (A)
(4) Labour idle time	
Hours paid	300 hours
Hours worked	290 hours
	10 hours (A) @ standard cost per hour ($4) $40 (A)
(5) Labour efficiency	
630 meals should take (0.5)	315 hours
did take	290 hours
	25 hours @ standard cost per hour ($4) $100 (F)
(6) Variable overhead expenditure	$
290 hours should incur ($1)	290
did incur	325
	35 (A)
(7) Variable overhead efficiency	
As labour	25 hours (F) @ standard overhead per labour hour ($1) $25 (F)
(8) Fixed overhead expenditure	$
Budget = 100 *6 *1.25	750
Actual	750
	Nil
(9) Sales price	$
630 meals should sell for (6.95)	4,378.50
did sell for	4,500.00
	121.50 (F)
(10) Sales volume meals	
Budget meals	600
Actual meals	630
	30 meals @ standard contribution per meal ($3.85) $115.50 (F)

(11) Actual profit = revenues – costs

4,500 – (380 – 30) – 1,350 – 325 – 750 = 1,725

Favourable price variance could be due to:

1. Negotiated better price
2. bulk buying →discount
3. cheaper quality goods
4. alternative supplier used
5. price inflation different to anticipated

Favourable usage variance

1. less wastage
2. more efficient may be due to better processes
3. better grade of staff
4. better quality of material (unlikely given favourable price variance)

Adverse labour rate

1. higher pay rises than anticipated
2. higher skilled workers than expected
3. overtime worked

Favourable efficiency variance

1. better processes
2. better materials ∴ less rework
3. higher skilled staff
4. learning effect
5. training

Idle time – given in question

Adverse variable overheads expenditure variance

1. rate rise
2. alternative suppliers
3. standard too low
4. excessive use

Favourable efficiency variance (as labour)

[Solution # 4]

Mix	Act Qty Std Mix	Act Qty Act Mix	Diff	Std cost $	Var $
A	1,000	1,040	(40)	80	(3,200)
J	600	560	40	100	4,000
H	400	400		120	0
	2,000	**2,000**			**800 F**

Yield	Std Qty Std Mix	Act Qty Std Mix	Diff	Std cost $	Var $
A	1,056	1,000	560	80	4,480
J	633	600	330	100	3,300
H	422	400	222	120	2,640
	2,111 (w1)	**2,000**			**10,420 F**

(W1) Standard quantity = 1,900/0.9 = 2,111 **OR**

(W2) Standard cost of 1 kg of output is 90/9,400= 104.44

[Solution # 5]

(a) Operational causes of variances

1 - Adverse sales volume variance = this is caused by actual sales units being less than budgeted. This could be as a result of increases in selling price (as evidenced by a favourable sales price variance), or reduced quality (as possibly suggested by the favourable ingredients price variance). Other explanations include increased competition, changes in taste, a reduction in the amount of air passengers etc.
2 - Favourable sales price variance = this is caused by actual selling price being higher than standard. This could result in a reduction in demand, as evidenced by the adverse sales volume variance. It would usually be caused by a management decision to increase prices, possibly in anticipation of cost increases. It could also represent an attempt to benefit from anticipated excess demand.
3 - Favourable ingredients price variance = this is caused by actual ingredients price being less than standard. This could be due to buying lower quality ingredients (as possibly indicated by the adverse ingredients usage variance, the adverse labour efficiency variance and the adverse sales volume variance). Alternative explanations include surpluses of ingredients or general price inflation being less than anticipated.
4 - Adverse ingredients usage variance = this is caused by using more ingredients per meal unit than standard. This could be as a result of using poor quality ingredients resulting in wastage (see comments above) or could be due to careless usage of ingredients causing excess waste.
5 - Adverse direct labour rate variance = this is caused by paying more per hour for labour than standard. Potential causes include using higher paid skilled labour to perform unskilled tasks, skill shortages leading to wage increases or general inflationary pressures on wages.
6 - Adverse direct labour efficiency variance = this is caused by using more labour hours to produce and serve meals than standard. This could be due to poor quality ingredients resulting in more time to produce meals (see favourable raw ingredients price variance above), or high labour turnover resulting in inexperienced staff.
7 - Favourable fixed overhead expenditure variance = this is caused by actual fixed overhead being less than budgeted. It could be caused by price decreases, or a different pattern of overhead expenditure.
8 - Adverse fixed overhead capacity variance = this is caused by actual labour hours being less than budgeted leading to an under absorption of overhead. This could be as a result of reduced sales and production leading to less hours being worked (as evidenced in the adverse sales volume variance).
9 - Adverse fixed overhead efficiency variance = this is caused by the standard hours for actual production being less than actual hours worked.

(i) Sales volume profit variance

Actual sales units at standard profit (5,200 meals x $3 per meal)	=	$15,600
Budgeted sales units at standard profit (5,000 meals x $3 per meal)	=	$15,000
		$600 Fav

(ii) Sales price variance

Actual sales at actual price	$98,800
Actual sales at standard price (5,200 meals x $20 per meal)	$104,000
	$5,200 Adv

(iii) Fixed overhead expenditure variance

Budgeted fixed overhead (5,000 meals x $4 per meal)	$20,000
Actual fixed overhead	$19,000
	$1000 Fav

(iv) Fixed overhead volume variance

Budgeted fixed overhead	$20,000
Standard fixed overhead for actual production (5,200 meals x $4 per meal)	$20,800
	$800 Fav

Tutorial Note

Variances are often calculated by a formula and such an approach would be equally acceptable here. For example the sales volume variance could be calculated as follows:

(Actual sales units – budgeted sales units) x standard profit

(5,200 – 5,000) x $3 = **$600 Fav**

[Solution # 6]

(a) Standard cost variances

Direct labour

Actual hours at actual rate		$345,000
Actual hours at standard rate (27,600 hours x $12 per hour)		$331,200
Rate variance	**>**	**$13,800 adverse**
Actual hours at standard rate (27,600 hours x $12 per hour)		$331,200
Standard hours at standard rate (12,000 units x 2 hours x $12)		$288,000
Efficiency variance	**>**	**$43,200 adverse**

Fixed Overhead

Actual fixed overhead		$115,000
Budgeted fixed overhead (10,000 units x $12 per unit)		$120,000
Expenditure variance	**>**	**$5,000 favourable**
Budgeted fixed overhead (10,000 units x $12 per unit)		$120,000
Actual hours at standard rate (27,600 hours x $6 per hour)		$165,600
Capacity variance	**>**	**$45,600 favourable**
Actual hours at standard rate (27,600 hours x $6 per hour)		$165,600
Standard hours at standard rate (12,000 units x 2 hours x $6)		$144,000
Efficiency variance	**>**	**$21,600 adverse**

(b) Cost reconciliation

			$
Original Budgeted production cost (10,000 units x $46)			460,000
Production volume variance (2,000 units x $46)			92,000 Adverse
Standard cost for actual production			552,000
	Adverse	Favourable	
	$	$	
Direct material price variance	5,400		
Direct material usage	15,000		
Direct labour rate variance	13,800		

Direct labour efficiency variance	43,200		
Fixed overhead expenditure variance		5,000	
Fixed overhead capacity variance		45,600	
Fixed overhead efficiency variance	21,600		
	99,000	50,600	48,400 adverse
Actual cost ($140,400 + $345,000 + $115,000)			**600,400**

Validity of the production manager's arguments

The argument to explain the price variance is possibly valid. The concept of responsibility accounting tells us that managers should only be held accountable for costs they are able to control. If the purchase decision was made by a purchasing manager then the variance is not the responsibility of the production manager.
The second argument is not valid. Direct material usage variances are calculated by comparing actual usage of materials with standard usage of material for actual production. Any volume differences between budgeted and actual production are thus allowed for in calculating the variance. Factors other than production volume must have caused the variance.

[Solution # 7]

Attainable standard cost card for the coming period

				$
Direct labour	(w1)	0.266 labour hours x $15 per hour	=	4.00
Direct material	(w2)	4kg x $0.6 per kg	=	2.40
Variable overhead four machine hours x $3 per hour			=	12.00
Fixed overhead four machine hours x $1.25 per machine hour			=	5.00
				23.40

Working 1
Standard hours per unit allowing for lost time = 60 minutes÷ 5 units ÷ 45 minutes = 0.266 hours per unit

Working 2
$0.4 per kg x 168/105 = $0.64 per kg
Allowing for the quantity discount $0.64 x 0.9375 = $0.60

Working 3
Variable overhead = $3 per machine hour
Fixed overhead = $500,000 ÷ 400,000 machine hours = $1.25 per machine hour
Machine hours per unit = 400,000 machine hours ÷ 100,000 units = 4 machine hours per unit

[Solution # 8]

I] ***Material Cost Variance:*** Standard Cost for Actual Production – Actual Cost
Rs.3, 300 – Rs.2955 = Rs.345 [F]
Note: Standard cost for actual production is computed as shown below:
For 80 kg, the standard cost is Rs.1, 600, so for actual production of 165 kg, the standard cost is 165/80 X 1600 = Rs.3, 300

II] *Material Price Variance:* Actual Quantity [Standard Price – Actual Price]

- Material A = 105 [Rs.20 – Rs.20] = Nil
- Material B = 95 [Rs.10 – Rs.9] = Rs.95 [F]
- Total Material Price Variance = Rs.95 [F]

III] *Material Quantity Variance:* Standard Price [Std. Quantity – Actual Quantity]

- Material A = Rs.20 [124 – 105] = Rs.380 [F]
- Material B = Rs.10 [83 – 95] = Rs.120 [A]
- Total Material Quantity Variance = Rs.260 [F]

Note: Standard quantity for actual production is computed as shown below

- Material A = 165/80 X 60 = 123.75 or 124
- Material B = 165/80 X 40 = 82.5 or 83

IV] *Material Mix Variance:* Standard Cost of Standard Mix – Std. Cost of Actual Mix

Rs.3, 200 – Rs.3, 050 = Rs.150 [F]

Note: Standard cost of standard mix is computed as under,

Material A: 60% of 200 [Actual Input] = 120 X Rs.20 = Rs.2400

Material B: 40% of 200 [Actual Input] = 80 X Rs.10 = Rs.800

Total Cost = Rs.3200

Standard cost of actual mix is computed by multiplying the actual quantity by the standard price

V] *Material Yield Variance:* Standard Yield Rate [Actual Yield – Standard Yield]

1600/80 [165 – 160] = Rs.20 [165 –160] = Rs.100 [F]

Note: Standard yield is in relation to the actual input of 200 kg and hence the standard yield is 200 less 20% normal loss i.e.40 kg and the standard yield is 160 kg.

[Solution # 9]

Standard Cost Sheet

	Standard cost/Actual yield (W-1)		Standard cost per unit
Direct Material	194,600 / 4,865	5kg @ Rs 8 **(W-2)**	40
Direct Labour	136,220 / 4,865	8hrs @ Rs 3.5 **(W-3)**	28
Variable OH	19,460 / 4,865	8hrs @ Rs 0.5	4
Fixed OH	194,600 / 4,865	8hrs @ Rs 5	40
			112

Working Notes

W-1

	Actual Cost - total variance A/(F) = Standard Cost
Direct Material	199,920 - 5,320 = 194,600
Direct Labour	142,800 - 6,580 = 136,220
Variable OH	20,000 - 540 = 19,460
Fixed OH	189,000 + 5,600 = 194,600

W-2

Direct Material total variance

199,920 - 194,600 = 5,320 (A)

Price Variance	**Usage Variance**
AQ (AR - SR)	SR (AQ - SQA)
23800 (8.4*-8) = 9,520 (A)	8 (23800-24325) = 4,200 (F)

* AR = 199,920/23,800 = 8.4 St. consumption = 24,325/4,865 = 5

Note: Price variance is calculated on consumed quantity

W-3

Direct Labour total variance

142,800 - 136,220 = 6,580 (A)

Rate Variance	Efficiency Variance
AC - (AHxSR)	SR (AH - SHA)
142,800 - (42,000x3.5) = 4,200 (F)	3.5 (42,000 - 38,920) = 10,780 (A)

AH = 142,800/3.4 = 42,000 hrs St.time per unit = 38,920/4,865 = 8 hrs

[Solution # 10]

SQA	= **Ay x standard consumption per unit of output**		
Total	= 5,120 x 37 / 36	=	5,262.22 kgs
Material A	= 17 / 37 x 5,262.22	=	2,417.78
Material B	= 11.5 / 37 x 5,262.22	=	1,635.55
Material C	= 8.5 / 37 x 5,262.22	=	1,208.89
SHA	= **Ay x standard time per unit**		
Dept X	= 4 / 36 x 5,120	=	568.89
Dept Y	= 2 / 36 x 5,120	=	284.44

Material price variance = AQ (AR – SR)

A	2,400 (7.7 – 6)	4,080 (A)
B	2,000 (25.6 – 26)	800 (F)
C	1,150 (62.4 – 60)	2,760 (A)
		6,040 (A)

Material usage variance = SR (AQ at A mix – SQA)

A	6 (2,400 – 2,417.78)	107 (F)
B	26 (2,000 – 1,635.55)	9,476 (A)
C	60 (1,150 – 1,208.89)	3,533 (F)
		5,836 (A)

Material mix variance = SR (AQ at A mix – AQ at S mix)

A	6 (2,400 – 2,550)	900 (F)
B	26 (2,000 – 1,725)	7,150 (A)
C	60 (1,150 – 1,275)	7,500 (F)
		1,250 (F)

Material yield variance = SR (AQ at S mix – SQA)

A	6 (2,550 – 2,417.78)	793 (A)
B	26 (1,725 – 1,635.55)	2,326 (A)
C	60 (1,275 – 1,208.89)	3,967 (A)
		7,086 (A)

Labour cost variance = AC – (SHA x SR)

Dept X	26,000 – (568.89 x 50)	2,445 (F)
Dept Y	14,400 – (284.44 x 36)	4,160 (A)
		1,715 (A)

Labour rate variance = AH (AR – SR)

Dept X	500 (52 – 50)	1,000 (A)
Dept Y	360 (40 – 36)	1,440 (A)
		2,440 (A)

Labour efficiency variance = SR (AH – SHA)

Dept X	50 (500 – 568.89)	3,445 (F)
Dept Y	36 (360 – 284.44)	2,720 (A)
		725 (F)

[Solution # 11]

(a) SIMPLY SOUP Limited

(i) Meaning and Controllability of the variances

Material Price Variance

Indicates whether Simply Soup has paid more (adverse) or less (favourable) for its input materials than the standard prices set for the period. For example, if a new supplier had to be found and the price paid was more than the standard price then Simply Soup would incur an extra cost. This extra cost is the price variance. Price variances are controllable to the extent that Simply Soup can choose its suppliers. On the other hand, vegetables are a seasonal and weather dependent crop and therefore factors outside Simply Soups control can influence prices in the market. The key issue is that the production manager will not control the price paid that is the job of the Purchasing Manager.

Material Mix Variance

Considers the cost of a change in the mix of the ingredients to make soup. For example adding less butter (which is expensive) and more stock (which is cheaper) will be a cheaper mix than the standard mix. A cheaper mix will result in a favourable variance. The recipe determines the mix. The recipe is entirely under the control of the production manager.

Material Yield Variance

This shows the productivity of the manufacturing process. If the process produces more soup than expected then the yield will be good (favourable). At the moment 2.05 litres of input produces 1 litre of soup, if 2.05 litres of input produces more than 1 litre of soup then the yield is favourable. Greater yield than expected can be a result of operational efficiency or a change in mix. The production manager

controls the operational process so should be able to control the yield. Poor quality ingredients can damage yield but the production manager should be in control of quality and reject dubious ingredients. The production manager is also responsible for things like spillage. Higher spillage can also reduce yield.

(ii) Production manager's performance

Cost Efficiency

The production manager has produced significant favourable cost variances. The total favourable variance has risen from $4,226 to $10,352 in the first three months. This last figure represents approximately 7.1% of the standard monthly spend. The prices for materials have been rising but are probably outside the control of the production manager. The rising prices may have put pressure on the production manager to cheapen the mix. The mix has become cheaper. This could be seen as a cost efficient step. However, Simply Soup must question the quality implications of this (see later). The yield results are the most significant. The manager is getting far more out of the process than is usual. The new mix is clearly far more productive than before. This could easily be seen as an indicator of good performance as long as the quality is maintained.

Quality

The concern is that the production manager has sacrificed quality for lower cost and greater quantity. The sales director has indicated that sales are falling, perhaps an indication that the customers are unhappy with the product when compared to competitor offers. The greater yield and cheaper mix may well have produced a tasteless soup.

Overall

Overall there has to be concern about the production manager's performance. Cost control and efficiency are important but not at the expense of customer satisfaction and quality. We do not have figures for the extent to which sales have been damaged and small reductions may be acceptable.

(iii) Changes to the performance management system

The performance management system needs to take account of the quality of the soup being produced and the overall impact a decision has on the business. Quality targets need to be agreed with the manager. These are difficult to quantify but not impossible. For example soup consistency (thickness) is measurable. Regular tasting will indicate a fall in quality; tasters could give the soup a mark out of 10 on taste, colour, smell etc. The production manager should not be rewarded for producing lots of cheap soup that cannot be sold. The performance management system should reflect the overall effect that decisions have. If the production manager's actions have reduced sales then sales volume variances should be allocated to the production manager as part of the performance assessment.

(b) Variance calculations

Material Price Variance

Mixed Vegetables	: (69700/82000 – 0.80) x 82000	= $4100 (A)
Butter	: (21070/4900 – 4) x 4900	= $1470 (A)
Stock	: (58560/122000 – 0.50) x 122000	= $2440 (F)

Material Mix Variance

Mixed Vegetables	: (82,000 – 91,712.2*) x 0.80	= $7,770 (F)
Butter	: (4,900 – 5,095.1) x 4	= $780 (F)
Stock	: (122,000 – 112,092.7) x 0.50	= $4,954 (A)
Total Mix Variance		**$3,596** (F)

Note: it is only the total mix variance that is a valid variance here
Total input volume = (82,000 + 4,900 + 122,000) = 208,900
* Standard mix for mixed vegetables is = $91,712.2

Material Yield Variance

[112,000 – 101,902.4] x 1.47 = $14,843(F)
The standard inputs add up to 2.05 units (0.9+0.5+1.1). This produces 1ltr of soup. The actual inputs were 208,900 litres and therefore the standard expected output should be
208,900 * 1 /2.05= 101,902.4 litres

[Solution # 12]

(a) A budget forms the basis of many performance management systems. Once set, it can be compared to the actual results of an organisation to assess performance. A change to the budget can be allowed in some circumstances but these must be carefully controlled if abuse is to be prevented. Allow budget revisions when something has happened that is beyond the control of the organisation which renders the original budget inappropriate for use as a performance management tool. These adjustments should be approved by senior management who should attempt to take an objective and independent view. Disallow budget revisions for operational issues. Any item that is within the operational control of an organisation should not be adjusted. This type of decision is often complicated and each case should be viewed on its merits. The direction of any variance (adverse or favourable) is not relevant in this decision.

(b) Materials

Arguments in favour of allowing a revision

– The nature of the problem is outside the control of the organisation. The supplier went in to liquidation; it is doubtful that Spike Limited could have expected this or prevented it from happening.

– The buyer, knowing that budget revisions are common, is likely to see the liquidation as outside his control and hence expect a revision to be allowed. He may see it as unjust if this is not the case and this can be demoralising.

Arguments against allowing a budget revision

– There is evidence that the buyer panicked a little in response to the liquidation. He may have accepted the first offer that became available (without negotiation) and therefore incurred more cost than was necessary.

– A cheaper, more local supplier may well have been available, so it could be argued that the extra delivery cost need not have been incurred. This could be said to have been an operational error.

Conclusion

The cause of this problem (liquidation) is outside the control of the organisation and this is the prime cause of the overspend. Urgent problems need urgent solutions and a buyer should not be penalised in this case. A budget revision should be allowed.

Labour

Arguments in favour of allowing a revision

– The board made this decision, not the departmental manager. It could be argued that the extra cost on the department's budget is outside their control.

Arguments against allowing a budget revision

– This decision is entirely within the control of the organisation as a whole. As such, it would fall under the definition of an operational decision. It is not usual to allow a revision in these circumstances.

– It is stated in the question that the departmental manager complained in his board report that the staff level needed improving. It appears that he got his wish and the board could be said to have merely approved the change.

– The department will have benefited from the productivity increases that may have resulted in the change of policy. If the department takes the benefit then perhaps they should take the increased costs as well.

Conclusion

This is primarily an operational decision that the departmental manager agreed with and indeed suggested in his board report. No budget revision should be allowed. An alternative view is that the board made the final decision and as such the policy change was outside the direct control of the departmental manager. In this case a budget revision would be allowed.

(c) Total sales variances

Sales price variance = (Actual SP – Std SP) x Act sales volume
= (16·40 – 17·00) x 176,000
= $105,600 (Adverse)

Sales volume variance = (Actual sales volume – Budget sales volume) x Std contribution
= (176,000 – 180,000) x 7
= $28,000 (Adverse)

(d) Market size and share variances

Market size variance = (Revised sales volume – budget sales volume) x Std contribution
= (160,000 – 180,000) x 7
= $140,000 (Adverse)

Market share variance = (Actual sales volume – revised sales volume) x Std contribution
= (176,000 – 160,000) x 7
= $112,000 (Favourable)

(e) Comment on sales performance

Sales Price

The biggest issue seems to be the decision to reduce the sales price from $17·00 down to $16·40. This 'lost' $105,600 of revenue on sales made compared to the standard price.

It seems likely that the business is under pressure on sales due to the increased popularity of electronic diaries. As such, they may have felt that they had to reduce prices to sustain sales at even the level they achieved.

Volume

The analysis of sales volume into market size and share shows the usefulness of planning and operational variances. Overall, the sales level of the business is down by 4,000 units, losing the business $28,000 of contribution or profit. This calculation does not in itself explain how the sales department of the business has performed. In the face of a shrinking market they seem to have performed well. The revised level of sales (allowing for the shrinking market) is 160,000 units and the business managed to beat this level comfortably by selling 176,000 units in the period.

As mentioned above, the reducing price could have contributed to the maintenance of the sales level. Additionally, the improved quality of support staff may have helped maintain the sales level. Equally the actions of competitors are relevant to how the business has performed. If competitors have been active then merely maintaining sales could be seen as an achievement. Spike should be concerned that its market is shrinking.

[Solution # 13]

(a) When assessing variances it is important to consider the whole picture and the interrelationships that exist. In Chaff there appears to be doubt about the wisdom of some of the decisions that have been made. Favourable variances have been applauded and adverse variances criticised and the managers in charge dispute the challenge to their actions.

The **purchasing manager** has clearly bought a cheaper product, saving $48,000. The cause of this is not specified and it could be due to good buying or negotiation, reductions in quality or changes in overall market conditions. We are told the market for buying seeds is stable, so there is more likely to be an internal reason for the problem. The material usage variance is significantly adverse, indicating much more waste than is normal has occurred in month 1. This suggests that the quality of the seed bought was poor and as a result a $52,000 excess loss has occurred. It is possible that the waste was caused by the labour force working poorly or too quickly and this has to be considered. The sales price achieved is also well down on standard with the sales price variance showing an $85,000 loss of revenue and (therefore) profit. We are told that the market for sales of brown rice is stable and so it is reasonable to presume that the fall in sales price achieved is as a result of internal quality issues rather than general price falls. The purchasing manager of the only ingredient may well be responsible for this fall in quality. This may have also led to a fall in the volume of sales, another $21,000 of adverse variance.

In conclusion the purchasing manager appears mainly responsible for a loss of $110,000* taking the four variances above together.
* ($85,000 + $52,000 + $21,000 – $48,000)

The **production director** has increased wage rates and this has cost an extra $15,000 in month 1. However one could argue that this wage increase has had a motivational effect on the labour force. The labour efficiency variance is $18,000 favourable; and so it is possible that a wage rise has encouraged the labour force to work harder. Academic evidence suggests that this effect might only be temporary as workers get used to the new level of wages. Equally the amount of idle time has reduced considerably, with a favourable variance of $12,000 resulting. Again it is possible that the better motivated labour

force has been more willing to work than before. Idle time can have many causes, including, material shortages or machine breakdowns. However, we are told the machines are running well and the buyer has bought enough rice seeds.

In conclusion the increase in the wage rate did cost more money but it may have improved morale and enhanced productivity. The total of the three variances above is $15,000* Fav. *($18,000 + $12,000 – $15,000)

The **maintenance manager** has decided to delay the annual maintenance of the machines and this has saved $8,000. This will increase profits in the short term but could have disastrous consequences later. In this case only time will tell. If the machines breakdown before the next maintenance then lost production and sales could result. The maintenance manager has only *delayed* the spend and not prevented it altogether. A saving of $8,000 as suggested by the variance has not been made. It is also possible that the adverse variable overhead expenditure variance has been at least partly caused by poor machine maintenance. The variance calculated is not the saving made as it represents a timing difference only. The calculation also ignores the risks involved.

(b) The standard contribution is given, but could be calculated as follows (not required by the question but shown as a proof):

	$	$
Sales price		240
Less:		
Rice seed (1·4 Tonnes x $60/tonne)	84	
Labour (2 hours x $20/hr)	40	
Variable overhead (2 hours x $30/hr)	60	
Marginal costs of production		(184)
Standard contribution		**56**

The standard labour charge needs to be adjusted to reflect the cost to the business of the idle time. It is possible to adjust the time spent per unit or the rate per hour. In both cases the adjustment would be to multiply by 10/9 – a 10% adjustment. In the case above the rate per hour has been adjusted to $18 x 10/9 = $20/hr.

In order to reconcile the budget profit to the actual profit, both these profits need to be calculated and an operating statement prepared.

Budget profit statement for month 2

	$	$
Sales (8400u x $240/u)		2,016,000
Less:		
Rice seed (1·4 tonnes x $60/tonne x 8,400 tonnes)	705,600	
Labour (2 hours x $20/hr x 8,400 tonnes)	336,000	
Variable overhead (2 hours x $30/hr x 8,400 tonnes)	504,000	
Marginal costs of production		(1,545,600)
Contribution		470,400
Less Fixed costs		(210,000)
Budget profit		**260,400**

Actual profit for month 2.

	$	$
Sales		1,800,000
Less:		
Rice seed	660,000	
Labour	303,360	
Variable overhead	480,000	
Marginal costs of production		(1,443,360)
Contribution		356,640
Less Fixed costs		(200,000)
Actual profit		**156,640**

Operating statement for month 2

	$	$	$
Budget contribution			470,400
Variances:	**Adverse**	**Favourable**	
Sales price	120,000		
Sales volume	22,400		
			(142,400)
			328,000
Material price		60,000	
Material usage	48,000		
Labour rate	18,960		
Labour efficiency		20,000	
Idle time		15,600	
Variable overhead efficiency		30,000	
Variable overhead expenditure	30,000		
	96,960	125,600	28,640
Actual contribution			356,640
Budget fixed cost		210,000	
Less: Fixed cost expenditure variance		10,000	
Actual fixed cost			(200,000)
Actual profit			**156,640**

Workings for the variances in month 2

1. Sales price: (225 – 240)8,000 = 120,000 *Adv*
2. Sales volume: (8,000 – 8,400)56 = 22,400 *Adv*
3. Material price: (660000/12000 – 60) *12000 = 60000 fav
4. Material usage: (12,000 – 11,200*) 60 = 48,000 *Adv*
*(8,000 x 1·4 = 11,200)
5. Labour rate: (19·20 – 18)15,800 = 18,960 *Adv*
6. Labour efficiency: (15,000 – 16,000)20 = 20,000 *Fav*
7. Idle time: (800 – 1,580*) 20 = 15,600 *Fav*
*10% of 15,800
8. Variable overhead expenditure: (480000/15000 - 30) * 15000 = 30000 Adv
9. Variable overhead efficiency variance: (15,000 – 16,000)30 = 30,000 *Fav*

Alternative calculations if standard hours adjusted for expected idle time and not the rate.

Standard cost (2 hours x 10/9) x $18 = $40 per tonne
Or 2·222 hours x $18 = $40 per tonne
Rate variance as above = 18,960 *Adv*
Idle time: (800 – 1,580)18 = 14,040 *Fav*
Efficiency variance: (15,000 – 16,197·77777*) 18 = 21,560 *Fav*
* (standard time allowed less standard idle time)
Standard time is 8,000 tonnes x 2·222 hours = 17,777·777 hours
Standard idle time is 10% of 15,800 = 1,580 hours
Therefore expected working hours is 17,777·777 – 1,580 = 16,197·777 hours

[Solution # 14]

(a) The total variances are as follows:

Total price variance = ($5.25 – $4)3,500kg = $4,375 Adverse
Total usage variance = (3,500 – 4,000)4 = $2,000 Favourable
This makes a total of $2,375 Adverse

(b) The planning variances are calculated by comparing the original budget and the revised standards after adjustment for factors outside the control of the organisation. On this basis the revised standards would be a price of $4·80 per kg with revised usage at 42g per card.

Planning price variance = ($4·80 – $4)4,200 = $3,360 Adverse
Planning Usage variance = (4,200 – 4,000)$4 = $800 Adverse
The total planning error (variance) is $4,160 Adverse

The operational variances compare the actual spend with the revised budget figures.

Operational price variance = ($5·25 – $4·80)3,500kg = $1,575 Adverse
Operational usage variance = (3,500 – 4,200)$4·80 = $3,360 Favourable
The total operational variance is $1,785 Favourable

(c) The production manager is subject to external pressures which appear beyond his control. The size of the security card has to fit the reader of that card and if the industry specification changes there is nothing that he can do about that. This is, then, a 'planning' error and should not form part of any assessment of his performance. Equally if world-wide oil prices increase (and hence plastic prices) then the production manager cannot control that. This would be allocated as a planning error and ignored in an assessment of his performance. The performance of the production manager should be based on the operational variances (and any relevant qualitative factors). The decision to use a new supplier 'cost' an extra $1,575 in price terms. On the face of it this is, at least potentially, a poor performance. However, the manager seems to have agreed to the higher price on the promise of better quality and reliability. If this promise was delivered then this could be seen as a good decision (and performance). The savings in waste (partly represented by the usage variance) amount to $3,360 favourable. This would seem to suggest better quality. The fact that the production level jumped from 60,000 to 100,000 also suggests that suppliers' reliability was good (in that they were able to deliver so much). The net variance position is relevant at a saving of $1,785.

It is also possible that such a large increase in volume of sales and production should have yielded a volume based discount from suppliers. This should also be reflected in any performance assessment in that if this has not been secured it could be seen as a poor performance. This is backed up by the lack of obvious quality problems since we are told that 100,000 cards were produced and sold in the period, a huge increase on budget. The ability of a production manager to react and be flexible can often form a part of a performance assessment. In conclusion the manager could be said to have performed well.

[Solution # 15]

(a) Production manager

Assessing the performance of the two managers is difficult in this situation. In a traditional sense the production manager has seriously over spent in March following the move to organic ingredients. He has a net adverse variance against his department of $2,300 in one month. No adjustment to the standards has been made to allow for the change to organic. The manager has not only bought organically he has also changed the mix, increasing the input proportion of the more expensive ingredients. This may have contributed to the increased sales of cakes. However, the decision to go organic has seen the sales of the business improve. We are told that the taste of the cakes should be better and that customers could perceive a health benefit. However, the production manager is allocated none of the favourable sales variances that result. If we assume that the improved sales are entirely as a result of the production manager's decision to change the ingredients then the overall net favourable variance is $7,700. The production manager did appear to be operating within the original standard in February, indicating a well performing department. Indeed he will have earned a small bonus in that month.

Sales manager

A change to organic idea would need to be 'sold' to customers. It would presumably require a change of marketing and proper communication to customers. The sales manager would probably feel he has done a good job in March. It is debatable, however, whether he is entirely responsible for all of the favourable variances. The move to organic certainly helped the sales manager as in February he seems to have failed to meet his targets.

Bonus scheme

The problem here is that the variances have to be allocated to one individual. The good sales variances have been allocated to the sales manager when in truth the production manager's decision to go organic appears to have been a good one and the driver of the business success. Responsibility accounting systems struggle to cope with 'joint' success stories, refuting in general a collective responsibility. Under the current standards the production manager has seemingly no chance to make a bonus. The main problems appear to be the out-of-date standards and the fact that all sales variances are allocated to the sales manager, despite the root cause of the improved performance being at least in part the production manager's decision to go organic. The system does not appear fair.

General comments

It would appear that some sharing of the total variances is appropriate. This would be an inexact science and some negotiation would be needed. One problem seems to be that the original standards were not changed following the decision to go organic. In this sense the variances reported are not really 'fair'. Standards should reflect achievable current targets and this is not the case here.

(b) Variance calculations

Material price variances

Ingredient	Act price/kg	Std price/kg	Actual quantity	(AP – SP) x AQ kg MPV	Adv or Fav
Flour	0·13	0·12	5,700	57	Adv
Eggs	0·85	0·70	6,600	990	Adv
Butter	1·80	1·70	6,600	660	Adv
Sugar	0·60	0·50	4,578	458	Adv
Total				**2,165**	**Adv**

Material mix variance

Ingredient	Act mix	Std mix	Std price	Variance	Adv or Fav
Flour	5,700	5,870	0·12	–20	
Eggs	6,600	5,870	0·70	511	
Butter	6,600	5,870	1·70	1,241	
Sugar	4,578	5,870	0·50	–646	
Totals	**23,478**	**23,478**		**1,086**	**Adv**

Material yield variance

Actual yield	60,000 cakes
Standard yield (23,478/0·4)	58,695 cakes
Difference	1,305 cakes
Standard cost of a cake (W1)	$0·302
Yield variance (1,305 * 0·302)	**394 Fav**

Sales price variance

	Act price	Std Price	Act volume	(AP – SP) * Act Vol Variance	Adv or Fav
Cake	0·99	0·85	60,000	8,400	Fav

Sales volume contribution variance

Actual volume	60,000 cakes
Budget volume	50,000 cakes
Standard contribution	0·35
Variance (60,000 – 50,000) * 0·35	= $3,500 Fav

W1

Standard cost of a cake

Ingredients	Kg	$	Cost
Flour	0·10	$0·12 per kg	0·012
Eggs	0·10	$0·70 per kg	0·070
Butter	0·10	$1·70 per kg	0·170
Sugar	0·10	$0·50 per kg	0·050
Total input	0·40		0·302
Normal loss (10%)	(0·04)		
Standard weight/cost of a cake	**0·36**		**0·302**

[Solution # 16]

(a) (i) Sales price variance and sales volume variance

Sales price variance = (actual price – standard price) x actual volume

	Actual price	Standard price	Difference	Actual volume	Sales price Variance
	$	$		$	$
Plasma TVs	330	350	–20	750	15,000 A
LCD TVs	290	300	–10	650	6,500 A
					21,500 A

Sales volume contribution variance = (actual sales volume – budgeted sales volume) x standard margin

	Actual sales volume	Budgeted sales volume	Difference	Standard margin variance	Sales volume
				$	$
Plasma TVs	750	590	160	190	30,400 F
LCD TVs	650	590	60	180	10,800 F
	1,400	**1,180**			**41,200 F**

(ii) Material price planning and purchasing operational variances

Material planning variance =
(original target price – general market price at time of purchase) x quantity purchased
($60 – $85) x 1,400 = $35,000 A.

Material price operational variance =
(general market price at time of purchase – actual price paid) x quantity purchased.
($85 – $80) x 1,400 = $7,000 F.

(iii) Labour rate and labour efficiency variances

Labour rate variance = (standard labour rate per hour – actual labour rate per hour) x actual hours worked.
Actual hours worked by temporary workers:
Total hours needed if staff were fully efficient = (750 x 2) + (650 x 1·5) = 2,475.
Permanent staff provide 2,200 hours therefore excess = 2,475 – 2,200 = 275.
However, temporary workers take twice as long, therefore hours worked = 275 x 2 = 550
Labour rate variance relates solely to temporary workers, therefore ignore permanent staff in the calculation.

Labour rate variance = ($14 – $18) x 550 = $2,200 A.

Labour efficiency variance = (standard labour hours for actual production – actual labour hours worked) x standard rate = (275 – 550) x $14 = $3,850 A.

(b) Explanation of planning and operational variances

Before the material price planning and operational variances were calculated, the only information available as regards material purchasing was that there was an adverse material price variance of $28,000. The purchasing department will be assessed on the basis of this variance, yet, on its own, it is not a reliable indicator of the purchasing department's efficiency. The reason it is not a reliable indicator is because market conditions can change, leading to an increase in price, and this change in market conditions is not within the control of the purchasing department. By analysing the materials price variance further and breaking it down into its two components – planning and operational – the variance actually becomes a more useful assessment tool. The planning variance represents the uncontrollable element and the operational variance represents the controllable element. The planning variance is a really useful for providing feedback on just how skilled management are in estimating future prices. This can be very easy in some businesses and very difficult in others. The operational variance is more meaningful in that it measures the purchasing department's efficiency given the market conditions that prevailed at the time. It therefore ignores factors that the purchasing department cannot control, which in turn, stops staff from becoming demotivated.

[Solution # 17]

(a) (i) Usage variance

	Std usage for actual output	Actual usage per kg	Variance	Std cost	Variance
	kgs	kgs	kgs	$	$
Honey	2,020	2,200	(180)	20	(3,600)
Sugar	1,515	1,400	115	30	3,450
Syrup	1,010	1,050	(40)	25	(1,000)
					(1,150) A

(ii) Mix variance

	Actual qnty std mix	Actual qnty actual mix	Variance	Std cost per kg	Variance
	kgs	kgs	kgs	$	$
Honey	2,066·67	2,200	(133·33)	20	(2,666·60)
Sugar	1,550	1,400	150	30	4,500
Syrup	1,033·33	1,050	(16·67)	25	(416·75)
					1,416·65 F

(iii) Yield variance

	Std quantity std mix	Actual qnty std mix	Variance	Std cost per kg	Variance
	kgs	kgs	kgs	$	$
Honey	2,020	2,066·67	(46·67)	20	(933·40)
Sugar	1,515	1,550	(35)	30	(1,050)
Syrup	1,010	1,033·33	(23·33)	25	(583·25)
					(2,566·65) A

The method used above is a more simple method for calculating the mix and yield variances than the one shown below. However, in the method shown below, the individual variances for each material are

also meaningful, whereas they are not in the method shown above. Since the question only asks for the total variances, students will be given credit for either method.

(ii) Mix variance

	Actual qnty std mix	Actual qnty actual mix	Variance	Budgeted WAC per kg	Std cost per kg	Difference	Variance
	kgs	kgs	kgs		$		$
Honey	2,066·67	2,200	(133·33)	24·44	20	(4·44)	592·59
Sugar	1,550	1,400	150	24.44	30	5.56	833.33
Syrup	1033.33	1050	(16.67)	24.44	25	0.56	(9.26)
							1,416·66 F

(iii) Yield variance

	Std usage for actual output	Actual qnty actual mix	Variance		Variance
	kgs	kgs	kgs		$
Honey	2020	2200	(180)	24·44	(4400)
Sugar	1515	1400	115	24.44	2811.11
Syrup	1010	1050	(40)	24.44	(977.78)
					(2,566·67) A

Budgeted weighted average cost

Honey	2,066·67	20	41,333·4	
Sugar	1,550	30	46,500	
Syrup	1,033·33	25	25,833·25	
		4,650	**113,666·65**	24·44

WAC = $113,666·65/4,650 kg = $24·44

(b) (i) Expenditure variance

Cost driver rate = $52,800/330 = $160

Expected cost therefore = 360 x $160	$57,600
Actual cost	$60,000
Variance	**$2,400 A**

(ii) Efficiency variance

Expected no. of units per set up

264,000/330 = 800

Therefore expected no. of set ups for

320,000 = 320,000/800	=	400
Actual number of set ups		360
Difference		**40 F**
x standard rate per set up		$160
Variance		**$6,400 F**

[Solution # 18]

Tutorial note: This problem tests your understanding of the formulae for calculating variances. Here, you are given the actual costs and the variances, and have to work back to calculate the standard cost. The answer can be found by filling in the balancing figures for each variance calculation.

Materials price variance

	$
150,000 kilos of materials did cost	210,000
150,000 kilos of materials should cost	225,000
Material price variance	**15,000 (F)**

(The variance is favourable, so the materials did cost less to buy than they should have cost.)
Therefore the standard price for materials is $225,000/150,000 kilograms = $1.50 per kilo.

Materials usage variance

Materials usage variance in $	=	$9,000 (A)
Standard price for materials	=	$1.50
Materials usage variance in kilograms	=	9,000/1.50
	=	**6,000 kilos (A)**

18,000 units of the product did use	150,000
Material usage variance in kilos	6,000 (A)
18,000 units of the product should use	144,000

Therefore the standard material usage per unit of product = 144,000 kilos/18,000 units = 8 kilos per unit.

Direct labour rate variance

	$
32,000 hours of labour did cost	136,000
32,000 hours of labour should cost	128,000
Direct labour rate variance	**8,000 (A)**

Therefore the standard direct labour rate per hour = $128,000/32,000 hours = $4 per hour.

Direct labour efficiency variance

Labour efficiency variance in $	=	$16,000 (F)
Standard rate per hour	=	$4
Labour efficiency variance in hours	=	16,000/4
	=	4,000 hours (F)

18,000 units of the product did take	32,000
Labour efficiency variance in hours	4,000 (F)
18,000 units of the product should take	36,000

Therefore the standard time per unit of product = 36,000 hours/18,000 units = 2 hours per unit.

This number of hours per unit also applies to variable production overheads.

Variable overhead expenditure variance

	$
32,000 hours did cost	38,000
32,000 hours should cost	32,000
Variable overhead expenditure variance	**6,000 (A)**

Therefore the variable production overhead rate per hour = $32,000/32,000 hours = $1 per hour.

Standard marginal production cost – Product XY		$
Direct materials	(8 kilos at $1.50 per kilo)	12.0
Direct labour	(2 hours at $4 per hour)	8.0
Variable production overhead	(2 hours at $1 per hour)	2.0
Standard marginal production cost		**22.0**

[Solution # 19]

(a) ***Standard cost of output produced (18 000 units)***

	(£)
Direct materials	864 000
Direct labour	630 000
Variable production overhead	180 000
Fixed production overhead	900000
	2574000

(b)	**Standard cost of output (£)**	**Variances (£)**	**Actual cost (£)**
Direct materials	864 000		
Price variance[a]		76 000 (F)	
Usage variance[b]		48 000 (A)	
Actual cost			836 000
Direct labour	630 000		
Rate variance[c]		16 800 (A)	
Efficiency variance[d]		42 000 (F)	
Actual cost			604 800
Variable production overhead	180 000		
Expenditure variance[e]		4 000 (A)	
Efficiency variance[f]		12 000 (F)	
Actual cost			172 000
Fixed production overhead	900 000		
Expenditure variance[g]		30 000 (A)	
Volume variance[h]		100 000 (A)	
Actual cost			1030000
	2574000	**68800(A)**	**2642800**

Notes

a (Standard price - Actual price) * Actual quantity
(£12 * £836 000/76 000) * 76 000 = **£76 000 (F)**

B (Standard quantity - Actual quantity) * Standard price
(18 000 * 4 kg = 72 000 -- 76 000) * £12 = **£48 000 (A)**

c (Standard rate - Actual rate) * Actual hours
(£7 * £604 800/84 000) * 84 000 = **£16 800 (A)**

d (Standard hours - Actual hours) * Standard rate
(18 000 * 5 hrs = 90 000 - 84 000) * £7 = **£42 000 (F)**

e (Actual hours - Standard rate) * Actual cost
(84 000 * £2 = £168 000 - £172 000 = **£4000 (A)**

f (Standard hours - Actual hours) * Standard rate
(18 000 * 5 hrs = 90 000 - 84 000) * £2 = **£12 000 (F)**

g Budgeted fixed overheads - Actual fixed overheads
(20 000 * £50 = £1 000 000 - £1 030 000) = **£30 000 (A)**

h (Actual output - Budgeted output) * Standard rate
(18 000 - 20 000) * £50 = **£100 000 (A)**

(c) The statement in (b) can be used to provide a detailed explanation as to why actual cost exceeded standard cost by £68 800 for the output achieved. The statement provides attention-directing information by highlighting those areas that require further investigation. Thus management can concentrate their scarce time on focusing on those areas that are not proceeding according to plan. By investigating variances, management can pinpoint inefficiencies and take steps to avoid them re-occurring. Alternatively, the investigation may indicate that the current standards are inappropriate and need changing to take account of the changed circumstances. This may result in an alteration in the plans or more up-to-date information for decision-making.

[Solution # 20]

(a) **Budgeted contribution** = Standard unit contribution (£1.99 – £1.39 = £0.60) × 50 000 = **£30 000**
Actual contribution = £96 480 – (£58 450 + £6800 + £3250) = **£27 980**

(b) **Sales margin price** = (Actual price – Standard price) × Actual sales volume
= Actual sales (£96 480) – Actual sales volume (49 700) × Standard price (£1.99)
= £2423A (note that the same answer would be obtained using contribution margins in the above formula)
Sales margin volume = (Actual volume – Budgeted volume) × Standard unit contribution
= (49 700 – 50 000) × £0.60 = £180A
Ingredients price = (SP – AP)AQ = (AQ × SP) – (AQ × AP)
= (55 000 × £1.18/1.08 = £60 093) – £58 450 = £1643F
Ingredients usage = (SQ – AQ)SP = (49 700 × 1.08 = 53 676 – 55 000)£1.18/1.08 = £1447A
Wage rate = (SP – AP)AH = (AH × SP) – (AH × AP)
= (1200 × £6[a] = £7200) – £6800 = £400F
Labour efficiency = (SH – AH)SP = (49 700 × 1.5 minutes
= 1242.5 hours –1200hours) × £6 = £255F
Variable conversion price = (SP – AP)AH = (AH × SP) – (AH × AP)
= (1200 × £2.40[b] = £2880 – £3250 = £370A

Variable conversion efficiency = (SH – AH)SP = (49 700 × 1.5 minutes = 1242.5 hours –1200 hours) × £2.40 = £102F

Notes

a Actual price paid for labour = £0.15/1.5 minutes = £0.10 per minute = £6 per hour

b Actual variable overhead price = £0.06/1.5 minutes = £0.04 per minute = £2.40 per hour

Reconciliation statement

				(£)
Budgeted contribution				30 000
Sales volume contribution variance				180 (A)
Standard contribution on actual sales				29 820
Sales price variance				2423 (A)
				27 397
Cost variances		A	F	
Ingredients:	Price		1643	
	Usage	1447		
Labour	Rate		400	
	Efficiency		255	
Conversion cost	Expenditure	370		
	Efficiency		102	
Total		1817	2400	583 (F)
Actual contribution				**27980**

[Solution # 21]

(a) **Wage rate variance** = (SP - AP) AH = (SP * AH) - (AP * AH)
= (£5 * 53 workers * 13 weeks * 40 hrs) = £138 500 **= £700A**
Labour efficiency = (SH - AH) SP
SH (Standard hours) = (35 000 * 0.4 hrs) - (25 000 * 0.56 hrs) = 28 000
AH (Actual hours) = 53 workers * 13 weeks * 40 hrs = 27 560
Variance = (28 000 - 27 560) * £5 **= £2200A**

(b) **Material price variance** = (SP - AP) AQ = (AQ * SP) - (AQ * AP)
£430F (given) = 47 000 SP - £85 110
SP (Standard price) = £430 + 85 110/47 000 **= £1.82**
Material usage variance = (SQ - AQ) SP = (SQ * SP) - (AQ * SP)
£320.32A (given) = £1.82 SQ - (33 426 * £1.82)
£320.32A = £1.82 SQ - £60 835.32
£1.82 SQ = £60 515
SQ = £60 515/£1.82 **= 33 250**
Note that SQ = Actual production (35 000 units) * Standard usage
Therefore 35 000 * Standard usage = 33 250
Standard usage = 33 250/35 000
= 0.95 kg per unit of component X

[Solution # 22]

(a) **(i)** ***Sales margin volume variance (Marginal costing):***
(Actual volume - Budgeted volume) * Standard contribution margin per unit
(9500 - 10 000) * Standard margin (SM) = £7500A
500 SM = 7500
Standard margin = £15
(ii) ***Sales margin volume variance (Absorption costing):***
(Actual volume - Budgeted volume) * Standard profit margin per unit
(9500 - 10 000) * Standard margin (SM) = £4500A
500 SM = £4500
Standard profit margin per unit = £9
(iii) ***Fixed overhead volume variance:***
(Actual production - Budgeted production) * Standard rate
(9700 - 10 000) * Standard rate = £1800A
Standard fixed overhead rate per unit = £6
Budgeted fixed overheads = 10 000 units * £6 = £60 000
Fixed overhead expenditure variance = £2500F
Actual fixed overheads (£60 000 - £2500) = £57 500

(b) Absorption costing unitises fixed overheads and treats them as product costs whereas marginal costing does not charge fixed overheads to products. Instead, the total amount of fixed overheads is charged as an expense (period cost) for the period. A fixed overhead volume variance only occurs with an absorption costing system. Because marginal costing does not unitise fixed costs product margins are expressed as contribution margins whereas absorption costing expresses margins as profit margins.

[Solution # 23]

(a) ***Variance analysis***

Material price = (standard price - actual price) * actual purchases
X = (£20 - £20.50) * 9000 **= £4500A**
Y = (£6 - £5.50) * 5000 **= £2500F**
Material usage = (standard usage - actual usage) * standard price
X = (800 * 10 kg - 7800 kg) * £20 **= £4000F**
Y = (800 * 5 litres - 4300 litres) * £6 **= £1800A**
Wage rate= [standard rate (£6) - actual rate (£24 150/4200)] * actual hours (4200) **= £1050F**
Labour efficiency= [standard hours (800 * 5 hrs) - actual hours (4200)]* standard rate (£6) **= £1200A**
Fixed overhead expenditure= budgeted cost (10 800/12 * £50) - actual cost (£47 000) **= £2000A**
Volume efficiency = [standard hours (800 * 5 hrs) - actual hours (4200)] * (£50/5 hours) **= £2000A**
Volume capacity[a] = [actual hours (4200) - budgeted hours[b] (4500)] * FOAR (£50/5 hours) **= £3000A**

Notes
A Volume variance as being equivalent to the volume capacity variance.
b Budgeted hours = monthly budgeted output (10 800/12) * 5 hrs

(b)

Stores control

	(£)		(£)
K Ltd: X (AQ * SP)	180 000	WIP: (SQ * SP)	160 000
C Ltd: Y (AQ * SP)	30 000	WIP: (SQ * SP)	24 000
Material usage variance (X)	4 000	Material usage variance (Y)	1 800
		Balance	28200
	£214000		£214000

Wages control account

	(£)		(£)
Cash	20 150	Wages owing b/fwd	6 000
PAYE and NI	5 000	Labour efficiency	1 200
Accrued wages	5 000	WIP (SQ * SP)	24 000
Wage rate variance	1050		
	£31200		£31200

WIP control account

	(£)		(£)
Stores control: X	160 000	Finished goods control a/c	248 000
Y	24 000		
Wages control	24 000		
Fixed overhead	40000		
	£248000		£248000

Fixed overhead control

	(£)		(£)
Expense creditors	33 000	WIP (SQ * SP)	40 000
Depreciation provision	14 000	Expenditure variance	2 000
		Efficiency variance	2 000
		Capacity variance	3000
	£47000		£47000

Finished goods control

	(£)		(£)
WIP control	£248000	Cost of sales	£248000

Cost of sales

	(£)		(£)
Finished goods control	£248000	Profit and loss (P/L)	£248000

Material price variance

	(£)		(£)
K Ltd: X	4500	C Ltd: Y	2500
P/L	2000		
	£4500		£4500

Material usage variance

	(£)		(£)
Stores control: Y	1800	Stores control: X	4000
P/L	2200		
	£4000		£4000

Labour rate variance

	(£)		(£)
P/L	£1050	Wages control	£1050

Labour efficiency variance

	(£)		(£)
Wages control	1200	P/L	1200

Fixed overhead expenditure variance

	(£)		(£)
Overhead control	2000	P/L	2000

Fixed overhead efficiency variance

	(£)		(£)
Overhead control	2000	P/L	2000

Fixed overhead capacity variance

	(£)		(£)
Overhead control	£3000	P/L	£3000

Sales

	(£)		(£)
P/L	320000	Debtors	320000

K Limited

	(£)
Stores control	180 000
Price variance account	4500

C plc

	(£)		(£)
Price variance account	2500	Stores control	30000

Expense creditors

	(£)
Fixed overhead control	33000

Provision for depreciation

	(£)
Fixed overhead control	14000

Profit and loss account

		(£)	(£)	(£)
Sales				320 000
Cost of sales				(248000)
				72 000
Variances		**(F)**	**(A)**	
Material	price	—	2 000	
	usage	2200	---	
Labour	rate	1050	—	
	efficiency	—	1 200	
Overhead	expenditure	—	2 000	
	efficiency	—	2 000	
	volume	--	3000	
		3250	10 200	6950
Gross profit				**65050**

(c) The difference of £250 in the accounts is due to the fact that the material price variance has been calculated on purchases (instead of usage) and written off as a period cost. In the question the raw material stocks are recorded at actual cost, and therefore the £250 is included in the stock valuation and will be recorded as an expense next period.

[Solution # 24]

(a) Reporting of fixed overhead volume variance indicates that the company is using Absorption Costing system.

(b) (i) Calculation of Actual Sales Volume:

Budgeted profit margin = Budgeted Profit / Budgeted Volume

= Rs.34,000/ 1,500 units = Rs.22.66667

Unfavourable Sales Volume Variance in units = Rs 6,800/ 22.6667 = 300 Units

Therefore, Actual Sales Volume was 300 units less than budgeted sales volume.

Actual Sales Volume = 1,500 units - 300 Units = 1,200 units

(ii) Calculation of Actual Quantity of Material Consumed:

Standard quantity of material used per unit of output

= Budgeted Material Consumed/ Budgeted Production

= 750 Kgs/ 1,500 units = 0.5 Kg.

Standard Price = Budgeted Material Cost/ Budgeted Consumption

= Rs. 36,000/ 750 Kgs = Rs. 48 per Kg.

Material Usage Variance	=	(Std Quantity	- Actual Quantity) x	Standard Price
Rs -1200	=	(1550 x 0.5kg	- Actual Quantity) x	48
Rs -1200	=	(775 kgs	- Actual Quantity) x	48
Rs -1200	=	37,200	- 48 AQ	
48 AQ	=	38,400		
Actual Quantity	=	800 kgs		

(iii) Calculation of Actual Material Cost:

Material Price Variance	=	(Standard Price	- Actual Price) x	Actual Purchase Quantity
Rs.8,000	=	(Rs.48 per kg	- Actual Price) x	1,000 kg
Rs.8,000	=	48,000	- 1,000 AP	
1,000 AP	=	40,000		
Actual Price	=	Rs. 40 per Kg		

(ii) Calculation of Actual Quantity of Material Consumed:

Standard quantity of material used per unit of output

= Budgeted Material Consumed/ Budgeted Production

= 750 Kgs/ 1,500 units = 0.5 Kg.

Standard Price = Budgeted Material Cost/ Budgeted Consumption

= Rs. 36,000/ 750 Kgs = Rs. 48 per Kg.

Material Usage Variance	=	(Std Quantity	- Actual Quantity) x	Standard Price
Rs -1200	=	(1550 x 0.5kg	- Actual Quantity) x	48
Rs -1200	=	(775 kgs	- Actual Quantity) x	48
Rs -1200	=	37,200	- 48 AQ	
48 AQ	=	38,400		
Actual Quantity	=	800 kgs		

(iii) Calculation of Actual Material Cost:

Material Price Variance	=	(Standard Price	- Actual Price) x	Actual Purchase Quantity
Rs.8,000	=	(Rs.48 per kg	- Actual Price) x	1,000 kg
Rs.8,000	=	48,000	- 1,000 AP	
1,000 AP	=	40,000		
Actual Price	=	Rs. 40 per Kg		

Actual Material Cost	=	1,000 Kg	x	Rs.40 per Kg
	=	Rs.40,000		

(iv) Calculation of Actual Labour Hours:

Standard hours per unit of output:

= Budgeted Hours/ Budgeted Output

= 1,125 hours/ 1,500 units = 0.75 hour

Standard Labour Rate = Budgeted Labour Cost/ Budgeted Hours

= Rs.36,000/ 1,125 hours = Rs. 32 per hour

Labour Effcy Variance = (Standard Hours – Actual Hours) x Standard Rate

Rs. 1,200 = (1550 x 0.75 – Actual Hours) x Rs.32

Rs.–1,200 = (1,162.50 – Actual Hours) x Rs.32

Rs.–1,200 = (37,200 – 32 Actual Hours)

32 AH = 38,400

Actual Hours = 1,200 Hrs

(v) Calculation of Actual Labour Cost:

Total Labour Variance = Standard cost – Actual cost

(Rs.1600UF + Rs.1200UF) = (1550 x 0.75 Hrs x Rs.32) - Actual Cost

Rs.2,800 UF = 37,200 – Actual cost

Actual cost = Rs.40,000

(vi) Calculation of actual variable overhead cost:

Variable OH variance = Standard cost – Actual cost

(Rs4800UF+Rs600UF) = 1,550 x (18,000/1,500) – Actual cost

Rs 5,400 UF = 1,550 x 12 – Actual cost

Rs 5,400 UF = 18,600 – Actual cost

Actual variable OH cost = 24,000

(vii) Calculation of actual fixed overhead cost:

Fixed OH Efficiency variance = Budgeted Cost – Actual Cost

Rs 20,000 F = Rs 36,000 – Actual Cost

Actual fixed OH cost = Rs 36,000 – Rs 20,000 = Rs.16,000

[Solution # 25]

(a) (i)

Flexible Budgeted Income Statement
For the quarter ended March 31, 2010.

Rs. in million

	Product A	Product B	Total
Sales Units (Nos)	37,500	58,000	95,500
Sales	28.125	29.000	57.125
Variable Costs			
Factory Overhead	11.250	11.600	22.850
Administrative OH	3.750	3.480	7.230
Total Variable Costs	15.000	15.080	30.080
Contribution Margin	13.125	13.920	27.045
Fixed Costs			
Factory Overhead			7.000
Administrative OH			4.000
Total Fixed Costs			11.000
Operating Income			16.045

(ii)

Income Statement under Marginal Costing showing Variances
For the quarter ended March 31, 2010.

Rs. in million

	Master Budget	Flexible Budget	Actual	Volume and Mix Variances		Price and OH Exp Variances	
Sales Units (Nos)	90,000	95,500	95,500	5,500	(F)		
Sales	55.000	57.125	52.350	2.125	(F)	4.775	(U)
Variable Costs							
Factory Overhead	22.000	22.850	21.825	0.850	(U)	1.025	(F)
Administrative OH	7.000	7.230	8.100	0.230	(U)	0.870	(U)
Total Variable Costs	29.000	30.080	29.925	1.080	(U)	0.155	(F)
Contribution Margin	26.000	27.045	22.425	1.045	(F)	4.620	(U)
Fixed Costs							
Factory Overhead	7.000	7.000	7.000	0.000		0.000	
Administrative OH	4.000	4.000	4.000	0.000		0.000	
Total Fixed Costs	11.000	11.000	11.000	0.000		0.000	
Operating Income	15.000	16.045	11.425	1.045	(F)	4.620	(U)

(b) (i) Sales Price Variance = (Actual Sales Price - Master Budget Sales Price) x Actual Sales Units.

Product A = $\frac{26,250}{37.5}$ $\frac{30,000}{40}$ x 37,500 units

= (Rs. 700 - Rs. 750)x 37,500 units = Rs.**1,875,000** Unfavourable

Product B = $\frac{26,100}{58}$ $\frac{25,000}{50}$ x 58,000 units

= (Rs. 450 - Rs. 500)x 58,000 units = Rs.**2,900,000** Unfavourable

(ii) Sales Volume Variance = (Actual Sales Units - Master Budget Sales Units) x Master Budget. Average Contribution Margin per unit

= (95,500 units - 90,000 units) x Rs.26,000,000/,90,000

= 5,500 Units x Rs.288.889

= Rs.**1,588,889** Favourable

Sales Mix Variance = (Flexible Budget Avg Contribution Margin per unit Master Budget Average Contribution Margin per unit) x Actual unit sales

(= Rs. $\frac{27,045,000}{95,500}$ Rs. $\frac{26,000,000}{90,000}$) x 95,500

(= Rs. 283.1937 Rs. 288.8889) x 95,500

= Rs. 5.6952 x 95,500

= Rs. **543,889** Unfavourable

BREAK EVEN POINT

[*Solution* # 01]

A] Break Even Point = Fixed Cost /Contribution Per unit
= Rs.2 * 1 50 000 units = Rs.3, 00, 000 /Rs.18.40 – Rs.14.00
= Rs.3, 00, 000 / Rs.4.40 = 68, 182 units.
Note: Contribution per unit is computed as shown below.
Selling Price per unit = Total Cost + 15% Profit on cost = Rs.16 [Rs.14 variable cost + Rs.2 fixed cost] + Rs.2.40 [15% of Rs.16] = Rs.18.40
Contribution = Selling Price – Variable Cost = Rs.18.40 – Rs.14 = Rs.4.40

B] Profit/Volume Ratio: Contribution Per Unit/Selling Price Per Unit * 100
Rs.4.40 /Rs.18.40 * 100 = 23.91%

C] Reduction in selling price by 5%: Reduced selling price = Rs.18.40 – 5% of Rs.18.40 = Rs.17.48, revised contribution = Rs.17.48 – Rs.14.00 = Rs.3.48
Break Even Point = Fixed Cost /Contribution Per Unit = Rs.3, 00, 000 /Rs.3.48 = 86, 207 units

D] Desired profit = Rs.2.40 + 10% of Rs.2.40 = Rs.2.64 per unit
Total Profits = Rs.2.64 * 1 50 000 units = Rs.3, 96, 000 + Total Fixed Costs = Rs.3, 00, 000 Total Contribution = Rs.6, 96, 000
Quantity to be sold = Total Contribution + Revised Contribution Per Unit
= Rs.6, 96, 000 / Rs.3.48 = 2, 00, 000 units
Sales Value = 2 00 000 units * Rs.17.48 = Rs.34, 96, 000

[*Solution* # 02]

Existing Break Even Sales = Fixed Cost/Contribution per unit
= Rs.18.02 lakhs/Rs.69.50 – Rs.35.50 = Rs.18.02 lakhs/Rs.34 = 53 000 units
Sales Value = 53, 000 * Rs.69.50 = Rs.36, 83, 500

It is given in the problem that 40% capacity represents 53, 000 units. Hence 80% capacity will represent 1 06 000 units

For additional 20% capacity, selling price falls by 10%

Revised Selling Price	=	Rs.69.50 – Rs.6.95 = Rs.62.55
Less: Variable Cost	=	(Rs.35.50)
Contribution	=	**Rs.27.05**

20% capacity = 53, 000 units/2 = 26, 500 units

Profit if sale price is Rs.62.55 = Contribution per unit * Sales units = Rs.27.05 * 26, 500 units = Rs.7, 16, 825.

Contribution by 20% capacity for which selling price falls by 15%

Revised Selling Price	=	Rs.69.50 – Rs.10.425 = Rs.59.075
Less: Variable Cost	=	(Rs.35.50)
Contribution	=	**Rs.23.575**

Profit is sale price is Rs.59.075 = Contribution per unit * Sales units = Rs.23.575 * 26, 500 units = Rs.6, 24, 737.

Additional profit by 40% sales = Rs.7, 16, 825 + Rs.6, 24, 737 = Rs.13, 41, 562

[*Solution* # 03]

1. Break Even Point: [units] = Fixed Cost / Contribution Per Unit = Rs.4, 000, 000/Rs.200 = 20 000 number of shirts

Note: Contribution per units is selling price – variable cost per unit Rs.800 – Rs.600 = Rs.200

Break Even Point [sales value] = 20000 units * Rs.800 = Rs.16, 000, 000

Margin of safety = Actual Sales – Break Even Sales

= 24, 000 shirts * Rs.800 = Rs.19, 200, 000 – Rs.16, 000, 000 = Rs.3, 200, 000

Margin of safety [units] = 24, 000 shirts – 20, 000 shirts = 4000 shirts

2. Amount of profit if 30, 000 shirts are sold:

Sales [units] = Fixed Cost + Profit / Contribution Per Unit

= 30, 000 = Rs.4, 000, 000 + Profit /Rs.200 = Profit = Rs.2, 000, 000

3. Revised Break Even Point if fixed cost rise by Rs.1, 000, 000 and selling price increase by 15%

New selling price = Rs.800 + 15% = Rs.920, new fixed cost = Rs.4, 000, 000 + Rs.1, 000, 000 = Rs.5, 000, 000

Revised Break Even Point [number of shirts] = Rs.5, 000, 000 / Rs.920 – Rs.600

Break Even Point = 15, 625 shirts and 15, 625 * Rs.920 = Rs.1, 43, 75, 000

[*Solution* # 04]

1. Break Even Sales = Fixed Cost / Profit/Volume Ratio = Rs.5, 00,000/40% = Rs.12, 50, 000
2. Total Sales = Break Even Sales + Margin of Safety

   Margin of Safety = Actual Sales – Break-Even Sales

   Let the actual sales be 100, Margin of Safety is 37.5%

   Hence Break even sales will be Rs.62.5

   Now, if the Break even sales are Rs.62.5, actual sales are Rs.100, hence if Break even sales are Rs.12.5 lakhs, actual sales will be 100/62.5 * 12.5 = Rs.20 lakhs
3. Contribution = Sales – Variable Cost. As the contribution is 40% of sales, the variable cost is 60% of sales and so variable cost will be 60% of Rs.20 lakhs, i.e. Rs.12 lakhs.
4. Current Profits = Sales – [Fixed Cost + Variable Cost] = Rs.2, 000, 000 – [Rs.1, 200, 000 + Rs.500, 000] = Rs.300, 000
5. New Margin of Safety is the sales volume is increased by 7.5%

   New Sales Volume = Rs.2, 000, 000 + 7.5% of Rs.2, 000, 000 = Rs.2, 150, 000

   Hence, New Margin of Safety = Rs.2, 100, 000 – BEP Sales Rs.1, 250, 000 = Rs.900, 000

[*Solution* # 05]

Working Note No. 1

Statement Showing Total Contribution and Contribution Per Unit

Particulars	Amount	Amount
	Rs.	Rs.
Sales: 1 00 000 units @ Rs.15 per unit		1, 500,000
Less: Variable Costs:		
Direct materials	300,000	
Direct labor	200,000	
Production overheads – variable	60,000	

Selling and distribution overheads – variable	90, 000	
Total Variable Cost		(650,000)
Contribution [Sales – Total Variable Cost]		**850,000**

Variable Cost Per Unit = 650,000 /1, 00,000 = Rs.6.50
Contribution Per Unit = 850,000 /1, 00,000 = Rs.8.50

Working Note No. 2

Total Fixed Cost:

Production overheads	:	Rs.300, 000
Administration overheads	:	Rs.150, 000
S & D Overheads	:	Rs.150, 000
Total fixed costs	:	Rs.600, 000

1) Amount of sales required to earn a target profit of 25% on sales after improving the packing:

Present variable cost per unit [Working Note No.1]	=	Rs.6.50
Additional cost of improvement in packing	=	Re.1.00
Revised variable cost per unit	=	Rs.7.50
Revised contribution per unit	=	Rs.7.50

Profit/volume ratio = Rs.7.50/Rs.15 * 100 = 50%

Let X is the amount of sales to earn desired profit, the amount of sales will be computed with the help of the following formula

S = Fixed Cost + Desired Profit /Profit/Volume Ratio

Therefore = Rs.600, 000 + .25/50% = Rs.2, 400, 000

Note: Total fixed cost is given in Working Note No.2

Amount of sales required to earn the profit is Rs.2, 400, 000 and the amount of profit is Rs.600, 00 [25% of sales]

2) Evaluation of purchase offer by a large retailer: 30 000 units, additional packing cost of Rs.2 per unit

Present variable cost per unit	:	Rs.6.50
Less: S & D Overheads	:	Rs.0.90
Add: Packing expenses	:	Rs.2.00
Revised variable cost per unit	**:**	**Rs.7.60**

The current selling price is Rs.15 per unit and after considering the revised variable cost, the contribution per unit works out Rs.15 – Rs.7.60 = Rs.7.40. Since the fixed costs are not going to increase, there will be additional contribution of 30 000 units * Rs.7.40 = Rs.222, 000 which will the additional profit and hence the offer can be accepted. The breakeven price for this offer will be Rs.7.60 per unit, which is equal to the variable cost per unit.

3) Evaluation of proposal of incurring additional advertising expenses of Rs.3, 00,000

Particulars		**Amount [Rs.]**
Revised Selling Price per unit		18.00
Less: variable cost [working note no.1] per unit		6.50
Contribution per unit		11.50
Total contribution	: 120, 000 * Rs.11.50 = 1, 380, 000	
Less: Fixed cost: Current	Rs.600, 000	
Addl. Expenditure on Advertising	Rs.300, 000	(900, 000)
Profit		**480,000**

Since the amount of profit has increased from the present Rs.250, 000 to Rs.480, 000 the expenditure on advertising is justified.

4) Reduction in selling price for increasing capacity utilization to 100%

Particulars	**Amount Rs.**
New selling price per unit	13.00
Less: variable cost per unit	6.50
Contribution per unit	6.50
Total Contribution	150,000 units * Rs.6.50 = 975, 000
Less: Fixed cost	(600, 000)
Profit	**375,000**

It can be seen that the existing profit can increase by reducing the selling price up to Rs.13 per unit and thus increasing the capacity utilization to 100% and hence the proposal is justified.

[*Solution* # 06]

I] Statement showing Present Cost and Profit

Particulars	**Product A**	**Product B**	**Total**
Production and Sales [units]	30000	20000	50000
Sales value	360000	400000	760000
Variable Costs:			
Direct material	60000	80000	140000
Direct labor	90000	100000	190000
Factory overheads	45000	50000	95000
Administrative & selling overheads	30000	30000	60000
Total variable costs	225000	260000	(485000)
Contribution	**135000**	**140000**	**275000**
Fixed Costs			(155000)
Profit			**120000**

II] Statement showing Cost and Profit after Diversification

Particulars	**Product A**	**Product B**	**Product C**
Capacity levels	**60%**	**60%**	**40%**
Production and Sales [units]	18000	12000	30000
Sales value	216000	240000	420000
Variable Costs:			
Direct material	36000	48000	75000
Direct labor	54000	60000	90000
Factory overheads	27000	30000	45000
Administrative & selling overheads	18000	18000	30000
Total variable costs	(135000)	(156000)	(240000)
Contribution	**81000**	**84000**	**180000**

Particulars		**Amount**
Contribution:		
Product A	:	Rs.81, 000
Product B	:	Rs.84, 000
Product C	:	Rs.180, 000
Total contribution		**345, 000**

Recommendation: The Company should implement the proposed diversification as it has resulted into increase in the profit from Rs.1, 20, 000 to Rs.1, 90, 000

[*Solution* # 07]

The basic marginal cost equation is S –V = F + P, where S = Sales, V = Variable Cost, F = Fixed Cost and P = Profit.
Let us assume that variable cost = x and fixed cost = y. We can form the following simultaneous equations under various situations.

Rs.15 X 8000 – 8000x = y – 40, 000 [loss of Rs.5 per unit X 8000 units] Situation I
Rs.15 X 20, 000 – 20, 000x = y + 80, 000 – Situation II
Or, 1, 20,000 – 8000x = y – 40, 000 (3)
And 3, 00,000 – 20, 000 x = y + 80, 000 (4)

By solving both the equations, we get x = Rs.5 i.e. variable cost per unit is Rs.5 and y = Rs.1, 20,000 i.e. fixed cost Rs.1, 20,000

Profit Volume Ratio = Contribution/Sales X 100 = Rs.15 – Rs.5/Rs.15 X 100 = 66.67%
Break Even Point = Fixed Cost/P/V Ratio = Rs.1, 20,000 / 66.67% = Rs.1, 80,000
Break Even Point [Units] = Fixed Cost/Contribution per unit = Rs.1, 20,000/Rs.10 = 12000 units.

[*Solution* # 8]

After merging the plants, the total of sales, variable costs and fixed costs will have to be taken. However before doing that, the capacity utilization of plant at Location II will have to be made 100%. Accordingly the figures at 75% are converted into figures at 100%. Fixed cost is the exception for this, as it will remain the same at 100% capacity utilization also. The statement prepared on the next page is on the basis of 100% capacity utilization of plants at both the locations.

Comparative Performance of Plant at 100% Capacity

Particulars	Plant - Location I	Plant - Location II	Total Merged Plant
Capacity Levels [%]	100	100	100
Sales	200	100	300
Less: Variable Cost	140	72	212
Contribution	60	28	88
Less – Fixed Cost	30	14	44
Profit	**30**	**14**	**44**
Profit Volume Ratio	60/200 = 30%	28/100 = 28%	88/300 = 29.33%
Break Even Sales			**44/29.33% = 150**

I] **Capacity of merged plant at breakeven :** 150/300*100 = 50%

II] **Computation of the profitability of merged plant at 80% capacity:**

Particulars	Amount (Rs)
Sales (80% of Rs:300)	240
Less: Variable Cost (70.67% of sales)	169.60
Contribution	70.40
Less – Fixed Cost	44
Profit	**26.40**

III] **Computation of sales required to earn desired profit of Rs: 22 lakhs:**

Sales = Fixed Cost + Desired Profit / Profit Volume ratio
= Rs: 44 lakhs + Rs: 22 lakhs / 29.33% = Rs: 225 lakhs

[*Solution* # 9]

Statement showing Profit & Break Even Point at 50% & 90% capacity

Particulars	50% Capacity	90% Capacity
Production – Units	12,500	22,500
Sale Price Per unit	19.40	19
Less – Variable Expenses		
Material	10	9.50
Labor	3	3
Variable Overhead	2	2
Total variable cost	15	14.50
Contribution per unit	4.40	4.50
Total contribution	55,000	101,250
Less- Fixed cost (Rs: 3 per unit at 40% capacity i.e. 10000 units)	30,000	30,000
Profit	25,000	71,250

Break Even Sales at 50% capacity = Fixed cost / Contribution per unit
= Rs: 30,000/Rs. 4.40 = 6818 units: Rs: 132,270 (approx)

Break Even Sales at 90% capacity = Fixed cost / Contribution per unit
= Rs: 30,000/Rs. 4.50 = 6667 units: Rs: 126,673 (approx)

[*Solution* # 10]

Let 4x = No of units of J
Then 3x = No of units of K
BEP in X units = Fixed cost / Contribution = 616000/4(40)+3(20) OR 616000/220 = 2800 units

BEP of Product J = 4*2800 = **11200 units**
BEP of Product K = 3*2800 = **8400 units**

[*Solution* # 11]

(a) Statement of trading results

			20X1
			Rs
Sales	1,476,461*0.95*1.4		1,963,693
Direct Materials	492,326*1.05*1.4	723,719	
Direct Labour	316,764*1.05*1.4	465,643	
Overheads - Variable **(W-1)**	318,136*1.06*1.4	472,114	
Total variable costs			(1,661,476)
Contribution Margin		15.39%	302,217
Less: Fixed Costs	**(W-1)** 134,182*1.06		(142,233)
	Net Profit		**159,984**

(b) Break-even points for the years

	20X0	20X1
	Rs	Rs
Fixed Costs	134,182	142,233
(W-2)	23.65%	15.39%
Break-even sales	**567,366**	**924,191**

Working Notes

(W-1)

Using High-low method	Prior Year	20X0	Difference
	Rs	Rs	Rs
FOH	418,232	452,318	**34,086**
Units (assuming)	100	112	**12**
Variable cost per unit			2,841
Fixed Cost	134,182	134,182	
Variable cost	284,050	318,136	
Total FOH	**418,232**	**452,318**	

(W-2)

		20X0
		Rs
Sales		1,476,461
Direct Materials	492,326	
Direct Labour	316,764	
Overheads - Variable **(W-1)**	318,136	
Total variable costs		(1,127,226)
Contribution Margin	23.65%	**349,235**
Less: Fixed Costs **(W-1)**		134,182
Net Profit		**215,053**

[*Solution* # 12]

(a) 100% capacity each month = 112,000 units/0.80 = 140,000 units.

Using high/low analysis:	units	$
High: Total cost of	140,000	695,000
Low: Total cost of	112,000	611,000
Difference: Variable cost of	**28,000**	**84,000**
Therefore variable cost per unit	= $84,000/28,000 units	**= $3.**

Substitute in high equation Cost

	$
Total cost of 140,000 units	695,000
Variable cost of 140,000 units (× $3)	(420,000)
Therefore **fixed costs per month**	**275,000**

(b) Contribution/sales ratio = 60%

Therefore variable cost/sales ratio	=	40%		
The normal sales price per unit	=	$3/0.40	=	$7.50

The **contribution per unit at the normal selling price** is $7.50 – $3 = **$4.50 per unit.**

(c) If the customer's offer is accepted, the sales price for the 25,000 units will be

= $7.50 – 20% = $6 per unit.
The contribution per unit for these units will be $6 – $3 = $3.
The reduction in monthly sales at the normal price will be 1/5 × 25,000 = 5,000 units.

	$
Increase in contribution from 25,000 units sold (25,000 × $3)	75,000
Loss of contribution from fall in other sales (5,000 × $4.50)	(22,500)
Net increase in profit each month	**52,500**

By accepting the new customer's offer, the profit would increase by $52,500 each month. The offer should therefore be accepted.

[*Solution* # 13]

(a) Contribution/sales ratio = 60%

Therefore variable costs/sales ratio	= 40%.
Variable cost per unit	= $20
Therefore sales price per unit	= $20/0.40 = $50.
Contribution per unit	= $50 – $20 = $30.

	$
Budgeted contribution (8,000 × $30)	240,000
Budgeted fixed costs (8,000 × $25)	(200,000)
Budgeted profit, current year	**40,000**

(b) Sales price next year = $50 × 1.06 = $53 per unit
Variable cost per unit next year = $20 × 1.05 = $21
Therefore contribution per unit next year = $53 – $21 = $32

	$
Target profit next year	40,000
Fixed costs next year (200,000 × 1.10)	220,000
Target contribution for same profit as in the current year	**260,000**
Therefore **target sales** next year = $260,000/$32 per unit	= **8,125 units.**

[*Solution* # 14]

The first step is to identify the variable costs. We cannot calculate a variable cost per unit, because there is no information about the number of units produced. However, we can calculate the amount of variable costs as a percentage of sales revenue, using the information provided about costs at the 80% capacity level.

	$	$
Sales		800,000
Variable costs		
Production variable costs (40% × $300,000)	120,000	
Other variable costs (30% × $400,000)	120,000	
Total variable costs		240,000

Variable costs are equal to 30% of sales revenue (= $240,000/$800,000).
Sales at 80% capacity level are $800,000. At a 90% capacity level, the sales will be $800,000 × 90%/80% = $900,000. The expected profit will be:

	$	$
Sales		900,000
Variable costs (30% of sales)		(270,000)
Contribution		630,000
Fixed production costs (60% × $300,000)	180,000	
Other fixed costs (70% × $400,000)	280,000	
Total fixed costs		(460,000)
Profit		**170,000**

[*Solution* # 15]

The contribution per unit can be calculated from the variable cost per unit and the C/S ratio. The C/S ratio is 25%; therefore the variable cost is 75% of the sales price.

	$
Variable cost (75% of sales price)	12
Therefore contribution (25% of sales price) = $12 × 25/75	4

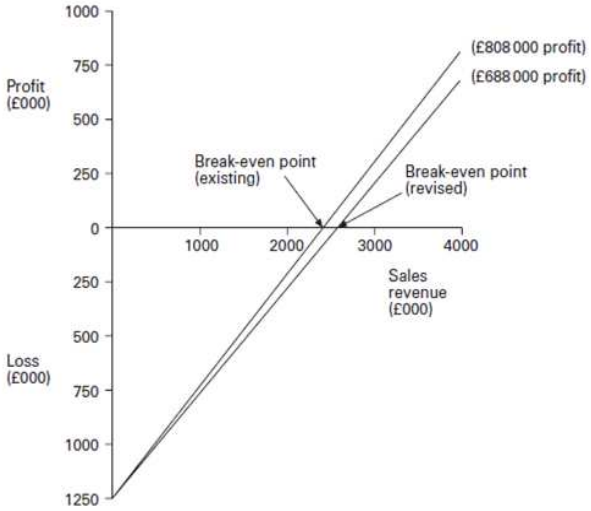
We know the total profit at 30,000 units of sale. We can also calculate the total contribution at this sales level. Fixed costs are the difference between total contribution and profit.

	$
Total contribution at 30,000 units of sale: 30,000 × $4	120,000
Total profit at 30,000 units of sale: given	(25,000)
Therefore **total fixed costs**	**95,000**

[*Solution* # 16]

(a) **Break-even point** = 1212000/0.505= £2 400 000
Average contribution per £ of sales = [0.7 * (£1 - £0.45)] + [0.3 * (£1 - £0.6)]

(b) The graph (Figure 9.2) is based on the following calculations:
Zero activity: loss = £1 212 000 (fixed costs)
£4 m existing sales: (£4m * £0.505) - £1 212 000 = £808 000 profit
£4 m revised sales: (£4m * £0.475) - £1 212 000 = £688 000 profit
Existing break-even point: £2 400 000
Revised break-even point: £2 551 579 (£1 212 000/£0.475)
Revised contribution per £ of sales: (0.5 * £0.55) + (0.5 * £0.40) = **£0.475**



[*Solution* # 17]

(a) **(i)**

Products	1	2	3	Total
1. Unit contribution	£1.31	£0.63	£1.87	
2. Specific fixed costs per unit	£0.49	£0.35	£0.62	
3. General fixed costs per unit	£0.46	£0.46	£0.46	
4. Sales volume (000s units)	98.2	42.1	111.8	252.1
5. Total contribution (1 * 4)	£128.642	£26.523	£209.066	£364.231
6. Total specific fixed costs (2 * 4)	£48.118	£14.735	£69.316	£132.169
7. Total general fixed costs (3 * 4)	£45.172	£19.366	£51.428	£115.966
8. Unit selling price	£2.92	£1.35	£2.83	
9. Total sales revenue (8 * 4)	**£286.744**	**£56.835**	**£316.394**	**£659.973**

Average contribution per unit = Total contribution (£364.231)/sales volume (252.1) = £1.4448
Average selling price per unit = Total sales revenue (£659.973)/sales volume (252.1) = £2.6179
Break-even point (units) = Total fixed costs/Average contribution per unit
= (£132.169 + £115.966) / £1.4448 = 171.743 units
Break-even point (sales value) = 171.743 units * average selling price (£2.6179) = £449.606

Alternatively, the break-even point (sales value) can be calculated using the following formula:

$$\text{Break-even point} = \frac{\text{Fixed costs (£132.169 + £115.966) * Total sales (£659.973)}}{\text{Total contribution (£364.231)}}$$

= £449.606

It is assumed that the question requires the calculation of the break-even point to cover both general and specific fixed costs. An alternative answer would have been to present details of the break-even point to cover only specific fixed costs.

(ii) The planned sales mix for Product 2 that was used to calculate the breakeven point in (i) is 42.1/252.1.
Therefore the number of units of Product 2 at the break-even point is:42.1/252.1 * 171 743 units = 28 681

(b) At the forecast sales volume the profit/contributions are as follows:

	(£000s)
Contributions to all fixed costs	26.523
Less - specific fixed costs	(14.735)
Contribution to general fixed costs	11.788
Less- share of general fixed costs	(19.366)
Net loss	**7.578**

Product 2 provides a contribution of £11 788 towards general fixed costs and, unless savings in general fixed costs in excess of £11 788 can be made if Product 2 is abandoned, it is still viable to produce Product 2. If the company ceases production of Product 2 it will lose a contribution of £11 788 and total profits will decline by £11 788. The company should investigate whether a greater contribution than £11 788 can be generated from the resources. If this is not possible the company should continue production of Product 2.

[*Solution* # 18]

(a) Analysis of semi-variable costs[a]

Method A: variable element = Increase in costs / Increase in activity = 100/100000 copies
= £0.10 per copy
Fixed element = total semi-variable cost (£55 000) - variable cost (£35 000) at an activity level of 350 000 copies
Therefore fixed element = £20 000

Method B: variable element = Increase in costs / Increase in activity = 5000/100000 copies
= £0.05 per copy

Fixed element = total semi-variable cost (£47 500) - variable costs (£17 500) at an activity level of 350 000 copies
Therefore fixed element = £30 000

Note
a The analysis is based on a comparison of total costs and activity levels at 350 000 and 450 000 copies per year.

Contribution per copy of new magazine

	Method A (£)	**Method B (£)**
Selling price	1.00	1.00
Variable cost (given)	(0.55)	(0.50)
Variable element of semi-variable cost	(0.10)	(0.05)
Lost contribution from existing magazine	(0.05)	(0.05)
Contribution	**0.30**	**0.40**

Calculation of net increase in company profits

	Method A		**Method B**			
Copies sold	**500000**	**400000**	**600000**	**500000**	**400000**	**600000**
Contribution per copy	£0.30	£0.30	£0.30	£0.40	£0.40	£0.40
Total contribution	£150 000	£120 000	£180 000	£200 000	£160 000	£240 000
Fixed costs [a]	£100 000	£100 000	£100 000	£150 000	£150 000	£150 000
Net increase in profit	**£50 000**	**£20 000**	**£80 000**	**£50 000**	**£10 000**	**£90 000**

Note
a
Method A = specific fixed costs (£80 000) + semi-variable element (£20 000) = £100 000
Method B = specific fixed costs (£120 000) + semi-variable element (£30 000) = £150 000

(b) **Break-even point = Fixed costs/contribution per unit**
Method A = £100 000/0.30 = 333333 copies
Method B = £150 000/0.40 = 375000 copies

The margin of safety is the difference between the anticipated sales and the break-even point sales:

Method A = 500 000 - 333333 = 166 667 copies
Method B = 500 000 - 375 000 = 125 000 copies

(c) Method B has a higher break-even point and a higher contribution per copy sold. This implies that profits from Method B are more vulnerable to a decline in sales volume. However, higher profits are obtained with Method B when sales are high (see 600 000 copies in (B)).

The break-even point from the sale of the existing magazine is 160 000 copies (£80 000 ÷ £0.50) and the current level of monthly sales is 220 000 copies. Therefore sales can drop by 60 000 copies before break-even point is reached. For every 10 copies sold of the new publication, sales of the existing publication

will be reduced by one copy. Consequently, if more than 600 000 copies of the new publication are sold, the existing magazine will make a loss. If sales of the new magazine are expected to consistently exceed 600 000 copies then the viability of the existing magazine must be questioned.

[*Solution* # 19]

(a) **(i)** The opportunity costs of producing cassettes are the salary forgone of £1000 per month and the rental forgone of £400 per month.
(ii) The consultant's fees and development costs represent sunk costs.

(b) The following information can be obtained from the report.

	£10 selling price	£9 selling price
Sales quantity	7500–10 000 units	12 000–18 000 units
Fixed costs[a]	£13 525	£17 525
Profit at maximum sales[b]	£3 975	£4 975
Profit/(loss) at minimum sales[c]	(£400)	(£2525)
Break-even point[d]	7729 units	14020 units
Margin of safety:		
Below maximum	2271 units	3980 units
Above minimum	229 units	2020 units

Notes

[a] Fixed production cost + £1400 opportunity cost

[b] (10 000 units * £1.75 contribution) - £13 525 fixed costs = £3975 profit
(18 000 units * £1.25 contribution) - £17 525 fixed costs = £4975 profit

[c] (7 500 units * £1.75 contribution) - £13 525 fixed costs = £400 loss
(12 000 units * £1.25 contribution) - £17 525 fixed costs = £2525 loss

[d] Fixed costs/contribution per unit

Conclusions

(i) The £10 selling price is less risky than the £9 selling price. With the £10 selling price, the maximum loss is lower and the break-even point is only 3% above minimum sales (compared with 17% for a £9 selling price).
(ii) The £9 selling price will yield the higher profits if maximum sales quantity is achieved.
(iii) In order to earn £3975 profits at a £9 selling price, we must sell 17 200 units (required contribution of 17 525 fixed costs plus £3975 divided by a contribution per unit of £1.25).

Additional information required

(i) Details of capital employed for each selling price.

(ii) Details of additional finance required to finance the working capital and the relevant interest cost so as to determine the cost of financing the working capital.
(iii) Estimated probability of units sold at different selling prices.
(iv) How long will the project remain viable?
(v) Details of range of possible costs. Are the cost figures given in the question certain?

[*Solution* # 20]

(a) Variable expenses increase:

New sales units	10,000 x 1.10	11,000 units
New fixed costs	Rs. 268,800 x 0.95	Rs. 255,360
New net income	Rs. 57,600 x 1.25	Rs. 72,000

Sales = Variable cost + Fixed cost + Net income
11,000 (Rs. 76.8) = 11,000 X + Rs. 255,360 + Rs. 72,000
Rs. 844,800 = 11,000 X + Rs. 327,360
X = Rs. 47.04 per unit or Rs. 517,440
Increase in variable expenses Rs. 517,440 – Rs. 441,600 = **Rs. 75,840**

Break-even point:

Contribution margin rate = (Rs.76.8 – Rs. 47.04) ÷ Rs. 76.8 = 0.3875

Break-even point Rs.255,360 ÷ 3,875 = Rs. 659,994

(b) Expected net income:

Variable cost rate per unit = Rs. 441,600 ÷ 10,000 = Rs. 44.16

		Rs.
Sales	(13,000 x Rs. 76.80)	998,400
Variable costs	(13,000 x Rs. 44.16)	574,080
Contribution margin		424,320
Fixed costs		268,800
Expected net income		155,520
Actual net income [(1.5 x Rs. 57,600) + Rs. 57,600]		144,000
Difference		11,520

Performance was worse than expected as the actual net income is decreased by **Rs. 11,520**

(c)

	Rs.
Sales (9,500 * x Rs. 76.8)	729,600
Variable costs (9,500 x Rs. 39.744 **)	377,568
Contribution margin	352,032
Fixed costs (268,800 + 25,000)	293,800
Net income	58,232

Net income increases slightly by Rs. 58,232 – Rs. 57,600 = Rs. 632.

Working:

* 10,000 units x 0.95 = 9,500 units
** Rs. 44.16 x 0.90 = Rs. 39.744

(d) Sale increase:

New sales = Variable cost + fixed cost + current net income
S = 0.575S + Rs. 319,800 + Rs. 57,600
0.425S = Rs. 377,400
S = Rs. 888,000
(Where S = Sales)
Sales increase required = Rs. 888,000 – Rs. 768,000 = Rs. 120,000

Working:

Variable cost ratio: Rs. 441,600 ÷ Rs. 768,000 = 0.575
Fixed cost: Rs. 268,800 + Rs. 51,000 = Rs. 319,800

LABOR

[*Solution* # 01]

Hasley Plan = Rowan Plan

Standard wage rate * 50% time saved = standard wage rate * time saved / time allowed * time taken

Assuming Standard wage rate & time saved being common & cancelled each other in L.H.S & R.H.S,

50% = time allowed / time taken

Time taken = 50% time allowed

Thus time taken is equal to 50% of time allowed; bonus under Hasley Plan & Rowan plan is same.

[*Solution* # 02]

- Time allowed = 8 hours
- Time taken will be = 8, 7, 6, 5, 4 , 3 , 2 , 1
- Time taken will never be greater than time allowed in normal situation.
- Student should particularly note the language of question carefully.
- Progressively indicates that time taken will be from 8 to 1.
- Hasley Plan = Standard wage rate * 50% time saved
- Rowan Plan = standard wage rate * time saved / time allowed * time taken
- Wages = time taken * wage rate
- Hourly earnings = earnings/time taken

Time Allowed	Time Taken	Time Saved	Base Wages	Bonus		Earnings		Hourly Earnings	
				Hasley	Rowan	Hasley	Rowan	Hasley	Rowan
8	8	7	64	-	-	64	64	8	8
8	7	1	56	4	7	60	63	8.57	9
8	6	2	48	8	12	56	60	9.33	10
8	5	3	40	12	15	52	55	10.40	11
8	4	4	32	16	16	48	48	12	12
8	3	5	24	20	15	44	44	14.67	13
8	2	6	16	24	12	40	40	20	14
8	1	7	8	28	7	36	36	36	15

[*Solution* # 03]

We will have to calculate the profit foregone by calculating the amount of contribution lost and the additional cost that was incurred as a result of the labor turnover. This is done in the following manner.

I. Actual productive hours: Actual hours worked – unproductive training hours

= 445, 000 – 15, 000 [30% of 30, 000] = 4, 30, 000 actual productive hours.

II. Total hours lost: 100,000 hrs

Sales lost [Rs.8, 303, 300 * 100, 000]/430, 000 = Rs.1, 931, 000

Loss of contribution – 20% of Rs.19, 31, 000 = Rs.386, 200

Statement Showing Profit Foregone

Contribution lost	:	Rs.3, 86, 200 [As per II above]
Settlement cost due to leaving	:	Rs. 43, 820
Recruitment cost	:	Rs. 26, 740
Selection cost	:	Rs. 12, 750
Training cost	:	Rs. 30, 490
Profit foregone	:	**Rs.5, 00,000**

[*Solution* # 04]

Hints to answers

Working Notes:

1. **Total time wages of 10 workers per month:**

= No. of working days in the month × No. of working hours per day of each worker × Hourly rate of wages × No. of workers = Rs. 4,000 = 25 days × 8 hrs. × Rs. 2 × 10 workers

2. Time saved per month:

- Time allowed per piece by a worker 2 hours
- No. of units produced during the month by 10 workers 1,250 pieces
- Total time allowed to produce 1,250 pieces: (1,250 ×2 hours) 2,500 hours
- Actual time taken to produce 1,250 pieces: 2,000 hours
- Time saved (2,500 hours – 2,000 hours) 500 hours

3. Bonus under Halsey scheme to be paid to 10 workers:

Bonus = (50% of time saved) × hourly rate of wages = 500

Total wages to be paid to 10 workers are (Rs. 4,000 + Rs. 500) Rs. 4,500, if Mr. A considers the introduction of Halsey Incentive Scheme to increase the labour productivity.

4. Bonus under Rowan Scheme to be paid to 10 workers:

Bonus= Rs. 800

Total wages to be paid to 10 workers are (Rs. 4,000 + Rs. 800) Rs. 4,800, if Mr. A considers the introduction of Rowan Incentive Scheme to increase the labour productivity.

==========

1. **(i) Effective hourly rate of earnings under Halsey scheme:** = Rs.2.25 (i.e. 4500/2000)
   (ii) Effective hourly rate of earnings under Rowan scheme: = Rs 2.40 (i.e. 4800/2000)

2. **(i) Saving in terms of direct labour cost per piece under Halsey scheme:**
   = Labour cost per piece (under time wage scheme) = 2 hours × Rs. 2 = Rs. 4
   = Labour cost per piece (under Halsey scheme) = Rs.3.60 (i.e. 4500/1250)
   = Saving per piece: (Rs. 4– Rs. 3.60) = Rs. 0.40.
   (ii) **Saving in terms of direct labour cost per piece under Rowan scheme:**
   = Labour cost per piece under Rowan scheme = Rs. 3.84 (i.e. 4800/1250)
   = Saving per piece = Rs. 4– Rs. 3.84 = Rs. 0.16.

3. From the labour cost per piece under Halsey scheme (Rs. 3.60) and Rowan scheme (Rs.3.84), it is quite clear that Halsey scheme brings about more saving than Rowan scheme to the concern. But Halsey scheme does not fulfils the assurance given to the workers about 20% increase in their earnings as it secures only 12.5%, On the other hand, Rowan scheme secures 20% and fulfils the assurance. Therefore, Rowan scheme may be adopted.

[*Solution* # 05]

Hints to Answer

Computation of average inflated wage rate (including overtime premium):

Basic wage rate	:	Rs. 10 per hour
Overtime wage rate before and after working	:	Rs. 10 × 175%
Working hours	=	Rs. 17.50 per hour

Overtime wage rate for Sundays and holidays: Rs. 10 × 225% = Rs. 22.50 per hour

Annual wages for the last year for normal: 1, 00,000 hrs × Rs. 10 time wages =Rs. 10, 00,000

For overtime before and after working hours: 20,000 hrs. × Rs. 17.50 =Rs. 3, 50,000

Wages for overtime on Sundays and holidays: 5,000 hrs. × Rs. 22.50 =Rs. 1, 12,500

Total wages for 1, 25,000 hrs. **=Rs. 14, 62,500**

Average inflated wage rate Rs. 14, 62,500 = Rs. 11.70 per hour

==========

(a) Where overtime is worked regularly as a policy due to labour shortage, the overtime premium is treated as a part of labour cost and job is charged at an inflated wage rate.

Labour cost chargeable to job XYZ = Total hours × Inflated wage rate

= 1,125 hrs. × Rs. 11.70 = Rs. 13,162.50

(b) Where overtime is worked irregularly to meet the requirements of production,basic wage rate is charged to the job and overtime premium is charged to factory overheads as under :

Labour cost chargeable to Job XYZ: 1,125 hours @ Rs. 10 per hour		=	Rs. 11,250.00
Factory overhead:	100 hrs. × Rs. (17.50 – 10)	=	Rs. 750.00
	25 hrs. × Rs. (22.50 – 10)	=	Rs. 312.50
Total factory overhead		=	**Rs. 1,062.50**

(c) Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:

Job XYZ:	1,125 hours @ Rs. 10 per hour	=	Rs. 11,250.00
Factory overhead:	100 hrs. × Rs. (17.50 – 10)	=	Rs. 750.00
	25 hrs. × Rs. (22.50 – 10)	=	**Rs. 312.50**
Total Labour cost		=	**Rs. 12,312.50**

[*Solution* # 06]

I. Additions Method: Number of additions/Number of average workers during the period * 100 = 280 / 2000 * 100 = 14%

II. Separations Method: Number of separations/Number of average workers during the period * 100 = 65/2000 *100 = 3.25%

III. Replacement Method: Number of replacements / Number of average workers during the period * 100 = 30/2000 * 100 = 1.5%

IV. Flux Method: ½ [Number of additions + Number of separations] / Number of average workers during the period * 100 = ½[280 + 65] / 2000 * 100 = 173/2000 * 100 = 8.65%

Note: Average number of workers in all the above methods is computed by taking opening number of workers + closing number of workers / 2 = 1900 +2100/2 =2000

[*Solution* # 07]

Cost of labor turnover can be computed by dividing the preventive cost and replacement cost by the average number of employees. The computation is shown below.

Preventive cost	: Rs.86, 000/1000 = Rs.86
Replacement cost	: Rs.34, 000 /1000 = Rs.34
Total labor turnover cost	**= Rs.86 + Rs.34 = Rs.120**

[*Solution* # 08]

Taylor Plan: High task is 100 units

Worker X: 96 units * Rs.4 = Rs.384 [X will get the wages at low piece rate as his output is below the high task]
Worker Y: 111 units * Rs.6 = Rs.666 [Y will get the wages at high piece rate as his output is above the high task i.e. standard]
Worker Z: 126 units * Rs.6 = Rs.756 [Z will also get the wages at high piece rate as his output is above the high task, i.e. standard]

Merrick Plan:

Worker X = High task is 100 units, actual output is 96, this means that the efficiency level is 96%. As per Merrick Plan, wages of X will be 110% of normal piece rate which is Rs.6.60 per unit = Rs.6.60 * 96 = Rs.633.6
Worker Y = High task is 100 units, actual output is 111 units, efficiency level is 111%. Y will be entitled for wages @ 120% of normal piece rate i.e. @ Rs.7.20 per unit. His wages will be, Rs.7.20 X 111 = Rs.799.2
Worker Z = High task is 100 units, actual output is 126 units, efficiency level is 126%. Z will get at higher piece rate @ Rs.7.20 per unit. His wages will be Rs.7.20 * 126 units = Rs.907.2

Gantt Task and Bonus Plan:

Worker X = Rs.10 * 40 hours = Rs.400 [X will get guaranteed time rate as his output is below the high task]
Worker Y = Rs.6 * 111 units = Rs.666 [High piece rate as output is above standard]
Worker Z = Rs.6 * Rs.126 = Rs.756 [High piece rate as output is above standard]

[*Solution* # 9]

Labour cost

(a)

	Total Worked	Idle time	Worked on production	Overtime
	hours	hours	hours	hours
Grade 1 (40 × 40)	1,600	250	1,350	
Grade 2 (20 × 46)	920	100	820	(20 × 6) 120

	Direct labour		Indirect labour (overhead)
	$		$
Grade 1 basic wages (1,350 × $10)	13,500	(250 × $10)	2,500
Grade 2 basic wages (820 × $15)	12,300	(100 × $15)	1,500
Overtime premium		(120 x $15 × 1/3)	600
Support staff		(5 x 40 × $12)	2,400
Total	**25,800**		**7,000**

(b)

Units produced		4,000
Direct labour cost/unit	= $25,800/4,000	= $6.45 per unit

BUDGETING

[*Solution* # 01]

		Variable cost per unit	*Total fixed costs*
		$	$
Direct materials	(W1)	2.75	–
Production labour	(W2)	5.00	80,000
Factory overheads	(W3)	1.50	147,000
Administration		–	30,000
Selling and distribution	(W4)	0.50	21,000
		9.75	**278,000**

Workings

1 - This is a variable cost (cost for 40,000 units is double that for 20,000 units) with cost per unit = $50,000/20,000 = $2.50.

Quarter 4 cost = $2.50 * 1.1 = $2.75.

2 - Variable cost per unit = (cost for 40,000 units – cost for 20,000 units)/ (40,000 – 20,000) units = $(280,000 – 180,000)/20,000 = $5

Fixed costs = $180,000 – (20,000 * $5) = $80,000

3 - Variable cost per unit = (cost for 40,000 units – cost for 20,000 units)/ (40,000 – 20,000) units = $(200,000 – 170,000)/20,000 = $30,000/20,000 = $1.50

Fixed costs = $170,000 – (20,000 * $1.50) = $140,000

Quarter 4 fixed costs = $140,000 * 1.05 = $147,000

4 - Variable cost per unit (based on sales volume) = (cost for 34,000 units – cost for 18,000 units)/ (34,000 – 18,000) units = $(37,000 – 29,000)/16,000 = $0.50

Fixed costs = $29,000 – (18,000 * $0.50) = $20,000

Quarter 4 fixed costs = $20,000 * 1.05 = $21,000

(b) **Flexible budget profit statements – Quarter 4**

	Low sales level	Most likely sales level	High sales level
	Activity		
Sales (units)	38,000	44,000	50,000
Production (units)*	30,000	36,000	42,000
Costs	**$**	**$**	**$**
Direct materials (W1)	82,500	99,000	115,500
Production labour (W2)	230,000	260,000	295,000
Factory overheads (W3)	192,000	201,000	210,000
Administration	30,000	30,000	30,000
Selling and distribution (W4)	40,000	43,000	46,000
Cost of production	574,500	633,000	696,500
Inventory adjustment (W5)	104,000	104,000	104,000
Production cost of sales	678,500	737,000	800,500
Sales	684,000	792,000	900,000
	5,500	***55,000***	***99,500***

*Inventory increases by 8,000 units during Quarters 1 to 3 (total production during Quarters 1 to 3, less total sales for the same period). Inventories must therefore fall by 8,000 units during Quarter 4 and so the production level is 8,000 less than the sales level.

W1 = Low level: 30,000 * $2.75 = $82,500
Most likely: 36,000 * $2.75 = $99,000
High level: 42,000 * $2.75 = $115,500
W2 = Low level: (30,000 * $5) + $80,000 = $230,000
Most likely: (36,000 * $5) + $80,000 = $260,000
High level: (42,000 * $5) + $80,000 + 0.5 (2,000 * $5) = $295,000
W3 = Low level: (30,000 * $1.50) + $147,000 = $192,0000
Most likely: (36,000 * $1.50) + $147,000 = $201,000
High level: (42,000 * $1.50) + $147,000 = $210,000
W4 = Low level: (38,000 * $0.50) + $21,000 = $40,000
Most likely: (44,000 * $0.50) + $21,000 = $43,000
High level: (50,000 * $0.50) + $21,000 = $46,000
W5 = Sales of units produced in earlier quarters valued at $13 per unit where number of units is difference between sales units and production units (ie 8,000)

[*Solution* # 02]

(a) Budgets:

(i) Sales Budget

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Sales (units 000)	1,950	2,275	3,250	2,275
Sales ($000) (w1)	**109,200**	**127,400**	**182,000**	**127,400**

Working 1 = Quarter 1 sales revenue = $56 x 1,950,000 units = $109,200,000

(ii) Production budget 000 units

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Desired closing inventory (w2)	175	250	175	150
Sales	1,950	2,275	3,250	2,275
Less - opening inventory (w3)	150	175	250	175
Production	**1,975**	**2,350**	**3,175**	**2,250**

Working 2 = Desired closing inventory
Quarter 1: 2,275,000 units x 5 days ÷ 13 weeks x 5 days = 175,000 units etc

Working 3 = Opening inventory
Quarter 1: 1,950,000 x 5 days ÷ 13 weeks x 5 days

(iii) Purchases budget

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Production	1,975	2,350	3,175	2,250
Kg per unit	3	3	3	3
Purchases 000 kg	5,925	7,050	9,525	6,750
Price per kg	$6	$6	$6	$6
Purchases $000	**35,550**	**42,300**	**57,150**	**40,500**

(b) Revised budget:

6,600,000 kg of material per quarter would allow the production of 2,200,000 units per quarter (6,600,000 kg ÷ 3 kg per unit). This is insufficient to meet sales demand for the year. Treehorn should purchase the maximum amount of material available each quarter and build up inventories of finished goods whenever possible.

(i) Production budget 000 units

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Opening inventory	150	400	325	0
Production	2,200	2,200	2,200	2,200
Available for sale	2,350	2,600	2,525	2,200
Less - Sales	1,950	2,275	2,525	2,200
Closing inventory	**400**	**325**	**0**	**0**

(ii) Methods of overcoming the problems caused by the restriction in material supply. Possible ways of overcoming the problem are as follows:

– Seek alternative sources of supply
– Seek substitute materials
– Offer to pay more per kg for a greater level of supply
– Be more efficient in the use of material
– Subcontract the production to companies who have supplies of the material.

[*Solution* # 03]

(a) Skilled labour budget:

Basic hours (20 workers x 40 hours per week x 48 weeks per year)	38,400 hours
Overtime hours (20 workers x 48 weeks per year x 8 hours)	7,680 hours
Total hours	**46,080 hours**
	$
Basic pay (46,080 hours x $25 per hour)	1,152,000
Overtime premium (7,680 hours x $25 per hour x 50%)	96,000
	$1,248,000

(b) Budgets year ending 31 December 2011:

(i) Production budget

Production (46,080 hours ÷ 2 skilled hours per unit)	23,040 units

(ii) Unskilled labour budget

Basic hours (23,040 units x 4 hours per unit)	92,160 hours
Basic pay (92,160 hours x $15 per hour)	$1,382,400

(iii) Direct material

Material usage (23,040 units x 6 kg per unit))	138,240 kg
Material cost (138,240 kg x $2 per unit)	$276,480

(iv) Sales budget

Units (from above)	23,040 units
Revenue (23,040 units x $250 per unit)	$5,760,000

(c) Income statement:

		$
Sales revenue	(from (iv) above)	5,760,000
Direct labour		
Skilled	(from (a) above)	(1,248,000)
Unskilled	(from (ii) above)	(1,382,400)
Direct material	(from (iii) above)	(276,480)
Variable overhead	(w1)	(691,200)
Fixed overhead absorbed	(w2)	(552,960)
Under absorbed fixed overhead	(w3)	(47,040)
Profit		**$1,561,920**

Working 1	46,080 skilled hours ÷ 2 hours x 6 hours x $5 per hour
Working 2	46,080 skilled hours ÷ 2 hours x 6 hours x $4 per hour
Working 3	(150,000 hours – 138,240 hours) x $4 per hour = $47,040

(d) Overcoming labour shortages:

Labour shortages could be overcome by
– Recruiting more skilled labour, possibly by offering higher wages
– Training more skilled workers
– Investing in equipment to improve the productivity of skilled employees
– Using unskilled labour to perform the simpler elements of the skilled labour's work
– Subcontracting (outsourcing) some of the work to other manufacturers.
(only two methods were required)

[*Solution* # 04]

The approach taken by the managing director has the following potential problems:

(i) The new budgeting system is a top down (non-participative) approach. This could result in the company failing to utilise the experience of its hotel general managers. This is particularly important given the geographical diversity of the business. It may also lead to a reduction in motivation and a lack of commitment amongst managers who are used to setting their own budgets.

(ii) The large increases in profitability required by the budget may be regarded by budget holders as impossible to achieve resulting in a lack of motivation and a consequent reduction in profit.

(iii) Relating hotel managers' pay to cost reduction programmes may result in dysfunctional decisions. Managers could increase their own salaries by reducing restaurant costs. These cost reductions could lead to a decrease in quality, causing both customer numbers and profitability to decrease.

[*Solution* # 5]

Sales Budget
AB Co Ltd

Division	Product	Budgeted for future period	Budgeted for current period	Actual sales for current period
North	**Product A**	5000 * 10 = 50000	40000 *9 = 36000	5000 *9 =45000
	Product B	4000 *20 = 80000	3000 * 21= 63000	2000 *21 = 42000
Total	**Quantity**	9000	7000	7000
	Amount	130000	99000	87000
South	**Product A**	7000 *10= 70000	6000 *9 = 54000	7000 * 9 =63000
	Product B	6000 * 20 = 120000	5000 *21 =105000	4000 * 21 =84000
Total	**Quantity**	13000	11000	11000
	Amount	190000	159000	147000
Total	**Product A**	12000*10= 120000	10000*9 =90000	12000*9 =108000
	Product B	10000*20 =200000	8000*21 = 168000	60000*21 =126000
Total	**Quantity**	22000	18000	18000
	Amount	320000	258000	234000

[*Solution* # 6]

Flexible Budget
At 40%, 50% and 90% Capacity Utilization

Particulars	40% Capacity Utilization	50% Capacity Utilization	90% Capacity Utilization
Production - Units	10000	12500	22500
Selling Price per unit	20	19.40	19
Sales Value	200000	242500	427500
Variable Cost:			
Material (Rs:10 per unit)	(100000)	(121500*)	(213750**)
Labor (Rs:3 per unit)	(30000)	(37500)	(67500)
Overhead (Rs:2 per unit)	(20000)	(25000)	(45000)
Fixed Costs	(30000)	(30000)	(30000)
Profit/ Loss	**20000**	**27500**	**71250**

* 12, 500 units X Rs.9.70 per unit = Rs.1, 21, 500
** 22, 500 units X Rs.9.50 per unit = Rs.2, 13, 750

[*Solution* # 7]

A Ltd.
Production Budget

April – June 2008

Particulars	Number of units
Sales forecast	1400
Estimated Closing Stock	140
Gross Requirements	1540
Opening Stock	(100)
Net Production Requirements	1440
Wastage (10% of total production – assumed)	160
Total Production Requirement	**1600**

Direct labor Budget

Particulars	Number of units
Total standard hours required (1600*3)	4800
Productivity Ratio : 80%	
Actual Hours Required (4800/80%)	6000
Budgeted Hours Available (36*144)	(5184)
Shortfall	**816**

Comments: From the Direct Labor Budget it can be seen that the direct labor hours available are not sufficient and hence there is a shortage of 816 hours. Therefore it will be necessary to work overtime, as well as improvement in the efficiency.

[*Solution* # 8]

ABC Ltd.
Cash Budget Period I – IV Quarter

Particulars	Quarter : 1 (Rs)	Quarter : 2 (Rs)	Quarter : 3 (Rs)	Quarter : 4 (Rs)
Opening Cash Balance	10000	15000	15000	15325
Cash Receipts	125000	150000	160000	221000
Total Cash Available	135000	165000	175000	236325
Expected Payments				
Material	20000	35000	35000	54200
Other Expenses	25000	20000	20000	17000
Salaries & Wages	90000	95000	95000	109200
Income Tax	5000	-	-	-
Machinery Purchased	-	-	-	20000
Total Payments	140000	150000	150000	200400
Minimum Cash Balance Required	15000	15000	15000	15000
Total Cash Required	155000	165000	165000	215400
Excess/Deficit	20000	-	10000	20925
Borrowing	20000	-	-	-
Repayment	-	-	9000	11000
Interest	-	-	675*	1100
Total Effect of Financing	20000	-	9675	12100
Closing Cash Balance	**15000**	**15000**	**15325**	**23825**

* Interest is calculated as follows.
10% p.a. on Rs.9, 000 = Rs.900. Since the amount is repaid in the third quarter, interest is calculated for 9 months, i.e. for 12 months Rs.900, for 9 months = Rs.675. Similarly, in the last quarter interest is calculated @ 10% on Rs.11, 000 = Rs.1, 100

[*Solution* # 9]

A] Comparative Statement of Operating Profit at Current Selling Price

Particulars	60% Capacity Utilization	70% Capacity Utilization	80% Capacity Utilization
Production - Units	6000	7000	80000
Selling Price per unit	9	9	9
Sales Value	54000	63000	72000
Variable Cost (Rs:3 per unit)	(18000)	(21000)	(24000)
Semi - Variable Cost (Fixed: 6000 + variable : 0.50 per unit)	(9000)	(9500)	(10000)
Fixed Costs	(20000)	(24000)	(24000)
Profit/ Loss	**13000**	**19500**	**22000**

B] Comparative Statement of Operating Profit at Proposed Selling Price

Particulars	60% Capacity Utilization	70% Capacity Utilization	80% Capacity Utilization
Production - Units	6000	7000	80000
Selling Price per unit	9	9	9
Sales Value	54000	63000	72000
Total Costs [same as shown in statement -A]	47000	50500	58000
Profit/ Loss	**7000**	**12500**	**14000**

C] Percentage Increase in the Present Output Required to maintain the Present Profit Margin At The Proposed Selling Price:

Proposed Selling Price	:	Rs.9.00
Variable Cost	:	(Rs.3.50)
Contribution	:	Rs.5.50
Present Profit	:	Rs.13, 000

Fixed Cost Rs.26, 000 [Rs.20, 000 + Rs.6, 000]
Required Contribution: Rs.39, 000 [Profit + Fixed Cost]
Required output: Required Contribution/Contribution Per Unit = 39, 000/5.5 = 7091 units % Increase in output required = 1091/6000 X 100 = 18.18%

[*Solution* # 10]

Working of gross sales:

	Men	Women	Total Rs.000
60% units at minimum price			
Units	720,000	300,000	
Price per unit	1,000	800	
Sale value (Rs.000)	**720,000**	**240,000**	**960,000**
10% units at maximum price			
Units	120,000	50,000	
Price per unit	4,000	2,500	
Sale value (Rs.000)	**480,000**	**125,000**	**605,000**
30% units at specified price			
Units	360,000	150,000	
Price per unit	2,000	1,200	
Sale value (Rs.000)	**720,000**	**180,000**	**900,000**
			2,465,000

Budgeted Profit and Loss Account **(Rs.000)**

Gross sale value		2,465,000
Variable cost (2,465,000 / 220) x 100	1,120,455	
Commission to distributors (2,465,000 x 30% x 20%)	147,900	
Discount on cut size units (2,465,000 x 70% x 5% x 40%)	34,510	
Fixed FOH (Rs.45 million x 12 months)	540,000	(1,842,865)
Gross profit		622,135
Less: Fixed cost of outlets		
(Rs.1.2 million x 22 outlets x 12 months)	316,800	
Admn overheads (Rs.15 million x 12 months)	180,000	(496,800)
Net profit		**125,335**

[*Solution* # 11]

(a) Overhead costs for the 2010 budget:

Property cost = $120,000 x 1·05 = $126,000
Central wages = ($150,000 x 1·03) + $12,000 = $166,500
Stationery = $25,000 x 0·6 = $15,000

(b) The road repair budget will be based on 2,200 metres of road repairs; it is common to include a contingency in case roads unexpectedly need repair (see part (c)). The weather conditions could add an extra cost to the budget if poor or bad conditions exist. The adjustment needed is based on an expected value calculation:

(0·7 x 0%) + (0·1 x 10%) + (0·2 x 25%) = 6%

Hence the budget (after allowing for a 5% inflation adjustment) will be:

2,200 x $15,000 x 1·06 x 1·05 = $36,729,000

This could be shown as:

(2,200 x 15,000 x 1·0 x 0·7) + (2,200 x 15,000 x 1·1 x 0·1) + (2,200 x 15,000 x 1·25 x 0·2) = $34,980,000

The $34,980,000 could then be adjusted for inflation at 5% to give $36,729,000 as above.

(c) An expected value calculation used in budgeting has the following problems associated with it:

– It is often difficult to estimate the probabilities associated with different (in this case) weather conditions. The weather in one year may not reflect the weather in the following year leading to wildly inaccurate estimates and hence budgeting errors.

– It is difficult to estimate the precise monetary value attaching to each of the outcomes. 'Bad' weather can presumably take many forms (extreme cold, heat or water); the effect of each of these could be difficult to assess. Whilst using expected values it is common to group the events together and have one probability estimate. This may prove inadequate or inaccurate.

– The expected value that is calculated might not reflect the true cost leading to over or under spends on budget.

– The managers will have an easy fallback position should the budgets turn out to be incorrect. It would probably be accepted that the weather (and hence the probability of it) is outside their control and over spends could not then be blamed on them. A contingency is often added to a budget in the event that there is uncertainty on the likely spend. In this case there would be much uncertainty over the level and indeed type of road repairs required. Roads could be damaged by weather conditions (extreme cold or heat) or unexpected land movements (earthquakes). Public safety could be at risk

meaning that a repair is essential. This could result in a higher spend. Equally the type of repair needed would vary and be unpredictable. Small holes might be simply filled in but larger holes or cracks might involve repairs to the foundations of the road. The costs could differ considerably between the different types of repairs.

(d) Zero based budgeting involves three main steps:

– Define decision packages. These are detailed descriptions of the activities to be carried out. There will be some standardisation within the data to allow comparison with other activities (costs, time taken and so on). A cost-benefit analysis is often carried out at this stage to ensure the most cost effective and beneficial approach to the activity is taken.

– Evaluation and ranking of activities. Each activity is assessed; those that are perhaps part of a legal obligation become 'must do' activities; others may be viewed as discretionary. The LGO will have to decide which of the activities offer the greatest value for money (VFM) or the greatest benefit for the lowest cost.

– Allocation of resource. The budget will then be created for the accepted activities.

[*Solution* # 12]

(a) Difficulties in the public sector

In the public sector, the objectives of the organisation are more difficult to define in a quantifiable way than the objectives of a private company. For example, a private company's objectives may be to maximise profit. The meeting of this objective can then be set out in the budget by aiming for a percentage increase in sales and perhaps the cutting of various costs. If, on the other hand, the public sector organisation is a hospital, for example, then the objectives may be largely qualitative, such as ensuring that all outpatients are given an appointment within eight weeks of being referred to the hospital. This is difficult to define in a quantifiable way, and how it is actually achieved is even more difficult to define. This leads onto the next reason why budgeting is so difficult in public sector organisations. Just as objectives are difficult to define quantifiably, so too are the organisation's outputs. In a private company the output can be measured in terms of sales revenue. There is a direct relationship between the expenditure that needs to be incurred i.e. needs to be input in order to achieve the desired level of output. In a hospital, on the other hand, it is difficult to define a quantifiable relationship between inputs and outputs. What is easier to compare is the relationship between how much cash is available for a particular area and how much cash is actually needed. Therefore, budgeting naturally focuses on inputs alone, rather than the relationship between inputs and outputs. Finally, public sector organisations are always under pressure to show that they are offering good value for money, i.e. providing a service that is economical, efficient and effective. Therefore, they must achieve the desired results with the minimum use of resources. This, in itself, makes the budgeting process more difficult.

(b) Incremental and zero-based budgeting

'Incremental budgeting' is the term used to describe the process whereby a budget is prepared using a previous period's budget or actual performance as a base, with incremental amounts then being added for the new budget period. 'Zero-based budgeting', on the other hand, refers to a budgeting process which starts from a base of zero, with no reference being made to the prior period's budget or

performance. Every department function is reviewed comprehensively, with all expenditure requiring approval, rather than just the incremental expenditure requiring approval.

(c) Stages in zero-based budgeting

Zero-based budgeting involves three main stages:

1. Activities are identified by managers. These activities are then described in what is called a 'decision package'. This decision package is prepared at the base level, representing the minimum level of service or support needed to achieve the organisation's objectives. Further incremental packages may then be prepared to reflect a higher level of service or support.

2. Management will then rank all the packages in the order of decreasing benefits to the organisation. This will help management decide what to spend and where to spend it.

3. The resources are then allocated based on order of priority up to the spending level.

(d) No longer a place for incremental budgeting

The view that there is no longer a place for incremental budgeting in any organisation is a rather extreme view. It is known for encouraging slack and wasteful spending, hence the comment that it is particularly unsuitable for public sector organisations, where cash cutbacks are being made. However, to say that there is no place for it at all is to ignore the drawbacks of zero-based budgeting. These should not be ignored as they can make ZBB implausible in some organizations or departments. They are as follows:

– Departmental managers will not have the skills necessary to construct decision packages. They will need training for this and training takes time and money.

– In a large organisation, the number of activities will be so large that the amount of paperwork generated from ZBB will be unmanageable.

– Ranking the packages can be difficult, since many activities cannot be compared on the basis of purely quantitative measures. Qualitative factors need to be incorporated but this is difficult.

– The process of identifying decision packages, determining their purpose, costs and benefits is massively time consuming and therefore costly.

– Since decisions are made at budget time, managers may feel unable to react to changes that occur during the year. This could have a detrimental effect on the business if it fails to react to emerging opportunities and threats. It could be argued that ZBB is more suitable for public sector than for private sector organisations. This is because, firstly, it is far easier to put activities into decision packages in organisations which undertake set definable activities. Local government, for example, have set activities including the provision of housing, schools and local transport. Secondly, it is far more suited to costs that are discretionary in nature or for support activities. Such costs can be found mostly in not for profit organisations or the public sector, or in the service department of commercial operations. Since ZBB requires all costs to be justified, it would seem inappropriate to use it for the entire budgeting process in a commercial organisation. Why take so much time and resources justifying costs that must be incurred in order to meet basic production needs? It makes no sense to use such a long-winded process for costs where no discretion can be exercised anyway. Incremental budgeting is, by its nature, quick and easy to do and easily understood. These factors should not be ignored.

In conclusion, whilst ZBB is more suited to public sector organisations, and is more likely to make cost savings in hard times such as these, its drawbacks should not be overlooked.

[*Solution* # 13]

(a) Objectives of a budgetary control system

– **To compel planning**

Budgeting makes sure that managers plan for the future, producing detailed plans in order to ensure the implementation of the company's long term plan. Budgeting makes managers look at the year ahead and consider the changes in conditions that might take place and how to respond to those changes in conditions.

– **To co-ordinate activities**

Budgeting is a method of bringing together the activities of all the different departments into a common plan. If an advertising campaign is due to take place in a company in three months' time, for example, it is important that the production department know about the expected increase in sales so that they can scale up production accordingly. Each different department may have its own ideas about what is good for the organisation. For example, the purchasing department may want to order in bulk in order to obtain bulk quantity discounts, but the accounts department may want to order in smaller quantities so as to preserve cash flow.

– **To communicate activities**

Through the budget, top management communicates its expectations to lower level management. Each department has a part to play in achieving the desired results of the company, and the annual budget is the means of formalising these expectations. The whole process of budget setting, whereby information is shared between departments, facilitates this communication process.

– **To motivate managers to perform well**

The budget provides a basis for assessing how well managers and employees are performing. In this sense, it can be motivational. However, if the budget is imposed from the top, with little or no participation from lower level management and employees, it can have a seriously demotivational effect. This is discussed further in part (b).

– **To establish a system of control**

Expenditure within any organisation needs to be controlled and the budget facilitates this. Actual results are compared to expected results, and the reasons for any significant, unexpected differences are investigated. Sometimes the reasons are within the control of the departmental manager and he/she must be held accountable; at other times, they are not.

– **To evaluate performance**

Often, managers and employees will be awarded bonuses based on achieving budgeted results. This makes more sense than evaluating performance by simply comparing the current year to the previous year. The future may be expected to be very different than the past as economic conditions change. Also, events happen that may not be expected to reoccur. For example, if weather conditions are particularly wet one year, a company making and selling umbrellas would be expected to make higher than usual sales. It would not be fair to assess managers against these historical sales levels in future years, where weather conditions are more normal.

– **To delegate authority to budget holders**

A formal budget permits budget holders to make financial decisions within the specified limits agreed, i.e. to incur expenditure on behalf of the organisation.

– **To ensure achievement of the management's objectives**

Objectives are set not only for the organisation as a whole but also for individual targets. The budget helps to work out how these objectives can be achieved.)

(b) Participative budgeting

'Participative budgeting' refers to a budgeting process where there is some level of involvement from subordinates within the organisation, rather than budgets just being set by the top level of management. There are various views about whether participative budgeting is more effective than other styles. Each of the objectives from part (a) is dealt with below, considering the extent to which participative budgeting helps to achieve this.

– **To compel planning**

Participative budgeting will compel planning. Although participation can take many forms, often it will take the form of bottom-up budgeting, whereby the participation starts at the lowest level of management and goes all the way up to the top. If this is the case, then planning is taking place at many levels, and should be more accurate than if it simply takes place at a high level, by individuals who are not familiar with the day to day needs of the business.

– **To co-ordinate activities**

Co-ordination of activities may become more time consuming if a participative style of budgeting is used. This is because, not only does there need to be co-ordination between departments but there also has to be co-ordination between the different levels of management within each department. The process should be cumbersome but also effective, with everyone knowing exactly what the plan is.

– **To communicate activities**

Communication will be particularly effective with participative budgeting, although how effective depends on the extent of the participation. If all levels of management are involved, from the bottom up, then all levels of management know what the plan is. However, the plan may change as different departments' budgets are reviewed together and the overall budgeted profit compared to the top level management's expectations. Hence, it may be the case that those people involved in the initial budgets, i.e. lower level management, have to deal with their budgets being changed.

– **To motivate managers to perform well**

If managers play a part in setting the budget, they are more likely to think that the figures included in them are realistic. Therefore, they are more likely to try their best to achieve them. However, it may be that managers have built budgetary slack into their budgets, in an attempt to make themselves look good. Therefore, managers could end up performing less well than they would do had tougher targets been set by their superiors.

– **To establish a system of control**

In terms of establishing a system of control, it is largely irrelevant whether the budget setting process is a participative one or not. What is important is that actual results are compared to expected, and differences are investigated. This should happen irrespective of the budget setting process. Having said that, control is only really effective if the budgeted figures are sound. As stated above, whilst they are more likely to be realistic if a participative style of budgeting is used, the system is open to abuse in the form of budgetary slack.

– **To evaluate performance**

Managers will be appraised by comparing the results that they have achieved to the budgeted results. A participative budget will be an effective tool for this provided that participation is real rather than pseudo and provided that the managers have not built slack into their figures, which has gone uncorrected.

[*Solution* # 14]

(a) Flexed budget

Number of meals 1,560

		$	$
Food sales	(1)	62,400	
Drink sales	(1)	15,600	
Total revenue			78,000
Variable costs:			
Staff wages	(2)	(12,672)	
Food costs	(3)	(7,800)	
Drink costs	(4)	(3,120)	
Energy costs	(5)	(4,234)	
			(27,826)
Contribution			50,174
Fixed costs:			
Manager's and chef's pay		(8,600)	
Rent, rates and depreciation		(4,500)	
			(13,100)
Operating profit			**37,074**

(1) Food revenue

Food revenue = 1,560 x $40 = $62,400

Drinks revenue = 1,560 x ($2·50 x 4) = $15,600.

(2) Staff wages

Average number of orders per day = 1,560/(6 days x 4 weeks) = 65 per day. Therefore extra orders = 15 per day.

8 staff x 1·5 hours x 6 days x 4 weeks = 288 extra hours.

At $12 per hour = $3,456 extra wages.

Total flexed wages = $9,216 + $3,456 = $12,672.

(3) Food costs

Food costs = 12·5% x $62,400 = $7,800.

(4) Drink costs

Drinks costs = $15,600 x 20% = $3,120.

(5) Energy costs

Standard total hours worked = (8 x 6) x 6 days x 4 weeks = 1,152 hours.

Extra hours worked = 288 (working 2).

Total hours = 1,152 + 288 = 1,440.

At $2·94 per hour = $4,234.

(b) The sales mix contribution variance measures the effect on profit of changing the mix of actual sales from the standard mix. The sales quantity contribution variance measures the effect on profit of selling a different total quantity from the budgeted total quantity.

The mix variance is adverse here. Since meal B generates a higher contribution than meal A, the adverse variance shows that more of meal A must have been sold, relative to B, than budgeted. Since the quantity variance is favourable, this means that the total quantity of meals sold (in the standard mix)

was higher than expected, as evidenced by the number of meals sold being 1,560 rather than the budgeted 1,200.

(c) Two other variances

Drink sales
As well as the price variance for drinks sales, the sales margin volume variance could be calculated. This will examine the difference between the standard volume of sales that would ordinarily be expected for this number of customers (1,560 x 4 drinks) compared to the actual volume of drinks sold because of the drinks promotion (1,560 x 6 drinks). Since the variance is calculated by applying the increase in volume to the standard margin, this variance will be favourable. In addition, the total sales margin price variance for drinks sales could be split into an operational and a planning variance. The manager is only responsible for any operational variance and any part of the sales margin variance that relates to a planning error (i.e. the last minute decision by the owner to run the drinks promotion) should be separated out. This way, the manager will not be held accountable for matters outside of his control.

Food sales
By running the half price drinks offer promotion, more customers have been attracted to the restaurant. Drinks have been treated as a 'loss leader' i.e. sold at a low price in order to entice customers. It would therefore be relevant to calculate some variances in relation to food sales in order to show how the drinks promotion has increased food sales. The most obvious one to calculate would be the sales margin volume variance for food sales.

[Solution # 15]

(a) Production budget

Product	A	B
Sales	2000	1500
Opening stock	(100)	(200)
Closing stock (10% × sales level)	200	150
	2100	**1450**

(b) Materials usage budget

Material type	X	Y
	Kg	**Litres**
Usage		
(2100 × 2) + (1450 × 3)	8550	
(2100 × 1) + (1450 × 4)		7900

(c) Materials purchases budget

Usage	8550	7900
Opening stock	(300)	(1000)
Closing stock[a]	850	800
	9100	7700
	× £10	×£7
	£91000	**£53900**

(d) Labour budget

	Skilled hours	Semi-skilled hours
(2100 × 4) + (1450 × 2)	11 300	
(2100 × 2) + (1450 × 5)		11 450
	× £12	× £8
	£135600	**£91600**

Note

a **Material Closing Stock**

Material X	(2000 × 2 + 1500 × 3) × 10%	=	850
Material Y	(2000 × 1 + 1500 × 4) × 10%	=	850

[Solution # 16]

(a) *Workings*

Budgeted sales (units and value)

Product	Units	Price	Value (£)
F1	34 000	£50.00	1700000
F2	58 000	£30.00	1740000
			3440000

Budgeted production (units)

Product	Sales	Stock increase	Production
F1	34 000	1000	35 000
F2	58 000	2000	60 000

(i) Component purchase and usage budget (units and value)

Product	Component C3	Component C4	Total
F1	280 000u	140 000u	
F2	240000u	180000u	
	520 000u	320 000u	
Value	£650 000	£576 000	**£1226000**

(ii) Direct labour budget (hours and value)

Product	Assembly	Finishing	Total
F1	17 500 hours	7000 hours	
F2	15000 hours	10000 hours	
	32 500	**17 000**	
Value	**£162 500**	**£102 000**	**£264500**

(iii) Departmental manufacturing overhead recovery rates

	Assembly	Finishing
Total overhead cost per month	£617 500	£204 000
Total direct labour hours	32 500	17 000
Overhead rate (per direct labour hour)	£19.00	£12.00

(iv) Selling overhead recovery rate

Total overhead cost per month	£344 000
Total sales value (Month 9)	£3 440 000
Selling overhead rate	10%

(v) Closing stock budget

Product	Units	Cost[a] £	Value £
F1	1000	32.80	32 800
F2	2000	19.40	38800
			71600

Note

[a] See part (b) for the calculation of the cost per unit

(b) Standard unit costs for month 9

			Product		
			F1 £/unit		F2 £/unit
Material	C3	(8 × £1.25)	10.00	(4 × £1.25)	5.00
	C4	(4 × £1.80)	7.20	(3 × £1.80)	5.40
Labour	Assembly (30/60 × £5)		2.50	(15/60 × £5)	1.25
	Finishing (12/60 × £6)		1.20	(10/60 × £6)	1.00
M'fg. overhead	Assembly (30/60 × £19)		9.50	(15/60 × £19)	4.75
	Finishing (12/60 × £12)		2.40	(10/60 × £12)	2.00
Manufacturing cost			32.80		19.40
Selling overhead (10% of selling price)			5.00		3.00
Total cost			**37.80**		**22.40**
Selling price			50.00		30.00
Profit			12.20		7.60

(c) Budgeted profit and loss account for month 9

	(£)
Components	1 226 000
Direct labour	264 500
Manufacturing overhead	821500
Subtotal	2 312 000
Less closing stock	71600
Cost of sales	2 240 400
Selling overhead	344000
Total cost	2 584 400
Sales	3440000
Net profit	**855600**

(d) The company currently uses an absorption costing system but computes predetermined overhead rates on a monthly basis. It is preferable to calculate a predetermined overhead rate at annual intervals. This is because a large amount of overheads are likely to be fixed in the short-term whereas activity will fluctuate from month to month, giving large fluctuations in

overhead rates if monthly rates are used. An average, annualised rate based on the relationship of total annual overhead to total annual activity is more representative of typical relationships between total costs and volume/activity than a monthly rate.

[Solution # 17]

(a) (i) *Cash budget*

	January (£)	February (£)	March (£)	April (£)
Balance b/d	10 000	9 000	3 890	9 090
Sales (*W1*)	15 200	57100	80000	
	10 000	24 200	60 990	89 090
Purchases (*W3*)		11 550	24 500	26 950
Wages (*W4*)		4 800	19 800	22 200
Variable overhead (*W5*)		960	4 600	7080
Fixed overhead (*W6*)	1 000	3000	3000	3000
	1 000	20 310	51 900	59 230
Balance c/d	**9000**	**3890**	**9090**	**2986**

Workings

(*W1*) Sales

	Amount	20%	Discount 5%	Net	50%	20%	8%	Total cash receipts
January	—	—	—	—	—	—	—	
February	80 000	16 000	800	15 200				15 200
March	90 000	18 000	900	17 100	40 000			57 100
April	100000	20 000	1000	19 000	45 000	16 000		80 000
May	100000	20 000	1000	19 000	50 000	18 000	6400	93 400

(*W2*) Production:

					Total
January	800				800
February	2400	900			3300
March		2700	1000		3700
April			3000	1000	4000
May				3000	
	3200	**3600**	**4000**	**4000**	

(*W3*) Purchases at £7 per unit:

	Production	Current month	Following month	Total	Value (£)
January	February (3300)		1650	1650	11 550
February	March (3700)	1650	1850	3500	24 500
March	April (4000)	1850	2000	3850	26 950

(*W4*) Direct wages:

February payment	800 * £6	=	£4 800
March payment	3300 * £6	=	£19 800
April payment	3700 * £6	=	£22 200

(*W5*) Variable overhead at £2 per unit:

Production	February (£)	March (£)	April (£)	May (£)
January (£1600)	960	640		
February (£6600)		3960	2640	
March (£7400)			4440	2960
	960	**4600**	**7080**	**2960**

(*W6*) Fixed overhead:

	January (£)	February (£)	March (£)	April (£)
January	1000	2000		
February		1000	2000	
March			1000	2000
April				1000
	1000	**3000**	**3000**	**3000**

(ii) It is assumed that the question relates to the amount received from customers in May and not the amount due. The answer is £93 400 (see *W1*).

(b) A software package would eliminate the tedious arithmetical calculations that are necessary to produce cash budgets. Furthermore, it would enable alternative scenarios to be considered, such as what the outcome would be if any of the parameters were changed.

[Solution # 18]

Task 1

Reclamation Division Performance Report – 4 weeks to 31 May:

Original budget	250 tonnes
Actual output	200 tonnes

	Budget based on 200 tonnes	Actual	Variance	Comments
Controllable expenses:				
Wages and social security costs[a]	43 936	46 133	2197A	
Fuel[b]	15 000	15 500	500A	
Consumables[c]	2 000	2 100	100A	
Power[d]	1 500	1 590	90A	
Directly attributable overheads[e]	20000	21000	1000A	
	82436	**8632**	**33887A**	

Non-controllable expenses:

Plant maintenance[e]	5 950	6 900	950A
Central services[e]	6 850	7300	450A
	12800	**14200**	**1400A**
Total	**95 236**	**100523**	**5287A**

Notes

A 6 employees * 4 teams * 42 hours per week * £7.50 per hour * 4 weeks = £30 240.
B 200 tonnes * £75
C 200 tonnes * £10
D £500 + (£5 * 200) = £1500
E It is assumed that directly attributable expenses, plant maintenance and central services are non-variable expenses.

Task 2

(a) (i) Past knowledge can provide useful information on future outcomes but ideally budgets ought to be based on the most up-to-date information. Budgeting should be related to the current environment and the use of past information that is two years old can only be justified where the operating conditions and environment are expected to remain unchanged.
(ii) For motivation and planning purposes budgets should represent targets based on what we are proposing to do. For control purposes budgets should be flexed based on what was actually done so that actual costs for actual output can be compared with budgeted costs for the actual output. This ensures that valid comparisons will be made.
(iii) For variable expenses the original budget should be reduced in proportion to reduced output in order to reflect cost behaviour. Fixed costs are not adjusted since they are unaffected in the short term by output changes. Flexible budgeting ensures that like is being compared with like so that reduced output does not increase the probability that favourable cost variances will be reported. However, if less was produced because of actual sales being less than budget this will result in an adverse sales variance and possibly an adverse profit variance.
(iv) Plant maintenance costs are apportioned on the basis of capital values and therefore newer equipment (with higher written-down values) will be charged with a higher maintenance cost. Such an approach does not provide a meaningful estimate of maintenance resources consumed by departments since older equipment is likely to be more expensive to maintain. The method of recharging should be reviewed and ideally based on estimated usage according to maintenance records. The charging of the overspending by the maintenance department to user departments is questionable since this masks inefficiencies. Ideally, maintenance department costs should be recharged based on actual usage at budgeted cost and the maintenance department made accountable for the adverse spending (price) variance.
(v) The comments do not explain the causes of the variances and are presented in a negative tone. No comment is made, nor is any praise given, for the favourable variances.
(vi) Not all variances should be investigated. The decision to investigate should depend on both their absolute and relative size and the likely benefits arising from an investigation.
(vii) Central service costs are not controllable by divisional managers. However, even though the divisional manager cannot control these costs there is an argument for including them as non-controllable costs in the performance report. The justification for this is that divisional managers are made aware of central service costs and may put pressure on central service staff to control such costs

more effectively. It should be made clear to divisional managers that they are not accountable for any non-controllable expenses that are included in their performance reports.

[Solution # 19]

Task 1

(a)	Quarter 1 units	Quarter 2 units	Quarter 3 units	Quarter 4 units
Actual sales volume	420 000	450 000	475 000	475 000
Seasonal variation	+25000	+15000		240000
Deseasonalised sales volumes	**395000**	**435000**	**475000**	**515000**

(b) The trend is for sales volume to increase by 40 000 units each quarter:

Forecast for next year	Quarter 1 units	Quarter 2 units	Quarter 3 units	Quarter 4 units
Trend projection	555 000	595 000	635 000	675000
Seasonal variation	+25000	+15000		40000
Forecast sales volumes	**580000**	**610000**	**635000**	**635000**

Task 2

(a) Seasonal variations represent consistent patterns in sales volume that occur throughout each year. For example, the seasonal variation of +25 000 for Quarter 1 indicates that sales volume in the first quarter tends to be 25 000 units higher than the underlying trend in sales. In contrast, the seasonal variation of 40 000 in Quarter 4 indicates that sales in this quarter tend to be 40 000 units lower than the underlying trend in sales. To derive the deseasonalised data the seasonal variations must be removed so that a trend can be observed. The above figures indicate an increase of 40 000 units per quarter. This trend is concealed when the actual data is observed because of the distorting effects of seasonal variations. Observations of the actual data suggests that the rate of increase in sales is declining

(b) Provided that the observed trend in deseasonalised data continues the deseasonalised data can be used to project the trend in future sales. The trend values are adjusted by seasonal variations in each quarter to predict actual sales.

Task 3

(a) A fixed budget is a budget for the planned level of activity and budgeted costs are not adjusted to the actual level of activity. A fixed budget is used at the planning stage because an activity level has to be initially determined so that all department activities can be coordinated to meet the planned level of activity. However, it is most unlikely that actual activity will be the same as the planned level of activity. For example, if the actual level of activity is greater than budgeted level of activity then those costs that vary with the level of activity will be greater than the budgeted costs purely because of changes in activity. It is clearly inappropriate for variable costs to compare actual costs at one level of activity with budgeted costs at another level of activity. The original fixed budget must be adjusted to reflect the budgeted expenditure at the actual level of activity. This procedure is called flexible budgeting. The

resulting comparison of actual costs with a flexible budget is more meaningful for cost control because the effect of the change in the activity level has been eliminated.

(b) Possible activity indicators include number of deliveries made, miles travelled and journeys made.

Task 4

(a) Production budget for product Q

	(units)
Forecast sales for year	18 135
Increase in stock (15% * 1200)	180
Finished units required	18315
Quality control loss (1/99)	185
Total units input to production	**18500**

(b) Direct labour budget for product Q

	(hours)
Active labour hours required (18 500 * 5)	92 500
Idle time allowance (7.5/92.5)	7500
Total hours to be paid for	100000
Standard hourly rate	£6
Budgeted labour cost	**£600000**

(c) Material usage budget for material M

	(kg)
Material required for processing 18 500 units (*9 kg)	166500
Wastage (10/90)	18500
Material usage for year	**185000**

(d) Material purchases budget for material M

	(kg)
Material required for production input	185 000
Increase in material stocks (12%)	960
Expected loss in stores	1000
Material purchases required	**186960**

Task 5

The implications of the shortage are that the budget plans cannot be achieved and the availability of material is the limiting factor. If the limiting factor cannot be removed the materials purchase budget should be the first budget to be prepared and all the other budgets coordinated to ensure the most efficient usage of materials. The following four possible actions could be taken to overcome the problem:

(i) Seek alternative supplies for material M. Possible problems include the reliability and quality of materials delivered by new suppliers. New suppliers should be carefully vetted prior to entering into any contracts or making company plans dependent on deliveries from new suppliers.

(ii) Reduce the budgeted sales of product Q. This will lead to loss in profits and the possible permanent loss of customers to competitors if the competitors are able to meet customer demand.
(iii) Reduce the stock levels for product Q and material M. The danger with this course of action is that stocks may not be available when required which could lead to disruptions in production and lost sales.
(iv) Reduce the wastage of material M and the defective output of product Q. This course of action will cause problems if quality standards are reduced resulting in inferior quality output. This could have a harmful effect on future sales. Problems will not be caused if quality standards are maintained and improved working practices result in a reduction of waste and defective output.

[Solution # 20]

Task 1 (a)

Calculation of unit variable costs

	Original budget	Revised budget	Difference	Variable unit cost[a]
Units	**24 000**	**20 000**	**4 000**	
Variable costs				
Material	216 000	180 000	£36 000	£9
Labour	288 000	240 000	£48 000	£12
Semi-variable costs				
Heat, light and power	31 000	27 000	£4 000	£1
Analysis of heat, light and power				
Variable cost	£24 000	£20 000		
Total cost	£31 000	£27 000		
Fixed cost	£7 000	£7 000		

Note

[a]Unit variable cost = change in total cost/change in volume

Task 1 (b)

Rivermede Ltd – flexible budget statement for the year ended 31 May

		Revised budget	Actual results	Variance
Production and sales (units)		22 000	22 000	
Variable costs		**(£)**	**(£)**	**(£)**
Material	(22 000 × £9)	198 000	214 320 (£206 800 + £7520)	6320 (A)
Labour	(22 000 × £12)	264 000	255 200	8800 (F)
Semi-variable cost				
Heat, light and power (22 000 × £1) + £7000		29 000	25 880 (£33 400 + £7520)	3120 (F)
Fixed costs				
Rent, rates and depreciation		40 000	38 000	2000 (F)
		531 000	**533 400**	**2400 (A)**

Task 2 (a)

The original statement compares the actual cost of producing 22 000 units with a budget for 20 000 units. This is not comparing like with like. The flexible budget shows what budgeted costs would have been for the actual production level of 22 000 units. Because actual production was greater than budgeted production of 20 000 units variable costs are likely to be higher and this comparison will result in an adverse effect on variable cost variances. The fact that overall variances are smaller when comparisons are made with the flexible budget is due to flexing the budget and not to participative budgeting.

Task 2 (b)

The report should indicate that favourable variances may have arisen for the following reasons:

(i) Controllable factors due to the more efficient usage of direct labour and heating, light and power.

(ii) Budget participation may have resulted in the creation of slack through an overstatement of budgeted costs.

(iii) Uncontrollable factors such as a reduction in the prices charged to Rivermede for rent and rates.

Task 2 (c)

The report should include the following items:

(i) The increased sales may have been due to a general increase in demand rather than the effort of the sales force.

(ii) The original budget of 24 000 units may have been over-estimated or the revised budget of 20 000 units may have been understated due to the sales director creating slack by deliberately understating demand.

[Solution # 21]

Task 1 (a)

For 2001 x takes on a value of 9.

Therefore, annual demand (y) = 640 + (40 × 9) = 1000

Weekly demand = 1 000/25 = 40 holidays

Task 1 (b)

Weaknesses of the least squares regression formula include:

(i) The formula assumes a linear relationship based on time but demand for holidays may not be a linear function of time.

(ii) Seasonal variations are ignored. Demand may vary throughout the holiday season with some holiday weeks being more popular than others.

(iii) It ignores changes in holidaymakers' tastes such as a change in demand from short haul to long haul or 10-day holidays to short-break holidays.

(iv) Cyclical fluctuations are ignored. Demand for holidays is likely to vary depending on the state of the economy, such as boom or recession.

Task 2 (a)

Revised cost statement 10 days ended 27 November

Flexed budget	*Note*	**Budget (£)**	**Actual (£)**	**Variance (£)**
Aircraft seats	1	18 000	18 600	600 A
Coach hire		5 000	4 700	300 F
Hotel rooms	2	14 300	14 200	100 F
Meals	3	4 560	4 600	40 A
Tour guide		1 800	1 700	100 F
Advertising		2 000	1 800	200 F
		45 660	**45 600**	**60 F**

Notes

1. £450 × 40 because purchases are in blocks of 20 seats
2. £70 × 10 days × 34 tourists × 0.5 £11 900
   £60 × 10 days × 4 tourists £2 400
   £14 300
3. £12 × 10 days × 38 tourists

Task 2 (b)

The original budget is a fixed budget based on the anticipated demand when the budget was set. If actual demand is different from anticipated demand a fixed budget is inappropriate for control purposes because it does not ensure that like is compared with like. The revised flexible budget shows what costs should have been for the volume of passengers taken on the holiday. This ensures that a more meaningful comparison of budget and actual costs is made.

Task 2 (c)

The following factors should be considered:

(i) The absolute amount of the variance;
(ii) The relative amount of the variance expressed as a percentage of budgeted costs;
(iii) The trend in variances by examining the cumulative variances for the period;
(iv) Whether or not the variance is controllable;
(v) The cost and benefits from investigating the variance.

[Solution # 22]

(a)

Cash Budget for first 6 months of 2011 — Rs. '000'

Months:	Jan	Feb	Mar	Apr	May	June	Total
Opening Balance	140	270	634	(204)	12	286	140
Receipts							
Collections from sale	396	702	1,062	1,314	828	666	4,968
Total Availability	536	972	1,698	1,110	840	952	5,108
Payments							
Material & Labour Costs	180	252	1,764	612	468	324	3,600
Administrative Salaries	60	60	60	60	60	60	360
Lease Payments	20	20	20	20	20	20	120
Misc. expenses	6	6	6	6	6	6	36
Advance Income Tax			50			50	100
Capital expenditure				400			400
Total Payments	266	338	1,900	1,098	554	460	4,616
Surplus (Deficit)	270	634	(204)	12	286	492	492

Collections from sale — Rs. '000'

Months:	Jan	Feb	Mar	Apr	May	June	Total
1st Month	72	108	144	72	72	18	486
2nd Month	270	540	810	1,080	540	540	3,780
3rd Month	54	54	108	162	216	108	702
Total Collections	396	702	1,062	1,314	828	666	4,968

(b) The cash budget indicates that the company will have surplus funds available during Jan., Feb., May & June 2011. During the month of March 2011 the company will need borrowing of approx Rs.345,000.

The company must invest surplus fund in Jan & Feb for 1 or 2 months in short term deposits in good rating bank(s) to reduce deficit in March 2011. The surplus that accrues again in May & June 2011 will enable the company to repay its borrowing from the bank.

The company should go on a cash sale policy the company should review its minimum cash requirements.

[Solution # 23]

(i) Variable production cost budget:

Rs. '000'

	April	May	June	Total
Raw materials *	3,024	3,321	4,050	10,395
Direct labour and variable overheads @ Rs. 130 on prod units	4,550	4,875	5,850	15,275
	7,574	8,196	9,900	25,670

** Calculation of material cost:*

April: Consumption from Opening units 35,000	@ Rs. 86.40	3,024
May: Consumption from Opening units 15,000	@ Rs. 86.40	1,296
May: Consumption from purchased units 22,500	@ Rs. 90.00	2,025
		3,321
June: Consumption from purchased units 45,000	@ Rs. 90.00	4,050

(ii) **Projected Balance Sheet as on June 30, 2011**

Rs. '000'

	Note		
Assets and equities			
Assets			
Non-current assets:			
Property, plant and equipment	(1)		657,867
Current assets:			
Raw material inventory (55,000 Kgs @ Rs 90)	(2)	4,950	
Finished Goods (42,500 Units @ Rs 220)	(3)	9,350	
Accounts receivable (sales of May & June)	(4)	39,420	
Cash and bank balances		16,913	70,633
Total assets			728,500
Equity and Reserve			
Issued, subscribed and paid-up Capital			500,000
Unappropriated profit (100,840+9,835)			110,675
Shareholders' equity			610,675
Current liabilities:			
Accounts payable (June units 42,500 @ Rs.90)		3,825	
Short term borrowing		114,000	
			117,825
Total equity, reserves and liabilities			728,500

Note: (1) Written down value

Rs. '000'

	Cost	Accumulated Depreciation	Written Down Value
Land & buildings	500,000	-	500,000
Plant, machinery and equipment	236,000	100,233	135,767
Motor vehicles	42,000	19,900	22,100
	778,000	120,133	657,867

Note: (2) Raw material inventory

Kgs in '000'

	April	May	June
Opening	50.0	55.0	57.5
Add: Purchases	40.0	40.0	42.5
Less: Production	(35.0)	(37.5)	(45.0)
Closing	55.0	57.5	55.0

Note: (3) Finished goods inventory

Units in '000'

	April	May	June
Opening	55.0	50.0	45.5
Add: Production	35.0	37.5	45.0
Less: Sold	(40.0)	(42.0)	(48.0)
Closing	50.0	45.5	42.5

Unit cost of finished goods at variable costing:	Rs.
Material Cost (1 Kg @ Rs 90)	90
Direct labour and Variable Overheads @ Rs 130	130
Valuation of finished goods	220

Note: (4) Accounts receivable

Sales May & June (90,000 units @ Rs.438) Rs.39,420,000

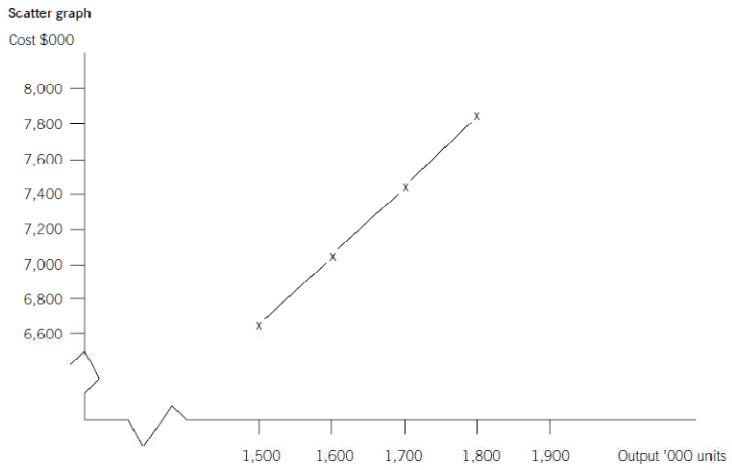
GENERAL

[Solution # 1]

(a) Total Costs in 2010 price levels

Year	Total	Cost
2007	$12,450,000 x 80 ÷ 150	6,640,000
2008	$15,840,000 x 80 ÷ 180	7,040,000
2009	$6,510,000 x 80 ÷ 70	7440,000
2010	$7,840,000	7,840,000

(b) Scatter Graph



(c) High low technique

Variable cost per unit = $4 per unit

Total cost = fixed cost + variable cost

At 1,800,000 units = $7,840,000 = fixed cost + (1,800,000 units x $4)

Fixed costs = $640,000 per annum

(d) 2011 Cost forecast

Cost forecast in 2010 prices

Total cost = $640,000 + ($4 x output)

= $640,000 + ($4 x 2,000,000 units) = $8,640,000

Indexed to 2011 price levels = $8,640,000 x 95 ÷ 80 = $10,260,000

(e) Three trends revealed by the diagram

- Total sales have increased over the three years
- Sales in market 1 have grown very rapidly
- Sales in market 2 are static
- Sales in market 3 are falling

[Solution # 2]

(a) In 2010 the four quarters will be numbers 5–8, consequently the trend figures for waste to be collected will be:

Quarter 1 (Q = 5)	: 2,000 + 25(5)	= 2,125 tonnes
Quarter 2 (Q = 6)	: 2,000 + 25(6)	= 2,150 tonnes

Quarter 3 (Q = 7)	: 2,000 + 25(7)	= 2,175 tonnes
Quarter 4 (Q = 8)	: 2,000 + 25(8)	= 2,200 tonnes

Seasonal adjustments are needed thus:

Quarter 1	: 2,125 – 200	= 1,925
Quarter 2	: 2,150 + 250	= 2,400
Quarter 3	: 2,175 + 150	= 2,325
Quarter 4	: 2,200 – 100	= 2,100

Total tonnage is 1,925 + 2,400 + 2,325 + 2,100 = 8,750 tonnes for the year.

(b) Regression analysis can be used to calculate the variable operating and fixed operating costs in 2009.

	Tonnes (X)	Total Cost (Y)	XY	X2
		$000's		
	2,100	950	1,995,000	4,410,000
	2,500	1010	2,525,000	6,250,000
	2,400	1010	2,424,000	5,760,000
	2,300	990	2,277,000	5,290,000
Sum	**9,300**	**3,960**	**9,221,000**	**21,710,000**

Y = a +bX

Where 'a' is fixed operating cost and 'b' is variable operating cost in this context.
Using the formula given:
b = (4 x 9,221,000 – 9,300 x 3,960)/(4 x 21,710,000 – (9,300)2)
b = 0·16 or $160 per tonne as the original data is in $000's. This was the variable operating cost per tonne for 2009.
a = (3,960/4) – (0·16 x 9,300/4)
a = 618 or $618,000 as the original data is in $000's. This was the fixed operating cost in 2009.

Allowing for inflation:

The variable operating cost in 2010 will be $160 x 1·05 = $168 per tonne
The fixed operating cost in 2010 will be $618,000 x 1·05 = $648,900

(c) Advantages of an incremental budgeting approach:

– Local government organisations are often complex and incremental budgeting will be seen as a simple approach to a budget that will take little effort.
– Budget processes can be long ones, however incremental approaches do tend to be quicker than most. Complex local government organisations can suffer from very long budget processes and incremental budgeting can alleviate this a little.

Disadvantages of incremental budgeting:

– Public bodies, such as local governments, will be encouraged to use up all of *this* year's budget in order to ensure that *next* year's budget will be as high as possible to give themselves the flexibility they need to do whatever is needed. The public services required can be unpredictable and so local government organisations prefer to be able to be flexible.
– Overspends made in *this* year will be budgeted for again *next* year, this is hardly giving taxpayers value for money.

[Solution # 3]

(a) The first stage is to convert all costs to a 2002 basis. The calculations are as follows:

	1998 (£000)	1999 (£000)	2000 (£000)	2001 (£000)
Raw materials				
Skilled labour	$242(1.2)^4$	$344(1.2)^3$	$461(1.2)^2$	477(1.2)
Unskilled labour				
Factory overheads	$168(1.15)^3$	$(1.2)\ 206(1.15)^2$	(1.2) 246(1.15)	(1.2) 265(1.2)
Power	$25(1.1)(1.25)^3$	$33(1.25)^3$	$47(1.25)^2$	44(1.25)
Raw materials				
Skilled labour	500.94	595.12	663.84	572.4
Unskilled labour				
Factory overheads	306.432	326.304	339.48	318
Power	53.625	64.35	73.32	55
Total (2002 prices)	**861 000**	**986 000**	**1 077 000**	**945 000**
Output (units)	160 000	190 000	220 000	180 000

The equation Y = *a* + *bx* is calculated from the above schedule of total production costs (2002 prices) and output. The calculations are as follows:

Output in units (000)	**Total cost (£000)**		
x	***y***	x^2	***xy***
160	861	25 600	137 760
190	986	36 100	187 340
220	1077	48 400	236 940
180	945	32400	170100
750	**3869**	**142500**	**732140**

We now solve the following simultaneous equations:

$$y = a + bx$$

Therefore

$$3869 = 4a + 750b \quad (1)$$
$$732\ 140 = 750a + 142\ 500b \quad (2)$$

Multiply equation (1) by 190 (142 500/750) and equation (2) by 1. Then equation (1) becomes

$$735\ 110 = 760a + 142\ 500b \quad (3)$$

Subtract equation (2) from equation (3):

$$2970 = 10a$$
$$a = 297$$

Substitute for *a* in equation (1):

$$3869 = 4 \times 297 + 750b$$
$$2681 = 750b$$
$$b = 3.57$$

The relationship between total production costs and volume for 2002 is:

$$y = £297\ 000 + 3.57x$$

where *y* = total production costs (at 2002 price) and *x* = output level.

(b) General company overheads will still continue whether or not product LT is produced. Therefore the output of LT will not affect general production overheads. Consequently, the regression equation should not be calculated from cost data that includes general company overheads. General company overheads will not increase with increments in output of product LT. Hence short-term decisions and cost control should focus on those costs that are relevant to production of LTs. Common and unavoidable general fixed costs are not relevant to the production of LT, and should not be included in the regression equation.

MATERIAL

[Solution # 01]

The difference between the prices quoted by the supplier is Rs.0.10 per unit as regards to the variable costs while the difference between the fixed costs is Rs.2000. The quantity of purchase where the purchase price per unit will be the same can be calculated with the help of the following formula.

Desired purchase quantity = Difference in the fixed cost/Difference in the variable cost
= Rs.2000 / Rs.0.10 = 20, 000 units.

Thus the purchase cost will be the same if the number of units ordered is 20, 000. If more than 20, 000 units are ordered, supplier B should be selected while for orders of less than 20, 000 units, supplier A should be selected. For order of 15, 000 units, supplier A should be selected. This can be proved as shown below.

Supplier A: Total Cost = 15, 000 units * Rs.2.20 per unit = Rs.33, 000
Supplier B: Total Cost = 15, 000 units * Rs.2.10 per unit = Rs.31, 500 + Rs.2000 fixed cost = Rs.33, 500 units.

[Solution # 2]

(a) ***Item A32: storage and ordering cost schedule***

No of orders per year	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Order size (boxes)	1250	1000	833	714	625	556	500	455	417
Average stock (boxes)	625	500	417	357	313	278	250	228	208
	(£)	(£)	(£)	(£)	(£)	(£)	(£)	(£)	(£)
Storage costs (average stock × 25% of £2)	312.5	250.0	208.5	178.5	156.5	139.0	125.0	114.0	104.0
Ordering costs (£12.5 per order)	50.0	62.5	75.0	87.5	100.0	112.5	125.0	137.5	150.0
Total cost	**£362.5**	**£312.5**	**£283.5**	**£266.0**	**£256.5**	**£251.5**	**£250.0**	**£251.5**	**£254.0**

(b) The number of orders which should be placed in a year to minimize costs is 10.

(c) The maximum saving that could be made if the authority process four orders per year would be: 362.5 - 250/ 362.5 = 31%

(d) **(i)** Reducing the number of stock items by eliminating slow moving and obsolete stocks.
(ii) Standardization of stock items thus reducing the total number of items in stock.

[Solution # 3]

The purchase cost is not constant per unit. It is therefore not possible to use the EOQ formula. Instead the following schedule of costs should be prepared:

Evaluation of optimum order size

Size of order	No. of orders	Annual purchase cost (WI) (£)	Storage cost (£)	Admin. cost (£)	Total cost (£)
2400	1	1728 (£0.72)	300	5	2033
1200	2	1728 (£0.72)	150	10	1888
600	4	1824 (£0.76)	75	20	1919
200	12	1920 (£0.80)	25	60	2005
100	24	1920 (£0.80)	12.50	120	2052.50

It is recommended that two orders be placed per year for 1200 units.

		(£)
Calculation of cost 2(1200 × £0.80 – 10%)	=	£1728
Add: Storage, average quantity held 600 × £0.25	=	150
Add two orders placed per annum × £5	=	10
		£1888

Workings (W1): Annual demand of 2400 units × unit purchase cost

OVERHEAD

[Solution # 01]

Particulars	Per annum	Per hour
Standing Charges – Insurance – Rs. 4,500 * 5 lacs/ 75 lacs	300	
Repairs and Maintenance	2,000	
Rent Rs. 800 per month * 12 months * 5 lacs/ 75 lacs	640	
Lighting Charges Rs. 120 per month * 12 months = Rs. 1,440 * 3/20	216	
Total Standing Charges	3,156	3,156/4,000 hours= 0.789
Machine Expenses		
Depreciation	5,00,000 – 5,000/10= 49,500/4,000 hours	12.375
Electricity Consumption 25 units per hour @ Rs. 5 per unit		75
Machine hour rate		**88.16**

Note :- The total cost of the machinery in the workshop is Rs. 75 lacs out of which the cost of this machine is Rs. 5 lacs and hence proportionate amount has been calculated in respect of expenses like insurance and rent.

[Solution # 2]

Computation of cost of running one machine for a four week period

		Rs.
Standing charges		**Per annum**
Rent		5,400
Heat and light		9,720
Forman's salary		12,960
Total expenses for one machine for four week period	(28,080*4/3*13)	2880
(Wages: Hours per week = 48 & hours for 4 weeks = 48*4 =192)		
(Wages (192*20) 3840)		
Bonus	(192-16) = 176*20*0.10	352
Total Outstanding Charges **(1)**		**7072**

Medical expenses

	Rs:
Depreciation (52000*10%*4/13)	1600
Repairs & Maintenance (60*4)	240
Consumable Stores (75*4)	300

Power (192-16) = 176*20*0.80	2816
Total Machine Expenses**(2)**	**4956**
Total Expenses (1) + (2)	**12028**

Machine Hour Rate = 12028/176 = **68.34**

[Solution # 3]

(a) Rate Capacity **36.5 Tones**

(Refers to the capacity of a machine
or a plant as indicated by its manufacturer)

(b) Practical Capacity **30 Tones**

(Defined as actually utilized capacity of a plant
i.e. 36.5/365* (365-65) tones)

(c) Normal Capacity **25 Tones**

(It is the capacity of a plant utilized based on
Sales expectancy)

(d) Actual Capacity **25.2 Tones**

(Refers to the capacity actually achieved)

RECONCILIATION

[*Solution* # 01]

Particulars	**Amount**	**Amount**
Profit as per cost accounts		291, 000
Add:		
Over-recovery of selling overheads	39, 000	
Over-valuation of opening stock in cost accounts	-	
Interest earned not recorded in cost a/cs	30, 000	
Rent received not recorded in cost a/cs	7, 500	130, 500
Total		421, 500
Less:		
Under recovery of work overheads	19, 000	
Under recovery of administrative overheads	45, 500	
Over-valuation of closing stock in cost a/cs	15, 000	
Bad debts not recorded in cost a/cs	18, 000	
Preliminary expenses written off not recorded in cost a/cs	36, 000	133, 500
Profit as per Financial Accounts		**288, 000**