Ans. 6:

(a) Calculation of cost of per 100 units of good components:

(A)

	X Ltd.	Y Ltd.
If not inspected		
Units required	10,000	10,000
Estimated defectives	300	500
	(3%)	(5%)
Cost	Rs.	Rs.
Purchase price (Rs.)	18,000	17,400
Production damage (Rs.)	540	900
Total Cost (Rs.)	18,540	18,300
Good component (units)	9,700	9,500
Cost per 100 good component (Rs.)	191.13	192.63

(B) **If inspected**

Defectives not detected	30	50
Defectives detected	270	450
Components paid for	9,730	9,550
Cost	Rs.	Rs.
Purchase cost	17,514	16,61
Inspection cost	2,400	2,400
Production damage	54	90
Total cost	19,968	19,107
Good components	9,700	9,500
Cost per 100 good components (Rs.)	205.86	201.3

Decision:

(i) On the basis of the cost per 100 good component calculated at (A) and (B) above, it is concluded that inspection at the point of receipt is not justified.

(ii) It will be advantageous to purchase the component from X Ltd.

Ans. 7:

1.

	2003	2004
a. Percentage of defective units shipped	400/10,000 = 4%	330/11000 = 3%
b. Customer complaints as a percentage of units shipped	500/10000 = 5%	517/11000 =4.7%
c. On-time delivery	8500/10000 = 85%	9900/11000 = 90%
d. Percentage of units reworked during production	600/10000 =6%	627/11000 =5.7%

2. The calculations in requirement I indicate that ESC's performance on both quality and timeliness has improved. Quality has improved because (a) percentage of defective units shipped has decreased from 4% to 3%,(b) customer complaints have decreased from 5% to 4.7% , and (c) percentage of units reworked during production has decreased from 6% to 5.7% . Timeliness has improved as on –time delivery has increased from 85 % to 90% . Of course , there is a relationship between the improvements in quality and timeliness. Better quality and less rework reduces delays in production and enables faster and on-time delivery to customers.

3a.	2003	2004
The output per labor- hour		
Between 2003 and 2004	10000 =0.11	11000 =0.10
Can be calculated as follows	90000	110000

3b . Output per labor-hour may have declined from 2003 and 2004 either because workers were less productive or more likely because the initial implementation of the quality program may have resulted in lost production time as employees were trained and became more adept at solving production quality problems. As workers implement good quality practices and defects and rework decrease over time, it is possible that both quality and productivity (output per labor-hour) will increase.

3c. it is not clear that the lower output per labor-hour will decrease operating income in 2004. the higher labor costs in 2004 could pay off in many ways. Higher quality and lower defects will likely result in lower material costs because of lower defects and rework. Internal and external failure costs will also be lower, resulting in lower customer returns and warranty costs. Customer satisfaction will likely increase, resulting in higher sales, higher prices, and higher contribution margins. Indeed the 10% increase in the number of units produced and sold in 2004 may well have been due to quality improvements. Overall, the benefits of higher quality in 2004 may very well exceed the higher labor costs per unit of output.

Ans. 8: (i) Classification of Quality Costs — Figures Rs. '000

	2007	% of sales	2008	% of sales
Sales	6,000		6,000	
Prevention				
Quality training	75	1.25	150	2.5
Appraisal				
Product Inspection	200		240	
Materials Inspection	80		60	
	280	4.67	300	5
Internal Failure				
Scrap	600		300	
Rework	500		400	
	1100	18.33	700	11.67
External Failure				
Product warranty	300	5	150	2.5
	1755	29.25	1300	21.67

(ii) Cost reduction was effected by 7.58% (29.25 – 21.67) of sales, which is an increase in profit by Rs.4,55,000. (6 Marks) Nov/08-NC& ICWA-June/03 [Adapted]

Ans. 9: Had there been no defectives for production of 1,00,000 pieces of P 1,00,000X5=5,00,000 units of raw material would be required. In case of high quality material , defective being 10% total raw material required is 5,00,000 units/0.90 =5,55,556 units. In case of lower quality material, defective being 20%, total raw material requirement is 5,00,000 units/0.08 =6,25,000 units. Similarly labour and variable overhead requirement are to be adjusted accordingly.

Ascertainment of Total cost

I. Using high quality materials	**(scrap 10%)**	**(Rs)**
Material	(5,00,000 units/0.90X Rs.1.05)	5,83,333
Labour	(2,50,000 hours/0.90X Rs.0.50)	1,38,889

Variable overhead	(Rs.1,00,000/0.90)	1,11,111
Fixed overhead		50,000
Less: Scrap	(5,00,000/0.90)-5,00,000)XRe.0.30	8,83,333
		16,667
Cost of 1,00,000 pieces of P		8,66,666

II. Using lower quality materials **(scrap 10%)** **(Rs)**

Material	(5,00,000 units/0.80X Rs.0.80)	5,00,000
Labour	(2,50,000 hours/0.80X Rs.0.50)	1,56,250
Variable overhead	(Rs.1,00,000/0.80)	1,25,000
Fixed overhead		50,000
Machine and Tooling cost		3,000
Additional laboour	(1,00,000units X 0.5hours XRe.0.50)	2,500
Additional overhead for additional labour		
	(1,00,000 units x 0.5 hours)X (Rs.1,00,000/2,50,000 hours)	20,000
		8,79,250
Less: Realizable value of scrap		5000
Cost of 1,00,000 pieces of P		8,74,250

Analysis: Hence the high quality material should be used.

Ans. 10:-Let the defectives be'd'

(I) If each components is tested before being sent to the agents for sales

No: of components in a batch	Rs.2000
Cost of testing each components	Rs.20
Cost of rectification before dispatch	Rs.200
Total Cost	Rs.(2000x25)+200d

(II) If components dispatch without pre-testing and defectives received back for rectification under warranty.

Total Cost	400d	
In difference point of two alternatives		
(2000x25)+200d	400d	
400d-200d	2000x25	
200d	50,000	
D	50000/20	
	250	
Defective Components	250 components	
Percentage of defectives to total components	250/2000*100	=12.5%

Analysis: If defectives exceed 12.5% of the total number of components per-testing is recommended**.**

Ans. 11: **Present Position (Based on 1,000 units Production)**

Cost per unit.		**(Rs.)**
Direct material		10
Direct wages	(8 hours @ Re.0.50)	4
Overheads	(8 hours @ Rs.1.75)	14
Total		**28**

	Per unit		**Units**	**Total**	
Particular	**Sales price**	**Profit / Loss**		**Profit**	**Loss**
Firsts	30	2	900	1,800	-
Seconds	20	(-) 8	50	-	400
Thirds	10	(-) 18	50	-	900
				1,800	1,300
				Net Profit	**500**

Reprocessing of Inferior units

(a) Additional expenditure for reprocessing per unit	**(Rs.)**
Direct Material	4
Direct Wages 8 hrs.	4
Variable overhead @ 0.875	7

15

Total expenditure for 100 units Rs.1,500

.

(b) Additional Revenue		**(Rs.)**
Second	(Rs.30-Rs.20)x50units	500
Thirds	(Rs.30-Rs.10)x50	1000
		1500

Note: No change in the profit position hence this need not be considered.

Ans. 12: (a)

		Existing		After TQM Programme
i.	Total production units (Preinspection)			
	Total sales requirements	5,000		5,000
	Specification losses 5%	250	2.5%	125
		5,250		5,125
	Downgrading at inspection $\frac{12.5}{87.5} \times 5{,}250$	750	$\frac{7.5}{92.5} \times 5{,}125$	416
	Total units before inspection	6,000		5,541
ii	Purchase of material 'X'(Sq Mtr)			
	Material required to meet pre inspection production requirement 6,000 × 8 SqMtr	48,000 SqMtr	5,541×8 SqMtr	44,328 SqMtr
	Processing loss $\frac{4}{96} \times 48{,}000$	2,000	$\frac{2.5}{97.5} \times 44{,}328$	1,137
	Input to the process	50,000		45,465
	Scrapped material $\frac{5}{95} \times 50{,}000$	2,632	$\frac{3}{97} \times 45{,}465$	1,406
	Total purchases	52,632		46,871
iii	Gross Machine Hours			
	Initial requirements 6,000 × 0.6	3,600	5,541 × 0.5	2,771
	Idle time $\frac{20}{80} \times 3{,}600$	900	$\frac{12.5}{87.5} \times 2{,}771$	396
	Gross time	4,500		3,167

(b) Profit and loss statement

	Rs	*Rs*
Sales revenue 5,000 Units× Rs 1,000	50,00,000	50,00,000

Sales downgraded 750 Units×Rs 700	5,25,000	416 Units × Rs 700	2,91,200
	55,25,000		52,91,200
Costs:			
Material 52,632 Sq Mtr ×Rs 40	21,05,280	46,871Sq Mtr × Rs 40	18,74,840
Inspection and storage costs 52,632 Sq Mtr ×Re 1	52,632	46,871Sq Mtr × Re 1	46,871
Machine cost 4,500 Hrs × Rs 400	18,00,000	3,167 Hrs× Rs 400	12,66,800
Inspection and other cost	2,50,000	2,50,000 × 60%	1,50,000
Product liability (3% × 50,00,000	1,50,000	1% × 50,00,000	50,000
Sundry cost of selling, distribution and administration.	6,00,000	6,00,000 × 90%	5,40,000
Preventive programme cost	2,00,000		6,00,000
	51,57,912		45,28,511
Net profit	3,67,088		7,62,689

Ans. 13:

(a) (i)

	Units
Components worked on in the process	6120
Less: planned defective units	612
replacements to customer (2% X 5400)	108
Components invoiced to customers	5400

Therefore actual result agree with planned results

(ii) Planned components cost = (3 X Rs.18 for material A) + (2 X Rs.9 for material B) + Rs.15 variable cost =Rs.87

Comparing with the data in appendix:

Materials = Rs.440 640/6120 =Rs.72

Variable overhead = Rs.91 800/6120 = Rs.15

This indicates that prices were at the planned levels.

(b) Internal failure costs = Rs.53 244(612 units X Rs.87)

External failure costs = Rs.9396 (108 units X Rs.87)

(c) (i)

	Period 2 (units)	**Period 3 (units)**
Components invoiced to customers	5500	5450
Planned replacement (2%)	110	109
Unplanned replacement	60 (170-110)	-69 (40-109)
Components delivered to customers	5670	5490
Planned process defects (10% of worked on in the process)	620	578
Unplanned defects (difference to agree with with final row)	-90	-288
Components worked on in the process	6200	5780

(ii)

	Period 2(Rs.)	**Period 3(Rs.)**
Internal failure costs	46,110 (620-90) XRs. 87	25,230 (578-288) X Rs.87
External failure costs	14,790 (110+60) X Rs.87	3,480 (109-69) X Rs.87
Appraisal costs	10,000	15,000

Prevention costs	5,000	8,000

(iii) The following points should be included in the report:

1. Insufficient detail is provided in the statistics shown in the appendix thus results in the need to for an improvement in reporting.
2. The information presented in (c) (i) indicate that free replacement to customers were 60 greater than planned in period 2 but approximately 70 less than planned in period 3. in contrast, the in process defects were 90 less than planned (approximately 15%) in period 2 and 288 less than plan (approximately 50%) in period 3.
3. Internal failure costs show a downward trend from period 1-3 with a substantial declined in period 3.External failure costs increased in period 2 but declined significantly in period 3.
4. The cost savings arising in period 2 and 3 are as follows:

	Period 2(Rs.)	**Period 3(Rs.)**
Increase /decrease from previous period:		
Internal failure costs	-1734(Rs.53244-Rs.46110)	-20880(Rs.46110-Rs.25230)
External failure	+5394(Rs.9396-Rs.14790)	-11310(Rs.14790-Rs.3480)
Total decrease	-1740	-32190

The above savings should be compared against the investment of Rs.10000 appraisal cost and Rs.5000 prevention cost for period 2 and Rs.15,000 and Rs.8,000 respectively in period 3. it can be seen that the cost exceed the savings in period 2 but the savings exceeds the cost in period 3. There has also been an increase in the external failure cost from period 1 to period 2. Investigations should me made relating to the likely time lag from incurring prevention/appraisal costs and their subsequent benefits.

5. The impact on customer goodwill from the reduction in replacements should also be explained.

Ans. 26: **(i)** Statement showing price of Product Z

Direct Material	Deptt. A	30	
	Deptt. B	25	55
Direct Labour	Deptt. A	30	
	Deptt. B	40	70
Variable overhead	Deptt. A 3×6	18	
	Deptt B 4×3	12	30
Variable selling and distribution overhead 30,000/1,500			20
Total Variable Cost per unit			175

Total hours required for a target of 1,500 units of product Z

Deptt. A1500 × 3	4500 hours
Deptt. B1500 × 4	6000 hours
	10500 hours

10500 hours represent 30% capacity

So total capacity per month 10500 / 0.30 = 35000 hours. Yearly capacity is 35000 × 12 = 420000 hours.

Fixed capital employed in both department = 40.00 Lakhs (25 lakhs + 15 Lakhs)

Expected return	= 0.21 × 40,00,000	= 840000
Contribution per hour	= 840000 / 4200000	= 2.00 per hour
Working Capital	= 0.21 × 400000	= 84000

Contribution per unit 84000 / 18000 unit = 4.67 per unit

Total contribution required	Rs.
To cover fixed cost 3 hours of A and 4 of B = 7 × 2	= 14.00
To working capital	= 4.67
	18.67

Fixed charges recovery is based on usage. Full capacity is not being used by product Z and departments are also producing other products using same plant and machinery.
Price of Product = Variable cost + contribution required = 175 + 18.67 = 193.67 per unit.

(ii) Price of product when product is well established in market:

Variable Cost	175
Fixed Cost (24 + 16)	40
Total price	215

The product is first time launched in the market, and then variable cost Rs.175 should form the basis for price fixation.

Ans. 27:

(a)

		Rs./u of alloy
Materials:		
Iron 10kg @ Rs.5/-	50	
Copper 5 kg @ Rs.8/-	40	90
Wages		
X : 3 hrs @ 15 Rs./Hr.	45	
Y : 5 hrs @ 12 Rs./Hr	60	105
Variable OH (Production)		
X : 8 hrs × 3 hrs	24	
Y : 5 hrs × 5 hrs	25	49
Variable OH – Selling		20
Total Variable Cost		264
Fixed Off:		
X : 8/hrs × 3 hrs.	24	
Y : 5/hrs × 5 hrs	25	49
Total Cost		313

(i) If pricing strategy is to penetrate the market, the minimum price for a new product should be the variable cost i.e. Rs.264/-. In some circumstances, it can also be sold below the variable cost, if it is expected to quickly penetrate the market and later absorb a price increase. Total Variable Cost is the penetration price.

(ii) When the alloy is well established, the minimum selling price will be the total cost – including the fixed cost i.e. Rs.313 per unit. Long run costs should cover at least the total cost.

Ans. 28: **XYZ Ltd.**

Sales in X (rearranged for the purpose of ranking)

Rank	Category	Stock(Rs.'000)	Cum. Sales(Rs.'000)	%

1	OTC	175	175	21.9
2	Toiletries	150	325	40.6
3	Photo	125	450	56.3
4	Food/ Drink	100	550	68.8
5	Baby	50	600	75.0
5	San. Prod.	50	650	81.3
5	Other	50	700	81.3
8	Foot Care	30	730	91.3
9	Cosmetics	25	755	94.4
10	Hair-care	25	780	97.5
11	Perfume	20	800	100.0

Stock in X (rearranged for the purpose of ranking)

Rank	**Category**	**Stock(Rs.'000)**	**Cum. Sales(Rs.'000)**	**%**
1	Toiletries	60	60	26.1
2	Cosmetics	40	100	43.5
3	OTC	35	135	58.7
4	Photo	20	155	67.4
4	Food/ Drink	20	175	76.1
6	Other	13	188	81.7
7	Baby	10	198	86.1
7	San. Prod.	10	208	90.4
7	Hair	10	218	94.8
7	Perfume	10	228	99.1
11	foot care	2	230	100.0

Sales in Z (Rearranged for ranking)

Rank	**Category**	**Stock(Rs.'000)**	**Cum. Sales(Rs.'000)**	**%**
1	OTC	120	120	24
2	Toiletries	100	220	44
3	Food/ Drink	75	295	59
4	Photo	60	355	71
5	Cosmetics	30	385	77
6	Baby	25	410	82
6	San. Prod.	25	435	87
6	Other	25	460	92
9	Foot care	20	480	96
10	Hair	10	490	98
11	Perfume	10	500	100

Sales in Z (Rearranged for ranking)

Rank	**Category**	**Stock (Rs.'000)**	**Cum. Sales(Rs.'000)**	**%**
1	Toiletries	65	65	30.2
2	Cosmetics	45	110	51.2
3	OTC	40	150	69.8
4	Food/ Drink	20	170	79.1
5	Photo	12.5	182.5	84.9
6	Perfume	7.5	190	88.4
7	Baby	5	200	93.0
7	San. Prod.	5	200	93.0
7	foot care	5	205	95.3
7	Hair	5	210	97.7
7	Other	5	215	100.0

Ans. 44: Annual Relevant Costs of Current Production System and JIT Production System for Evans Corporation.

	Relevant Costs under	**Relevant Costs under**

Relevant Items	Current Production System	JIT Production System
Annual tooling costs	-	Rs.1,50,000
Required return on investment:		
12% per year x Rs.9,00,000 of average inventory per year	Rs.1,08,000	-
12% per year x Rs.2,00,000 of average inventory per year	-	24,000
Insurance , space, materials handling , and setup costs	2,00,000	1,40,000[a]
Rework costs	3,50,000	2,80,000[b]
Incremental revenues from higher selling prices	-	(90,000)[c]
Total net incremental costs	Rs.6,58,000	Rs.5,04,000
Annual difference in favor of JIT production	Rs.1,54,000	

[a]Rs. 200,000 (1-0.30) = Rs.140,000
[b]Rs. 350,000 (1-0.20) = Rs.280,000
[c]Rs. 3x30,000 units = Rs.90,000

(a) Personal observation by production line workers and managers is more effective in JIT plants than in traditional plants. A JIT plant's production process layout is streamlined. Operations are not obscured by piles of inventory or rework. As a result, such plants are easier to evaluate by personal observation than cluttered plants where the flow of production is not logically laid out.

Besides personal observation, non financial performance measures are the dominant methods of control. Non financial performance measures provide most timely and easy to understand measures of plant performance. Examples of non financial performance measures of time, inventory, and quality include:

- Manufacturing lead time
- Units produced per hour
- Machine setup time / manufacturing time4
- Number of defective units / number of units completed.

In addition to personal observation and non financial performance measures. Financial performance measures are also used. Examples of financial performance measures include.

- Cost of rework
- Ordering costs
- Stock out costs
- Inventory turnover

(3b) The success of a JIT system depends on the speed of information flows from customers to manufactures to suppliers. The Enterprise Resource Planning (ERP) system has a single database, and gives lower-level managers, workers, customers, and suppliers access to operating information. This benefit, accompanied by tight coordination across business function, enables the ERP system to rapidly transmit information in response to changes in supply and demand so that manufacturing and distribution plans may be revised accordingly.

Ans. 45: (i) Comparative Statement of cost for purchasing from Y Co Ltd under current policy & JIT

Particulars	**Current Policy**	**JIT**
	Rs	Rs
Purchasing cost	18,20,000 (13,000 × 140)	18,20,260 (13,000 × 140.02)
Ordering cost	26 (2×13 orders)	260 (2×130 orders)
Opportunity carrying cost	10,500.00 (1/2×1000×140×15%)	1,050.15 (1/2×100×140.02×15%)
Other carrying cost(Insurance, material handling etc)	1,550.00 (1/2×1000×3.10)	155
Stock out cost		200 (4 × 50)
Total relevant cost	18,32,076	18,21,925.15

Comments: As may be seen from above, the relevant cost under the JIT purchasing policy is lower than the cost incurred under the existing system. Hence, a JIT purchasing policy should be adopted by the company.

(ii) Statement of cost for purchasing from Z Co Ltd.

Particulars	Rs.
Purchasing cost	1,76,800 (13,000x13.60)
Ordering Cost	260 (2x130 orders)
Opportunity Carrying Cost	102 (1/2×100×13.60× 15%)
Other Carrying Cost	150 (1/2×100×3.00)
Stock out Cost	2,880 (8x360)
Inspection Cost	650 (13,000 x .05)
Customer Return Cost	6,500.00 (13,000 x 2% x 25)
Total Relevant Cost	1,87,342

Comments : The comparative costs are as follows,

Under current policy	Rs 18,32,076.00
Under purchase under JIT	Rs 18,21,925.10
Under purchase from Z Co Ltd	Rs 1,87,342.00

Packages should be bought from Z Co as it is the cheapest.

Ans. 60: (i)

Statement of Profitability of E Ltd. in Existing Situation

	A	B	C	Total
No. of units	10,000	25,000	20,000	
	Rs.	Rs.	Rs.	
Selling Price per unit	40	75	85	
Less: Variable Cost per unit				
Direct Material	10	14	18	
Direct wages	8	12	10	
Variable Overhead	8	9	10	
Contribution per unit	14	40	47	
Total Contribution	1,40,000	10,00,000	9,40,000	20,80,000
Less: Fixed Cost	1,60,000	4,50,000	4,00,000	10,10,000
Net Profit	**-20,000**	**5,50,000**	**5,40,000**	**10,70,000**

Calculation of overall profit under each proposal

(ii)(a) If Product A is discontinued and capacity released is utilized for either B, either C or for both B and C

Revised contribution of Product B and Product C.

	B(Rs.)	C (Rs.)
Selling Price per unit	73.50 (75 – 2% of 75)	80.75 (85 – 5% of 85)
Less: Variable cost per unit		
Direct Material	15.40 (14 + 10%of 14)	18.90 (18 + 5%of 18)
Direct Wages	12.00	10.00
Variable Overhead	9.00	10.00
Contribution per unit	37.10	41.85

Profitability Statement

Option 1	Option 2	Option3- Both B and C equally	
Only B	Only C	B	C

No. of Units (as per W.N.1)	6,666	8,000	3,333	4,000
	Rs.	Rs.	Rs.	Rs.
Additional contribution	2,47,308.6	3,34,800	1,23,654.3	1,67,400
			2,91,054.3	
Savings from Fixed Cost of A	1,60,000	1,60,000	1,60,000	
Reduction in contribution from A	1,40,000	1,40,000	1,40,000	
Net Increase in Profit	267308.6	3,54,800	3,11,054.3	
Existing Profit	10,70,000	10,70,000	10,70,000	
Total Profit	1337308.6	**14,24800**	3,31,054.3	

Hence, it is better to produce Product C only.

(ii)(b) Discontinue Product A and divert the capacity to produce Product D

	A	B	C	Total
Sales (units)	10,000	25,000	20,000	
Labour Hrs. per unit	4	6	5	
Total Labour Hours	40,000	1,50,000	1,00,000	2,90,000
Idle Capacity (hours)	2,90,000 * 20 / 80			72,500
Capacity released of A				40,000
Total hours released				1,12,500
Hours per unit				4
No. of units that can be produced				28,125

Profitability Statement

No. of units	28,125
	Rs.
Selling Price per unit	60
Less: Variable Cost per unit	
Direct Material	28
Direct wages	12
Variable Overhead	6
Contribution per unit	14
Additional Contribution (D)	3,93,750
Less: Additional Fixed Cost	1,05,500
Additional Net Profit	2,88,250
Add: Existing Profit (B & C)	10,90,000
Total Profit	**13,78,250**

(c) If we hire out the idle capacity

	Rs.
Idle hrs.	72,500
Profit per hour (10,70,000 / 2,90,000)	3.69
Total Profit	2,67,500
Existing Profit	10,70,000
Total Profit	**13,37,500**

Decision : Better to produce product C as per proposal (a)

Working Note-1: Hours release on discontinuation of Product A = 10,000 * 4

Only B	Only C	B and C equally
40,000 / 6 = 6,666	40,000 / 5 = 8,000	B- 3333 and C- 4000

Ans. 64: Kitchen King's Score card should describe its product differentiation strategy. The key points that should be included in its balance score card are

- Financial Prospective – Increase in operating income by charging higher margins on Maharaja.
- Customer Prospective – Market share in high-end kitchen range market and customer satisfaction.
- Internal business perspectives: Manufacturing quality, order delivery time, on time delivery and new product feature added.
- Learning and Growth prospective: Development time for designing new end product and improvement in manufacturing process.

Operative Income:

	(Amount in 000 Rs.)	
	2003	2004
Revenue (40000×1000: 42000×1100)	40000	46200
Direct Material	12000	13530
Conversion cost	10000	11000
Selling and Customer service	7200	7250
Total cost	29200	31780
Operative Income	10800	14420

Change in operating Income 36, 20,000 (F)

A. *Growth Component*

(a) Revenue effect = Output Price in 2003{Actual units sold in 04 – Actual units sold in 03}
= Rs.1, 000 (42,000 units – 40,000 units)
= Rs.20, 00,000 (F)

(b) The cost effect = Input price in 2003{Actual units of input to produce 2003 output less Actual units of input which would have been used to produce year 2004 output on the basis of 2003}

(i) Direct Material = Rs.100 [1, 20,000sqft – 1, 20,000sqft × $\frac{\text{42000 units}}{\text{40000 units}}$]
= Rs.6, 00,000 (A)

(ii) Conversion cost and selling and customer service will not change since adequate capacity exists in 2003 to support 2004 output and customers.
Hence variance
Conversion cost = 200(50000 – 50000) = 0
S & Customer Service = 25000(300 – 300) = 0
Increase in operating effect of Growth component is Rs14, 00,000 (F)

B. *Price recovery Component:*

(i) Revenue effect = Actual output in 2004 [Selling price per unit in 2004 less Selling price per unit in 2003]
= 42,000units (Rs.1, 100 – Rs1, 000) = Rs.42, 00,000 (F)

(ii) Cost effect = Unit of input based on 2003 actual that would have been used to produce 2004 output {Input prices per unit in 2003 less Input prices per unit in 2004}

(a) Direct material = 1, 26,000sqft (Rs.100/sqft – Rs.110/sqft)
= Rs.12, 60,000 (A)

(b) Conversion Cost = 50,000 units (Rs.200/unit –Rs.220/unit)
= Rs.10, 00,000 (A)

(c) S & Custr Service = 300 customers (Rs.24, 000 –Rs.25,000)
= Rs.3,00,000 (A)
= Rs.25, 60,000 (A)

Increase in Operating income due to Price Recovery is Rs.16, 40,000 (F) {Rs.42, 00,000 – Rs.25, 60,000}

(C) *Productivity Component*

Productivity component = Input Prices in 04 {Actual units of input which would have been used to produce year 2004 output on the basis of 2003 actual less Actual Input}

(i) *Direct Material:* Rs.110/sqft (1, 26,000 units – 1, 23,000 units) = Rs.3, 30,000(F)
(ii) *Conversion Cost:* Rs.200/unit (50,000 units – 50,000 units) = 0
(iii) Selling & Customer = Rs.25, 000 (300 customers – 290 customers)
= Rs.2,50,000 (F)
= Rs. 5,80,000 (F)

The change in operating income from 2003 to 2004 is analyzed as follows:

(Amount in 000 Rs.)

	2003	Growth component	Price recovery	Cost effect of productivity component	2004
Revenue	40000	2000 (F)	4200 (F)	----------	46200
Cost	29200	600 (A)	2560 (A)	580 (F)	31780
Operating Income	10800	1400(F)	1640 (F)	580 (F)	14420