

PAPER – 5 : COST MANAGEMENT

Question Nos. 1 is compulsory.

Answer any four questions from the rest.

Working notes should form part of the answer.

Question 1

- (a) TQM Limited makes engines for motor cars for its parent company and for two other motor car manufacturers. (11 Marks)

On 31st December, the company has sufficient work order for January and one further order for 21,000 engines. Due to recession in the economy, no further order are expected until May when it is hoped economic prospect for the motor car industry will have improved. Recently factory has been working at only 75% of full capacity and the order for 21,000 engines represents about one month production at this level of activity.

The board of directors are currently considering following two options:

- (i) Complete the order in February and close the factory in March and April.

OR

- (ii) Operate at 25 per cent of full capacity for each of three months of February, March and April.

The costs per month at different levels of activities are as follows:

	At 75% (Rs.)	At 25% (Rs.)	Idle (Rs.)
Direct Material	5,25,000	1,75,000	--
Direct Labour	5,23,600	1,73,250	--
Factory overhead:			
Indirect material	8,400	4,900	4,900
Indirect labour	1,01,500	59,500	--
Indirect expenses:			
Repairs and maintenance	28,000	28,000	--
Others expenses	52,500	34,300	26,600
Office overheads:			
Staff salaries	1,48,400	98,000	67,550
Other overheads	28,000	19,950	11,200

Other information is as follows:

- Material cost and labour cost will not be incurred where there is no production.

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- On the reopening of the factory, one time cost of training and engagement of new personnel would be Rs.65,800 and overhauling cost of plant would be Rs.14,000.
- Parent company can purchase engines from open market at reasonable price.

Required:

- (i) To express your opinion, along with calculations, as to whether the plant should be shut down during the month of March and April or operate 25% of full capacity for three months.
- (ii) To list and comment on cost and non-costs factors which might be relevant to the discussion.

(b) The following are Product Nova Shaft's data for next year budget: (9 Marks)

Activity	Cost Driver	Cost Driver volume/year	Cost Pool
Purchasing	Purchase orders	1,500	Rs.75,000
Setting	Batches produced	2,800	Rs.1,12,000
Materials handling	Materials movements	8,000	Rs.96,000
Inspection	Batches produced	2,800	Rs.70,000
Machining costs	Machine hours	"50,000"	Rs.1,50,000

Purchase orders	25
Output	15,000 units
Production batch size	100 units
Materials movements per batch	6
Machine hours per unit	0.1

Required:

- (i) Calculate the budgeted overhead costs using activity based costing principles.
 - (ii) Calculate the budgeted overhead costs using absorption costing (absorb overhead using machine hours).
 - (iii) How can the company reduce the ABC for Product Nova Shaft?
- (c) Explain goals and performance measure for each perspective of Balance Score Card.

(4 Marks)

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Answer

(a) (i)

	Option I At 75% in Feb and close in March and April (Rs.)	Option II At 25% each from Feb – April (Rs.)
Direct Material	5,25,000	5,25,000
Direct Labour	5,23,600	5,19,750
	10,48,600	10,44,750
Factory Overhead :		
Indirect Material	8,400	14,700
Two months idle	9,800	
Indirect Labour	1,01,500	1,78,500
Training cost	65,800	
Indirect Exp. :		
Repairs & Maintenance	28,000	84,000
Over hauling cost	14,000	
Others Expenses	52,500	1,02,900
Idle × 2	53,200	
Office overhead:		
Staff Salaries	1,48,400	2,94,000
Idle 67,550 × 2	1,35,100	
Other overheads	28,000	59,850
Idle	22,400	
Total overhead cost	6,67,100	7,33,950
Total cost	17,15,700	17,78,700

The more economic course of action is to operate at 75% capacity for a month only, and close the plant for March and April. This option will save (Rs.17,78,700 – Rs.17,15,700) = Rs.63,000.

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(ii) Cost Factors and Non Cost Factors

In regard to the decision on close down of operations or continuing with operations, the factors to be considered are:

(a) Cost factors:

1. The proposal which involves the lower total costs will be selected.

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- (2) If the company has contracted the purchases from high quality and high price suppliers, a change in the procurement policy to 'shop around' may be considered to obtain economics in purchases.
- (3) The services of unskilled labour, if any, who do not require re-training may be dispensed with. They may be recruited and put on work without incurring training cost on re-opening of the factory. This will save training and idle time cost.
- (4) The possibility of wage freeze may reluctantly be considered as an extreme measure.

(b) Non-cost factors:

- (1) If the skilled workers are discharged, it may be difficult to get them back on rolls when the factory is re-opened. Skilled workers may be scarce and training and orientation costs may be heavy on re-opening of the factory. Thus it is advisable to continue operations in the interests of these types of workers.
- (2) Even though the closure is temporary in nature, the competitors may usurp the market and the company may lose a sizable market share on re-opening. To avoid this situation, continuance of production is better.
- (3) It is advisable to continue operations to avoid heavy depreciation of plant and machinery and obsolescence risk.
- (4) Regular customers may switch over to competitor's products and may not return after re-opening of the factory. This may result in reduction in sales.

(b) (i) Computation of the activity based overheads

Step 1: Compute cost per unit of cost driver = Cost pool / cost driver volume

Activity	Cost Driver	Cost Pool (a)	Cost driver volume/yr (b)	Cost/Unit of cost driver (a)/(b)
Purchasing	Purchase orders	Rs.75,000	1,500	Rs.50/purchase order
Setting	Batches produced	Rs.112,000	2,800	Rs.40/batch
Materials handling	Material movements	Rs. 96,000	8,000	Rs.12/movement
Inspection	Batches produced	Rs.70,000	2,800	Rs.25/batch
Machining	Machine hours	Rs.150,000	50,000	Rs.3/machine hour

Step 2: Compute the volume of cost drivers consumed by Product Nova Shaft

Purchase orders (given) = 25

Batches = 15,000/100 = 150

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Materials movement = 150 batches × 6 = 900

Machine hours = 15,000 units × 0.1 = 1,500

Step 3: Compute the Activity Based Overheads Cost for Product Nova Shaft

Activity	Cost Driver	Costing Rate / Cost Driver Unit Rs.		
Purchasing	Purchase orders	50	25 order × Rs.50	Rs.1,250
Setting	Batches produced	40	150 batches × Rs.40	Rs.6,000
Material handling	Material movements	12	900 movement × Rs.12	Rs.10,800
Inspection	Batches produced	25	150 batches × Rs.25	Rs.3,750
Machining	Machine hours	3	1,500 hours × Rs.3	<u>Rs.4,500</u>
				Rs.26,300

- (ii) Computation of budgeted overheads costs for Product Nova Shaft using absorption costing

Budgeted overheads = (Rs.75,000 + Rs.96,000 + Rs.112,000 + Rs.70,000 + Rs.150,000) = Rs.503,000

Budgeted absorption cost/machine hour = Rs.503,000 / 50,000 = Rs.10.06

Budgeted machining hours for Product Nova Shaft = 1,500

Budgeted absorbed overhead = 1,500 × Rs.10.06 = Rs.15,090

- (iii) Ways in which the company can reduce the ABC for product Nova Shaft:

- Reduce the number of batches by increasing the batch size which will then reduce the setting up overhead, materials handling and inspection costs.
- Reduce the number of purchase orders
- Innovate ways of speeding up production so that the machining hours are reduced.

- (c) Goals and performance measures for each perspective of balance scorecard.

Customer Perspective

Goals	Performance Measures
Price	Competitive price
Delivery	Number of on time delivery, lead time from receipt of order to delivery to customer.

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Quality	Own quality relative to industry standards, number of defects or defect level.
Support	Response time, customer satisfaction survey.

Internal Business Perspective

Goals	Performance Measures
Efficiency of manufacturing process	Manufacturing cycle time
Sales penetration	Sales plan, Increase in number of customer in a unit of time.
New Product introduction	Rate of new product introduction.

Innovation and Learning Perspective

Goals	Performance Measures
Technology leadership	Performance of product, use of technology
Cost leadership	Manufacture overhead per quarter
Market leadership	Market share in all major markets
Research and development	Number of new products, Patents

Financial Perspective

Goals	Performance Measures
Sales	Revenue and profit growth
Cost of Sales	Extent in remain fixed or decreased each year
Profitability	Return on capital employed
Prosperity	Cash flows

Question 2

- (a) A company is organized on decentralized lines, .with each manufacturing division operating as a separate profit centre. Each division manager has full authority to decide on sale of division's output to outsiders or to other divisions. Division AB manufactures a single standardized product. Some output is sold externally and remaining is transferred to division XY where it is a subassembly in the manufacture of the division product. The unit cost of division AB product and division XY is as follows: (12 Marks)

	Division AB (Rs.)	Division XY (Rs.)
Transfer from division AB to XY	--	42.00
Direct Material	6.00	35.00
Direct Labour	3.00	4.50
Direct expenses	3.00	--

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Variable manufacturing overheads	3.00	18.00
Fixed manufacturing overheads	6.00	18.00
Variable selling and packing expenses	3.00	2.50
	24.00	120.00

Division AB sold 40,000 units annually at the standard price of Rs.45 in external market. In additions to the external sales, 10,000 units are transferred annually to division XY at internal price of Rupees 42 per unit. Variable selling and packing expenses are not incurred by supplying division- for the internal transfer of the product. Division XY incorporates the transferred goods into more advance product. The manager of division XY disagrees with the basis used to set the transfer price. He argues that transfer price should be made at variable cost since he claims that his division is taking output that division AB should be unable to sell at price Rs.45.

He also submitted a report of the relationship between selling price and demand to support of his disagreement. The report of customer demand at various selling prices for division AB and for division XY is as follows:

Division AB

Selling price per unit (Rs.)	30	45	60
Demand (Units)	60,000	40,000	20,000

Division XY

Selling price per unit (Rs.)	120	135	150
Demand (Units)	15,000	10,000	5,000

The company has sufficient capacity to meet demand at various selling prices. Internal transfer demanded units will be decided by XY division.

Required:

- (i) To calculate divisional profitability and overall profitability of company if division AB transfers demanded units to XY at price of Rs. 42.
 - (ii) To calculate divisional profitability and overall profitability of company if division AB transfers demanded units to XY at variable cost.
 - (iii) In place of internal transfers, AB division can sell 10,000 units of their product in new external market without effecting existing market, at price Rs. 32 per unit and XY division can 'purchase these units at the rate of Rs. 31 in open market. Calculate company's profit by following above strategies.
- (b) Define the term 'value-chain'. Mention three 'useful strategic frameworks of the value-chain analysis. (4 Marks)
- (c) Meena is a news reporter and feature writer for an economic daily. Her assignment is to develop a feature article on 'Product Life-cycle Costing', including interviews with the Chief Financial Officers (CFO) and operating managers. Meena has been given a liberal

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budget for travel so as to research into company's history, operations, and market analysis for the firm she selects for the article. (3 Marks)

Required:

- (i) Meena has asked you to recommend industries and firms that would be good candidates for the article. What would you advice? Explain your recommendations.

Answer

- (a) (i) AB sells product at external market

Selling price (Rs.)	30	45	60
Less Variable cost	18	18	18
Contribution (per unit)	12	27	42
Demands (units)	60,000	40,000	20,000
Total contribution	7,20,000	10,80,000	8,40,000

Optimal output is 40,000 units at a selling price of Rs.45

AB transfer at Rs.42 to XY division then contribution of XY

Selling price (Rs.)	120	135	150
Less Variable cost V+TP (42+60)	102	102	102
Contribution (per unit)	18	33	48
Demands (units)	15,000	10,000	5,000
Total contribution	2,70,000	3,30,000	2,40,000

Manager will choose out put level 10,000 units at a selling price of Rs.135.

Overall profit when transfer made at Rs.42

Division AB contribution on 10,000 units $[42 - (18 - 3)]$ = 2,70,000

Division XY contribution 10,000 $(135 - 102)$ = 3,30,000

Total contribution = 6,00,000

Division AB contribution from external market sale 10,80,000

Total profit 16,80,000

- (ii) AB transfer at variable cost

Selling price (Rs.)	120	135	150
Less Variable cost (15+60)	75	75	75
Contribution (per unit)	45	60	75
Demands (units)	15,000	10,000	5,000
Total contribution	6,75,000	6,00,000	3,75,000

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Optimal is 15,000 units at the rate of 120 per unit.

If AB transfer at Variable cost (Rs.15) then no contribution will be generated by AB division

XY division choose 15,000 units level gives contribution $15,000 \times 45 = 6,75,000$

Division AB contribution from external market sale = 10,80,000

Total contribution = 17,55,000

- (iii) Contribution AB division by selling 10,000 units to new external market at Rs.32 and XY division purchasing at Rs.31.

Contribution $(32 - 18) \times 10,000 = 1,40,000$

XY contribution $[135 - (31 + 60)] = 4,40,000$

Division AB contribution from external market sale = 10,80,000

Total contribution = 16,60,000

- (b) Value chain is the linked set of value-creating activities all the way from basic raw material sources for component suppliers through to the ultimate end-use product or service delivered to the customer. Porter's described the value chain as the internal processes or activities a company performs "to design, produce, market, deliver and support its product". He further stated that "a firm's value chain and the way it performs individual activities are a reflection of its history, its strategy, its approach of implementing its strategy, and the underlying economics of the activities themselves". The business activities are classified in to primary activities and support activities.

Primary activities are those activities which are involved in transforming the inputs in to outputs, delivery and after sales service. Support activities are intended to support the primary activities like for example procurement, human resources management, etc.

Three useful strategic frameworks for value chain analysis are:

- Industry structure analysis;
- Core competencies; and
- Segmentation analysis.

- (c) The product life cycle span the time from the initial R & D on a product to when customer service and support is no longer offered for that product.

Life Cycle Costing technique is particularly important when:

- (a) High percentage of total life-cycle costs are incurred before production begins and revenue are earned over several years and
- (b) High fraction of the life cycle costs are locked in at the R & D and design stages.

Meena should identify those industries and then companies belonging to those industries where above mentioned feature are prevalent. For example, Automobile

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and Pharmaceutical Industries companies like Tata Automobile, M&M, Ranbexy and Dabur will be good candidates for study on product life cycle costing.

Question 3

- (a) JBC Limited, a manufacturing company having a capacity of 60,000 units has prepared a following cost sheet: (9 Marks)

Direct material (per unit)	Rs.12.50
Direct wages (per unit)	Rs.5.00
Semi-variable cost	Rs.30,000 fixed plus 0.50 per unit
Factory overhead (per unit)	Rs.10.00 (50% fixed)
Selling and administration overhead (per unit)	Rs.8.00 (25% variable)
Selling price (per unit)	Rs.40

During the year 2008, the sales volume achieved by the company was 50,000 units.

The company has launched an expansion program as under

- (a) The capacity will be increased to 1,00,000 units.
- (b) The cost of investment on expansion is Rs.5 lakhs which is proposed to be financed through financial institution at 12 per cent per annum.
- (c) The depreciation rate on new investment is 10 per cent based on straight line.
- (d) The additional fixed overheads will amount to Rs.2.00 lakhs up to 80,000 units and will increase by Rs.80,000 more beyond 80,000 units.

After the expansion, the company has two alternatives for operating the expanded plant as under:

- (i) Sales can be increased up to 80,000 units by spending Rs. 50,000 on special advertisement campaign to explore new market.
- (ii) Sales can be increased up to 1,00,000 units subject to the following:
 - (a) Reduction of selling price by Rs.4 per unit on all the units sold.
 - (b) The direct material cost would go down by 4 per cent due to discount on bulk buying.
 - (c) By increasing the variable selling and administration expenses by 4 per cent.

Required.

- (i) Construct a flexible budget at the level 50,000 units, 80,000 units and 1,00,000 units of production and select best profitable level of operation.
 - (ii) Calculate break even point both before and after expansion.
- (b) State major reasons for using simulation technique to solve a problem and also describe basic steps in a general simulation process. (5 Marks)

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- (c) What is penetrating pricing? What are the circumstances in which this policy can be adopted? (5 Marks)

Answer

(a) Flexible Budget

Output level (units)	50,000 (Rs. in lakhs)	80,000 (Rs. in lakhs)	1,00,000 (Rs. in lakhs)
Sales	20.00	32.00	36.00
Direct Material 12.5 per unit (reduction for 1,00,000 units by Rs.0.50)	6.25	10.00	12.00
Direct wages (5.00 per unit)	2.50	4.00	5.00
Semi variable cost (variable)	0.25	0.40	0.50
Factory overhead (V) Rs.5 per unit)	2.50	4.00	5.00
Selling and Adm. (25% variable)	<u>1.00</u>	<u>1.60</u>	<u>2.08</u>
Total variable cost	<u>12.50</u>	<u>20.00</u>	<u>24.58</u>
Contribution	<u>7.50</u>	<u>12.00</u>	<u>11.42</u>
Fixed factory overheads (5×60,000)	3.00	3.00	3.00
Selling and adm. (6 × 60,000)	3.60	3.60	3.60
Semi variable fixed part	.30	.30	.30
Increase due to expansion		2.00	2.80
Interest		.60	.60
Depreciation		.50	.50
Special Advertisement exp.	<u>—</u>	<u>.50</u>	<u>—</u>
Total fixed costs	<u>6.90</u>	<u>10.50</u>	<u>10.80</u>
	<u>0.60</u>	<u>1.50</u>	<u>0.62</u>

Therefore activity level 80,000 units is most profitable level.

Calculation of Break even point

P/V ratio

$7.5/20.00 \times 100 = 37.5\%$, $12.00/32.00 \times 100 = 37.5\%$, $11.42/36.00 \times 100 = 31.72\%$ BEP (value)

$= 6.90/37.5\% = \text{Rs.}18,40,000$, $10.50/37.5\% = \text{Rs.}28,00,000$, $10.80/31.72\% = 34,04,792$

BEP (Units)

$\frac{6.90 \text{ lakhs}}{\text{Rs.}15}$	$\frac{10.50 \text{ lakhs}}{\text{Rs.}15}$	$\frac{10.80 \text{ lakhs}}{\text{Rs.}15}$
= 46,000 units	= 70,000 units	= 94,571 units

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Alternative Solution (BEP in Sales)

Break Even Point in value of sales: $(F \times S) / (S - V)$

At 50000 units' level : $(6,90,000 \times 20,00,000) / 7,50,000 = \text{Rs. } 18,40,000$

At 80000 units' level : $(10,50,000 \times 32,00,000) / 12,00,000 = \text{Rs. } 28,00,000$

At 100000 units' level : $(10,80,000 \times 36,00,000) / 11,42,000 = \text{Rs. } 34,04,553$

(b) Reasons:

- (i) It is not possible to develop a mathematical model and solutions with out some basic assumptions.
- (ii) It may be too costly to actually observe a system.
- (iii) Sufficient time may not be available to allow the system to operate for a very long time.
- (iv) Actual operation and observation of a real system may be too disruptive.

Steps:

- (i) Define the problem or system which we want to simulate.
- (ii) Formulate an appropriate model of the given problem.
- (iii) Ensure that model represents the real situation/ test the model, compare its behaviour with the behaviour of actual problem environment.
- (iv) Identify and collect the data needed to list the model.
- (v) Run the simulation
- (vi) Analysis the results of the simulation and if desired, change the solution.
- (vii) Return and validate the simulation.

(c) The penetration pricing policy implies charging a low price to deter entry of competitors and to expand market share. Circumstances of penetration policy:

- The short run price elasticity of demand is high. By charging a low price, the first entrant is able to establish a market.
- Economies of scale are significant. By entering at a large scale the first firm can both enjoy low average cost and impose a cost penalty on any small scale subsequent entrant.
- Exploitation of established reputation / sales, marketing, distribution strengths. Create platform form for continued sale of related products.
- When there is a threat of competition. It depicted at maturity stage of a product in its life-cycle.

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Question 4

- (a) A project with normal duration and cost along with crash duration and cost for each activity is given below: (12 Marks)

Activity	Normal Time (Hrs.)	Normal Cost (Rs.)	Crash Time (Hrs.)	Crash Cost (Rs.)
1-2	5	200	4	300
2-3	5	30	5	30
2-4	9	320	7	480
2-5	12	620	10	710
3-5	6	150	5	200
4-5	0	0	0	0
5-6	8	220	6	310
6-7	6	300	5	370

Required:

- (i) Draw network diagram and identify the critical path.
 - (ii) Find out the total float associated with each activity.
 - (iii) Crash the relevant activities systematically and determine the optimum project completion time and corresponding cost.
- (b) A factory is going to modify of a plant layout to install four new machines M1, M2, M3 and M4. There are 5 vacant places J, K, L, M and N available. Because of limited space machine M2 cannot be placed at L and M3 cannot be placed at J. The cost of locating machine to place in Rupees is shown below: (7 Marks)

	(Rs.)				
	J	K	L	M	N
M1	18	22	30	20	22
M2	24	18	--	20	18
M3	--	22	28	22	14
M4	28	16	24	14	16

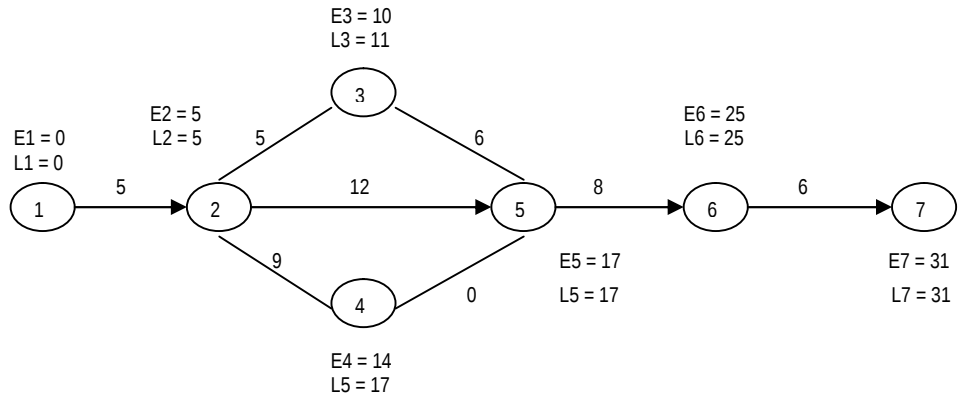
Required:

Determine the optimal assignment schedule in such a manner that the total costs are kept at a minimum.

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Answer

(a) (i) Net work diagram



Path are

- 1-2-5-6-7 = 31 hours, this is critical path
- 1-2-3-5-6-7 = 30 hours
- 1-2-4-5-6-7 = 28 hours

(ii) Total floats

Activity	Duration hours	Early start	Latest start	Early finish	Latest finish	Total float
1-2	5	0	0	5	5	0
2-3	5	5	6	10	11	1
2-4	9	5	8	14	17	3
2-5	12	5	5	17	17	0
3-5	6	10	11	16	17	1
4-5	0	14	17	14	17	3
5-6	8	17	17	25	25	0
6-7	6	25	25	31	31	0

(iii) Calculation of crashing

Activity	Nt	Nc	Ct	Cc	Slop = (Cc-Nc) / (Nt-Ct)
1-2	5	200	4	300	100
2-3	5	30	5	30	0
2-4	9	320	7	480	80
2-5	12	620	10	710	45
3-5	6	150	5	200	50
4-5	0	0	0	0	0

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5-6	8	220	6	310	45
6-7	6	300	5	370	70

The critical path activities are 1-2 2-5 5-6 6-7

Slope 100 45 45 70

Two activities cost slope cost is minimum (2-5 and 5-6) but activity 5-6 is common and critical, it also continuing so reduce by 2 hours, then reduce activity 2-5 by one hour.

	Activity	From-to	Project durations	Cost
I	5-6	8-6 hours	31-2 = 29	$1840 + (2 \times 45) + (29 \times 50) = 3380$
II	2-5	12-11	29-1 = 28	$1840 + 90 + (1 \times 45) + 28 \times 50 = 3375$

After this reduction now two paths are critical 1-2-3-5-6-7 = 28 and 1-2-5-6-7 = 28

So 1-2 3-5 6-7
2-5
Slope cost 100 50+45=95 70

As cost per hour for every alternative is greater than Rs.50 (overhead cost per hour). Therefore, any reduction in the duration of project will increase the cost of project completion. Therefore, time for projects is 28 weeks, minimum cost is Rs.3375.

- (b) Dummy machine (M5) is inserted to make it a balanced cost matrix and assume its installation cost to be zero. Cost of install at cell M3 (J) and M2 (L) is very high marked as é.

	J	K	L	M	N
M1	18	22	30	20	22
M2	24	18	é	20	18
M3	é	22	28	22	14
M4	28	16	24	14	16
M5 (Dummy)	0	0	0	0	0

Step 1

Subtract the minimum element of each row from each element of that row

	J	K	L	M	N
M1	0	4	12	2	4
M2	6	0	é	2	0
M3	é	8	14	8	0

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M4	14	2	10	0	2
M5 (Dummy)	0	0	0	0	0

Step 2

Subtract the minimum element of each column from each element of that column

	J	K	L	M	N
M1	0	4	12	2	4
M2	6	0	e	2	0
M3	e	8	14	8	0
M4	14	2	10	0	2
M5 (Dummy)	0	0	0	0	0

Step 3

Draw lines to connect the zeros as under:

	J	K	L	M	N
M1	0	4	12	2	4
M2	6	0	e	2	0
M3	e	8	14	8	0
M4	14	2	10	0	2
M5 (Dummy)	0	0	0	0	0

There are five lines which are equal to the order of the matrix. Hence the solution is optimal. We may proceed to make the assignment as under:

	J	K	L	M	N
M1	0	4	12	2	4
M2	6	0	e	2	0
M3	e	8	14	8	0
M4	14	2	10	0	2
M5 (Dummy)	0	0	0	0	0

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The following is the assignment which keeps the total cost at minimum:

Machines	Location	Costs Rs.
M1	J	18
M2	K	18
M3	N	14
M4	M	14
M5 (Dummy)	L	<u>0</u>
Total		<u>64</u>

Question 5

- (a) Global Limited uses standard and marginal costing system. It provides the following details for the year 2007-08 relating to its production, cost and sales: (9 Marks)

Particulars	Budget	Actual
Sales units	24,000	25,600
Sales value	6,000	6,784
Materials	960	1,080
Labour	1,440	1,664
Variable overheads	2,400	2,592
Total variable cost	4,800	5,336

The sales budget is based on the expectation of the company's estimate of market share of 12%. The entire industry's sales of the same product for the year 2007-08 is 2,40,000 units. Further details are as follows:

(In Rs.)		
Particulars	Standard	Actual
Material price per kg.	8.00	7.50
Labour rate per hour	6.00	6.40

You are required to :

- Prepare a statement reconciling the budgeted contribution with actual contribution on the basis of important material variances, labour variances, variable overhead variances and sales variances.
- Compute market size variance and market share variance.

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- (b) Fairbilt Furniture Ltd. manufactures three products: Tables, Chairs and Cabinets. The company is in the process of finalizing the plans for the coming year; hence the executives thought it would be prudent to have a look at the product-wise performance during the current year. The following information is furnished: (10 Marks)

	Tables	Chairs	Cabinets
Unit selling price	80	60	36
Direct material	28	24	16
Direct labour	20	12	12
Factory overheads:			
Variable	8	6	4
Fixed	8	6	1.28
Cost of production	64	48	33.28
Selling, distribution and general administration expenses :			
Variable	4	2	2
Fixed	4	6	1.52
Unit cost (I)	72	56	36.80
Unit profit (loss) (II)	8	4	(0.80)
Sales volume (units)	10,000	15,000	15,000
Profit (loss)	80,000	60,000	(12,000)

For the coming period, the selling prices and the cost of three products are expected to remain unchanged. There will be an increase in the sales of tables by 1,000 units and the increase in sales of cabinets is expected to be 8,000 units. The sales of chairs will remain to be unchanged. Sufficient additional capacity exists to enable the increased demands to be met without incurring additional fixed costs. Some among the executives contend that it will be unwise to go for additional production and sale of cabinets, since it is already making losses at Rs.0.80 per unit. The suggestion is that cabinets should be eliminated altogether.

Do you agree? Substantiate with necessary analysis and determine the product wise and overall profits for the coming year.

Answer

- (a) Sales variances

Budgeted Sales	Rs.6000
Budgeted sales quantity	24000
Budgeted selling price	$6000/24000 = \text{Rs.}0.25$
Actual industry sales in units	240000
Budgeted market share	12%
Hence market share required:	$240000 \times 12\% = 28800 \text{ units}$

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SQ	RSQ	AQ	SP	SQ × SP	RSQ × SP	AQ × SP	AQ×AP
24000	28800	25600	0.25	6000	7200	6400	6784

Sales Market Size variance 6000-7200 = Rs.1200 F

Sales Market Share Variance: 7200-6400 = Rs. 800 A

Sales Volume Variance: 6000-6400 = Rs. 400 F

Sales Price variance 6400-6784 = Rs. 384 F

Budgeted contribution:

Sales Rs.6000

Variable costs Rs.4800

Contribution Rs.1200

Units 24000

Contribution/unit : Rs.0.05

(1200/24000)

SQ	RSQ	AQ	SP	SQ × SP	RSQ × SP	AQ × SP
24000	28800	25600	0.05	1200	1440	1280

Sales Market Size variance: 1200 – 1440 = Rs.240 F

Sales Market Share Variance: 1440 – 1280 = Rs.160 A

Sales Volume Variance 1200 – 1280 = Rs. 80 F

As per the requirement of the question (b)

Sales Market Size variance is Rs.1200 F

Sales Market Share variance is Rs.800 A

Sales Variances:

Sales Gross Margin Market Size variance Rs.240 F

Sales Gross Margin Market Share variance Rs.160 A

Sales Gross Margin Volume Variance: Rs. 80 F

Sales Price Variance Rs.384 F

Direct materials :

Budgeted Material costs Rs.960

Budgeted units 24000

Budgeted material cost per 100 units: = Rs.4.00

(960/24000) × 100

Standard price of Material/ kg = Rs.8

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Standard requirement of materials per 100 units of output : 4/8 = 0.50 kg
 Actual output: = 25600
 Standard requirement for actual output =128kg
 $(25600 \times 0.50)/100$
 Actual material cost: = Rs.1080
 Actual price/kg = Rs.7.50
 Actual quantity of materials consumed: = 144 kg
 $(1080/7.50)$

SQ	AQ	SP	SQ × SP	AQ × SP	AP	AQ × AP
128	144	8	1024	1152	7.50	1080

Usage Variance 1024-1152 = Rs.128 A

Price Variance 1152-1080 = Rs. 72 F

Direct Labour:

Budgeted Labour costs Rs.1440
 Budgeted units 24000
 Budgeted Labour cost per 100 units : = Rs.6.00
 $(1440/24000) \times 100$

Standard Labour hour rate/hour = Rs.6
 Standard requirement of labour hours per 100 units of output:6/6 = 1.00 hour
 Actual output = 25600
 Standard hours required for actual output: $(25600 \times 1)/100$ = 256 hours
 Actual labour cost: = Rs.1664
 Actual direct labour hour rate = Rs.6.40
 Actual hours worked $(1664/6.40)$ = 260 hours
 Budgeted direct labour $(1440/6)$ = 240 hours

SH	AH	SR	SH×SR	AH×SR	AR	AH×AR
256	260	6	1536	1560	6.40	1664

Efficiency Variance 1536 – 1560 = Rs. 24 A

Labour Rate Variance 1560 – 1664 = Rs.104 A

Variable Overheads:

Budgeted variable overheads Rs. 2400
 Budgeted direct labour hours 240

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Budgeted variable overhead rate per direct labour hour: $2400/240 = \text{Rs.}10$

A.	Charged to production : 256 hours × 10	Rs.2560
B.	Standard cost of actual hours : 260 × 10	Rs.2600
C.	Actual overheads	Rs.2592
	Efficiency Variance 2560 – 2600	Rs. 40 A
	Expense variance 2600 – 2592	Rs. 8 F

Contribution analysis:

	Budget	Actual
	Rs.	Rs
Sales	6000	6784
Variable costs	4800	5336
Contribution	1200	1448

Statement of Reconciliation between Budgeted and Actual Contribution

		Rs
Budgeted Contribution		1200
Gross Margin Sales Volume Variance		80 F
Standard Contribution		1280
Sales Price Variance		384 F
Total contribution		1664
Cost Variances:		
	F	A
Material Usage Variance		128
Material Price Variance	72	
Labour Efficiency Variance		24
Labour Rate Variance		104
Variable OH Efficiency Variance		40
Variable OH Expense Variance	8	—
Actual Contribution		<u>1448</u>
		<u>216</u> A

- (b) Note : Reconciliation of the figures given for 'cabinets' reveals the fact that the selling price is 36(36.80 – .80)

Fairbilt Furniture Ltd.

Statement showing Product-wise Contribution and Total Profit

	Tables		Chairs		Cabinets		Total
	Per Unit	Total	Per unit	Total	Per unit	Total	
Sales volume (units)		10,000		15,000		15,000	
Selling price (Rs.)	<u>80</u>	<u>800,000</u>	<u>60</u>	<u>900,000</u>	<u>36</u>	<u>540,000</u>	<u>22,40,000</u>
Direct Material	28	280,000	24	360,000	16	240,000	880,000

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Direct Labour	20	200,000	12	180,000	12	180,000	560,000
Variable factory overheads	8	80,000	6	90,000	4	60,000	230,000
Variable selling, distribution and administration overhead	4	40,000	2	30,000	2	30,000	100,000
Total variable cost	60	600,000	44	660,000	34	510,000	1,770,000
Contribution	20	200,000	16	240,000	2	30,000	470,000
Fixed factory overheads		80,000		90,000		19,200	189,200
Fixed selling, distribution and administration overheads		40,000		90,000		22,800	152,800
Total fixed overheads							342,000
Total Profit							128,000

The above analysis shows the cabinets make a contribution of Rs.2 per unit. The loss sustained in the previous year is because of the falling sales volume below breakeven level.

Fairbilt Furniture Ltd.

Budgeted Performance for the Coming Year

	Tables	Chairs	Cabinets
Unit Contribution (Rs.)	20	16	2
Sales Volume (Units)	11,000	15,000	23,000
Total Contribution (Rs.)	220,000	240,000	40,000
Less: Fixed Cost (Rs.)	120,000	180,000	42,000
Profit (Rs.)	100,000	60,000	4,000

The company makes a total profit of Rs.164,000 if all the products are continued. However, if the production of cabinets is discontinued, there will be an adverse effect on the overall profit of the company. This is because cabinets also contribute toward meeting the fixed costs of the company.

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Question 6

- (a) What do you mean by back-flushing in JIT system? What are the problems that must be corrected before it will work properly? (5 Marks)
- (b) Explain the main characteristics of Service sector costing. (5 Marks)
- (c) X is a multiple product manufacturer. One product line consists of motors and the company produces three different models. X is currently considering a proposal from a supplier who wants to sell the company blades for the motors line. (9 Marks)

The company currently produces all the blades it requires. In order to meet customer's needs, X currently produces three different blades for each motor model (nine different blades).

The supplier would charge Rs.25 per blade, regardless of blade type. For the next year X has projected the costs of its own blade production as follows (based on projected volume of 10,000 units):

Direct materials	Rs.75,000
Direct labour	Rs.65,000
Variable overhead	Rs.55,000
Fixed overhead:	
Factory supervision	Rs.35,000
Other fixed cost	<u>Rs.65,000</u>
Total production costs	<u>Rs.2,95,000</u>

Assume (1) the equipment utilized to produce the blades has no alternative use and no market value, (2) the space occupied by blade production will remain idle if the company purchases rather than makes the blades, and (3) factory supervision costs reflect the salary of a production supervisor who would be dismissed from the firm if blade production ceased.

- (i) Determine the net profit or loss of purchasing (rather than manufacturing), the blades required for motor production in the next year.
- (ii) Determine the level of motor production where X would be indifferent between buying and producing the blades. If the future volume level were predicted to decrease, would that influence the decision?
- (iii) For this part only, assume that the space presently occupied by blade production could be leased to another firm for Rs.45,000 per year. How would this affect the make or buy decision?

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Answer

- (a) Backflushing requires no data entry of any kind until a finished product is completed. At that time the total amount finished is entered into the computer system, which multiplies it by all the components listed in the bill of materials for each item produced. This yields a lengthy list of components that should have been used in the production process and which is subtracted from the beginning inventory balance to arrive at the amount of inventory that should now be left of hand. Back the entire production process. Given the large transaction volumes associated with JIT, this is an ideal solution to the problem.

The following problems must be corrected before it will work properly:

- (i) Production reporting
 - (ii) Scrap reporting
 - (iii) Lot tracing
 - (iv) Inventory accuracy.
- (b) Main characteristics of service sector are as below:
- (a) Activities are labour intensive: The activities of service sector generally are labour intensive. The direct material cost is either small or non-existent.
 - (b) Cost-unit is usually difficult to define: The selection of cost units usually, for service sector is difficult to ascertain as compared to the selection of cost unit for manufacturing sector. The following table provides some examples of the cost units for service sector.
 - Hospital – Patient per day, Room per day
 - Accounting firm – Charged out client hours
 - Transport – passenger km., quintal km.
 - Machine maintenance – Maintenance hours provided to user department
 - Computer department – Computer time provided to user department.
 - (c) Product costs in service sector: Costs are classified as product or period costs in manufacturing sector for various reasons.
- (c) (a) This is a make or buy decision so compare the incremental cost to make with the incremental cost buy.

Incremental Costs Per Unit	Make the Blades
Direct materials (Rs.75,000 ÷ 10,000 units)	Rs.7.50
Direct labour (Rs.65,000 ÷ 10,000 units)	Rs.6.50
Variable overhead (Rs.55,000 ÷ 10,000)	Rs.5.50

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Supervision

(Rs.35,000 ÷ 10,000)

Rs.3.50

Total cost

Rs.23.00

Compare the cost to make the blades for 10,000 motors. Rs.23.00, with the cost to buy, Rs.25.00 There is a net loss of Rs.2.00 if 'X' chooses to buy the blades.

- (b) 'X' will be indifferent between buying and making the blades when the total costs for making and buying will be equal at the volume level where the variable costs per unit times the volume plus the fixed avoidable costs are equal to the supplier's offered cost of Rs.25.00 per unit times the volume.

(Direct materials + Direct labour + Variable overhead) × Volume + Supervision =,
Cost to buy × Volume. Let volume in units = x

$$(7.50 + 6.50 + 5.50) \times x + 35,000 = 25.00x$$

$$19.50x + 35,000 = 25.00x$$

$$35,000 = 25.00 \times x - 19.50 \times x$$

$$35,000 = 5.50 \times x$$

$$x = 6,364 \text{ units of blades}$$

As volume of production decreases, the average per unit cost of in house production increases. If the volume falls below 6,364 motors, then 'X' would prefer to buy the blades from the supplier.

- (c) If the space presently occupied by blade production could be leased to another firm for Rs.45,000 per year, 'X' would face an opportunity cost associated with in house blade production for the 10,000 units of Rs.4.50 per unit.

$$\text{New cost to make} = 23.00 + 4.50 = 27.50$$

Now 'X' should buy because the cost to make, 27.50, is higher than the cost to buy, 25.00.