FINAL EXAMINATION
Syllabus 2016

Paper 15: STRATEGIC COST MANAGEMENT – DECISION MAKING (SCMD)

Time Allowed: 3 Hours **Full Marks: 100**

There are Sections A, B, C and D to be answered subject to instructions given against each.

Section A **You are required to answer all the questions. Each question carries 1 mark.** **Instructions: Each question is followed by 4 Answer choices and only one is correct. You are required to select the choice which according to you represents the correct answer.**					**20 × 1 = 20 Marks**
1.	**a.**	Target profit is a commitment agreed by all the people in a firm, who have any part to play in achieving it. In this context, target cost can be expressed as:			
		(i)	Target Cost = Actual Selling Price - Actual Profit		
		(ii)	Target Cost = Planned Selling Price - Required Profit	A	
		(iii)	Target Cost = Planned Selling Price - Actual Profit		
		(iv)	Target Cost = Actual Selling Price - Required Profit.		
	b.	This is specific costing technique which refers to the ongoing continuous improvement program that focuses on the reduction of waste in the production process. This technique is known as _____.			
		(i)	Target costing		
		(ii)	Activity based costing	A	
		(iii)	Kaizen costing		
		(iv)	Throughput costing		
	c.	Ratio of work content to lead time is also known as _____.			
		(i)	Throughput efficiency ratio		
		(ii)	Throughput time ratio	A	
		(iii)	Operational efficiency ratio		
		(iv)	Manufacturing response time		
	d.	Management's attention which is directed towards situations where actual results differ from expected results is known as :			
		(i)	Management's Perception		
		(ii)	Management by Exception	A	
		(iii)	Total Quality Management		
		(iv)	Value Analysis		
	e.	What is the opportunity cost of making a component part in a factory given no alternative use of the capacity?			
		(i)	The variable manufacturing cost of the component		
		(ii)	The total manufacturing cost of the component		
		(iii)	The total variable cost of the component		
		(iv)	Zero	A	

	f.	A company makes a single product 'Z' which selling price per unit is Rs.10. Fixed costs are Rs.96,000 per month and the product has a contribution to sales ratio of 40%. In a period when actual sales were Rs.2,80,000, the company's margin of safety in units was:			
		(i)	1,600		
		(ii)	4,000	A	
		(iii)	16,000		
		(iv)	40,000		
	g.	A company has a break even point when sales are Rs.3,20,000 and variable cost at that level of sales are Rs. 2,00,000. How much would contribution margin increase or decrease if variable expenses are dropped by Rs. 30,000?			
		(i)	Increase by 27.5%		
		(ii)	Increase by 9.375%	A	
		(iii)	Decrease by 9.375%		
		(iv)	Increase by 37.5%		
	h.	Variance analysis involves breaking down and analyzing the total variance to explain :			
		(i)	How much of the variance is caused by using the resources that are different from the standards, i.e. the quantity variance		
		(ii)	How much of the variance is caused by using the cost of the resources being different from the standards, i.e. the rate variance.		
		(iii)	All of the Above	A	
		(iv)	None of the above		
	i.	Which of the following may be the cause of Material Price Variance?			
		(i)	Change in quantity of purchase or uneconomical size of purchase order.		
		(ii)	Failure to take advantage of off-season price or failure to purchase when price is cheaper.		
		(iii)	Change in basic purchase price of material.		
		(iv)	All of the above	A	
	j.	Which of the following is NOT a method of transfer pricing?			
		(i)	Cost plus transfer price		
		(ii)	Internal price plus transfer price	A	
		(iii)	Market-based transfer price		
		(iv)	Two part transfer price		
	k.	B Ltd. has earned net profit of Rs.1 lakh, and its overall P/V ratio and margin of safety are 25% and 50% respectively. What is the total fixed cost of the company?			
		(i)	Rs.1,00,000	A	
		(ii)	Rs.2,00,000		
		(iii)	Rs.2,50,000		
		(iv)	Rs.3,00,000		
	l.	Uniform costing is :			
		(i)	A separate method of costing		
		(ii)	A type of costing		
		(iii)	A technique of costing	A	
		(iv)	None of the above		

	m.	A company uses traditional standard costing system. The inspection and set-up costs are actually Rs.1,760 against a budget of Rs.2,000. ABC system is being implemented and accordingly the number of batches is identified as the cost driver for inspection and set up. The budgeted production is 10,000 units in batches of 1,000 units whereas actually 9,000 units were produced in 11 batches. What will be the cost per batch under ABC system?			
		(i)	Rs.160		
		(ii)	Rs.180		
		(iii)	Rs.200	A	
		(iv)	Rs.220		
	n.	Production overheads of XYZ Manufactures Pvt. Ltd. for 500 units of product X are : Machine oriented activity cost Rs.135400 , Material ordering overheads Rs. 69570 , Machine hours 1.50 hrs. per unit, No. of material orders are 6, production of X requires raw material cost Rs.300 per unit and labour cost Rs.150 per unit. Total cost of X is :			
		(i)	Rs.588		
		(ii)	Rs. 625		
		(iii)	Rs. 450		
		(iv)	Rs. 744.50	A	
	o.	A Ltd., has developed a new product and just completed the manufacture of first four units of the product. The first unit took 2 hours to manufacture and the first four units together took 5.12 hours to produce. The Learning Curve rate is :			
		(i)	83.50%	A	
		(ii)	80.00%		
		(iii)	75.50%		
		(iv)	None of the above		
	p.	The mathematical model of an Linear Programming is important because_____.			
		(i)	It helps in converting the verbal description and numerical data into mathematical expression	A	
		(ii)	Decision makers prefer to work with formal models		
		(iii)	It capture the relevant relationship among the decisions		
		(iv)	It enables the use of algebraic technique		
	q.	_____of a system is the operation of a model in terms of time or space, which helps analyze the performance of an existing or a proposed system.			
		(i)	Modelling		
		(ii)	Control Systems		
		(iii)	Simulation	A	
		(iv)	Radar		
	r.	While solving an assignment problem, an activity is assigned to a resource with zero opportunity cost because objective is to _____.			
		(i)	Minimize total cost of assignment	A	
		(ii)	Reduce total cost of assignment to zero		
		(iii)	Reduce cost of that assignment to zero		
		(iv)	Maximize total cost of assignment		
	s.	An assignment problem is considered as a particular case of _____.			

		(i)	Transportation problem	A	
		(ii)	Sequencing problem		
		(iii)	Queuing problem		
		(iv)	Game theory		
	t.	One disadvantage of using North-West Corner rule to find initial solution to the transportation problem is that _____.			
		(i)	It is complicated to use		
		(ii)	It does not take into account cost of transportation	A	
		(iii)	It leads to degenerate initial solution		
		(iv)	It may provide wrong solution		
	Section B **You are required to answer all the questions. Each question carries 2 marks.** **Instructions: Each question is followed by a space where you are required to type your answer.**				**10 × 2= 20 Marks**
2.	a.	Marketing department of an organization estimates that 40,000 of new mixers could be sold annually at a price of Rs.60 each. To design, develop and produce these new mixers an investment of Rs.40,00,000 would be required. The company desires a 15% return on investment (ROI). Given these data, what will be the target cost to manufacture, sell, distribute and service one mixer?			
		Type your answer here Rs. 45 per unit			
	b.	Company B uses a throughput accounting system. The selling price per unit of product X Rs.50, material costs and conversion costs per unit are Rs.16 and Rs.20 respectively. Time on bottleneck resources is 8 minutes. Compute the return per hour for product X.			
		Type your answer here Return per hour = Rs. 255 **ROUGH WORK** Return per minute = (Selling price - material cost)/Time on bottleneck resource = (50-16)/8 = 4.25; Return per hour = 4.25 × 60 = 255			
	c.	A Company is to market a new product. It can produce up to 1,50,000 units of this product. The following are the estimated cost data:			

Probability	Fixed Cost (Rs.)	Variable Cost
For production up to 75,000 units	8, 00,000	60%
Exceeding 75,000 units	1, 20,000	50%

Sale price is expected to be Rs.25 per unit. How many units must the company sell to break even?

		Type your answer here 1,11,000 units			
	d.	A Ltd is a manufacturing company which is involved in the production of automobiles. Based on information from its last budget period, budgeted production 2,50,000 units whereas actually it produced 2,75,000 units. Though budgeted fixed overheads Rs.50,00,00,000 was fixed by the concerned authority, actually company incurred Rs.52,60,00,000. Considering all these information, calculate Fixed overhead volume variance and Fixed overhead expenditure variance.			

		Type your answer here Fixed overhead volume variance = Rs.5,00,00,000 (F) Fixed overhead expenditure variance = Rs.2,60,00,000 (A)	
	e.	Sunk cost and Committed Cost are used interchangeably. Do u agree? Justify.	
		Type your answer here Sunk costs are costs that were incurred in the past. Committed costs are costs that will occur in the future, but that cannot be changed. As a practical matter, sunk costs and committed costs are equivalent with respect to their decision-relevance; neither is relevant with respect to any decision, because it cannot be changed. Sometimes, accountants use the term "sunk costs" to encompass committed costs as well.	
	f.	Fixed Costs are unrelated to output and are generally irrelevant for decision-making purpose. However, there are certain circumstances where fixed Costs become relevant for decision-making. In this context highlight any four situations where fixed cost is playing a major role.	
		Type your answer here The situations where fixed cost is playing a major role are as follows: 1. When Fixed Costs are specifically incurred for any contract, 2. When Fixed Costs are incremental in nature. 3. When the fixed portion of Semi-Variable Cost increases due to change in level of activity consequent to acceptance of a contract. 4. When Fixed Costs are avoidable or discretionary, When Fixed Costs are such that one cost is incurred in lieu of another (the difference in costs will be relevant for decision-making.)	
	g.	The profit volume ratio of Z Limited is 50% and the margin of safety is 40%. Calculate the net profit if the sales is Rs.1, 00,000.	
		Type your answer here Rs. 20,000	
	h.	A specific analysis enables us to take a systematic quantitative structural approach to the problem of managing a project through to successful completion. Name it. Is it applicable in all situations? Mention any two.	
		Type your answer here Network analysis It is not applicable in all situations. Applications: (i) Construction of a Residential complex, (ii) Commercial complex, (iii) Petro-chemical complex (iv) Ship building (v) Satellite mission development (vi) Installation of a pipe line project etc...	
	i.	Is AOA and AON same? Explain.	
		Type your answer here No its not same. AOA system (Activity on Arrow system): In this activities are represented by an arrows AON system (Activity on Node system): In this method activities are represented in the circles.	

	j.	There are many methods of solving an assignment problem. Mention any four.	
		Type your answer here The various method of solving an assignment problems are as follows: (1) Complete Enumeration Method (2) Simplex Method (3) Transportation Method and (4) Hungarian Method	
		Section C **You are required to answer any 4 out of 6 questions in this section** **Instructions: Each question is followed by a space where you are required to type your answer.**	**4 × 12= 48 Marks**
3.	a.	State the importance of Product Life Cycle Costing .	6
		Type your answer here Product Life Cycle Costing is considered important due to the following reasons — (1) Time based analysis: Life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their life cycle. Costs and revenues can analysed by time periods. The total magnitude of costs for each individual product can be reported and compared with product revenues generated in various time periods. (2) Overall Cost Analysis: Production Costs are accounted and recognized by the routine accounting system. However non-production costs like R&D; design; marketing; distribution; customer service etc. are less visible on a product — by — product basis. Product Life Cycle Costing focuses on recognizing both production and non-production costs. (3) Pre-production costs analysis: The development period of R&D and design is long and costly. A high percentage of total product costs may be incurred before commercial production begin. Hence; the Company needs accurate information on such costs for deciding whether to continue with the R&D or not. (4) Effective Pricing Decisions: Pricing Decisions; in order to be effective; should include market considerations on one hand and cost considerations on the other. Product Life Cycle Costing and Target Costing help analyze both these considerations and arrive at optimal price decisions. (5) Better Decision Making: Based on a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage, better decisions can be taken. (6) Long Run Holistic view: Product Life Cycle Costing can promote long-term rewarding in contrast to short-term profitability rewarding. It provides an overall framework for considering total incremental costs over the entire life span of a product, which in turn facilitates analysis of parts of the whole where cost effectiveness might be improved. (7) Life Cycle Budgeting: Life Cycle Budgeting, i.e., Life Cycle Costing with Target Costing principles, facilitates scope for cost reduction at the design stage itself. Since costs are avoided before they are committed or locked in the Company is benefited. (8) (h) Review: Life Cycle Costing provides scope for analysis of long term picture of product line profitability, feedback on the effectiveness of life cycle planning and cost data to clarify the economic impact of alternatives chosen in the design, engineering phase etc.	

	b.	A factory has a key resource (bottleneck) of Facility A which is available for 31,300 minutes per week. The time taken by per unit of Product X and Y in Facility A are 5 minutes and 10 minutes respectively. Last week's actual output was 4750 units of product X and 650 units of Product Y. Actual factory cost was Rs. 78,250. Calculate the throughput cost for the week.	2
		Type your answer here Throughput Cost for the week = 30,250 × Rs. 2.50 = Rs. 75,625 **ROUGH WORK** Cost per Factory Minute = Total Factory Cost / Minutes Available = Rs. 78,250/31,300 = Rs. 2.50 Standard Minutes of throughput for the week = (4750 × 5) + (650 × 10) = 30,250 minutes Therefore, throughput Cost for the week = 30,250 × Rs. 2.50 = Rs. 75,625	
	c.	D Co. manufactures and sells 7,500 units of a product. The full cost per unit is Rs. 100. The Company has fixed its price so as to earn a 20% return on an Investment of Rs. 9,00,000. **Required**: (i) Calculate the Selling Price per unit from the above. Also, calculate the mark-up % on the Full Cost per unit. (ii) If the Selling Price as calculated above represents a mark- up% of 40% on Variable Cost per unit. calculate the Variable Cost per unit. (iii) Calculate the Company's Income if it had changed the Selling Price to Rs. 115. At this price, the Company would have sold 6,750 units. (iv) In response to competitive pressures, the Company must reduce the price to Rs.105 next year, in order to achieve sales of 7,500 units. The company also plans to reduce its investment to Rs. 8,25,000. If a 20% return on Investment should be maintained, what is the Target Cost per unit for the next year?	4
		Type your answer here **(i)** Computation of Selling Price and mark - up % on the Full Cost per unit Target Sale Price per unit = Full Cost + Target Profit = Rs.100 + 24 — Rs. 124 So, Market – up price is — 24% **(ii)** Computation of Variable Cost per unit: Above sale Price Rs. 124 = VC + 40% thereon, i.e. 140% on VC. So, Var. Cost = Rs. 124/140% = Rs.89 (iii) Calculate the company's Income if selling price are increased Present Contribution at 7,500 units = (Rs. 124 – Rs. 89) × 7,500 units = Rs. 2,62,500 Revised Contribution at 6,750 units = (Rs. 115 – Rs. 89) × 6,750 units = Rs. 1,75,500 Rs. 87,000 Hence, increase in Sale Price is not beneficial. due to reduction in Contribution by Rs. 87,000 (iv) Calculate the company's Target Profit if selling price are reduced and Target cost if investment is Rs. 8,25,000 Target Profit for next year = Rs. 8,25,000 ×20% /7500 units = Rs. 24 Target cost = 105 - 24 = Rs. 83/unit	

4	a.	AB Cycles Ltd. has two divisions A & B. Division A produces bicycle frame and Division B assembles rest of the bicycle on the frame. There is a market for subassembly and the final product. Each division has been treated as a profit center. The transfer price has been set at the long run average market price. The following data are available to each division: Estimated selling price of the final product 3,000/unit Long run market price of sub assembly 2,000/unit Incremental cost of completing sub assembly 1,500/unit Incremental cost in Division A 1,200/unit (i) What is the profit/ loss of the company if Division A max capacity is 1000 units p. m and sales to the intermediate are now 800 units while 200 units are transferred to B on long term average price basis. (ii) What should be the transfer price from A and B if the profit are to be shared between the divisions equally?	3 +3
		Type your answer here (i) If Division B receives the sub assembly at market price of Rs. 2,000 plus incremental cost of Rs. 1,500 will make the total cost of product Rs. 3,500, thereby yielding a loss of Rs. 500 per unit for Division B. Whereas the Company makes a profit of Rs. 300 per unit. So it is not advisable to transfer the sub assembly to Division B at long term average price. (ii) Rs.1350 per unit **ROUGH WORK** Particulars / Option (a) / Option (b) Selling price / Rs. 2,000 / Rs. 3,000 Incremental cost in Division A / 1,200 / 1,200 Incremental cost in Division B / / 1,500 Total Variable Cost / Rs. 1,200 / 2,700 Contribution / 800 / 300 (ii) In order to keep the manager of Division B motivated, the profit earned of Rs. 300 per unit should be shared between Division A & B. Hence transfer price for Division B should be = Variable cost of Division A + 50% of profit per unit = 1200 + 50% × 300 = 122 + 150 = 1350 per unit	
	b.	A Company can produce any of its 4 products, A, B, C and D. Only one product can be produced in a production period and this has to be determined at the beginning of the production run. The production Capacity is 1,000 hours. Whatever is produced has to be sold and there is no Inventory build-up to be considered beyond the production period. The following information is given: Particulars / A / B / C / D Selling Price (Rs. Per unit) / 40 / 50 / 60 / 70 Variable Cost (Rs. Per unit) / 30 / 20 / 20 / 30 No. of units that can be sold / 1,000 / 600 / 900 / 600 No. of production hours required per unit of product / 1 hour / 1 hour and 15 minutes / 1 hour and 15 minutes / 2 hours What are the Opportunity Costs of A, B, C and D?	4

Type your answer here

A =NIL

B = NIL

C = Rs.4,000

D = Rs.4,000

ROUGH WORK

Particulars	A	B	C	D
Contribution per unit (SP-VC)	40-30 = Rs.10	50-20 = Rs.30	60-20 = Rs.40	70-30 = Rs.40
Time Required	1 Hr.	1.25 Hr.	1.25Hr.	2 Hr.
Possible Production Quantity (1000/2)	1000 units	800 units	800 units	500 units
Possible Sales Quantity	1000 units	600 units	900 units	600 units
Sales quantity lost due to production constraint	NIL	NIL	100 units	100 units
Opportunity Cost	NIL	NIL	4,000	4,000

c. Enumerate any 2 limitations of marginal costing. 2

Type your answer here

(i) The separation of costs into fixed and variable present's technical difficulties and no variable cost is completely variable nor is a fixed cost completely fixed.

(ii) Under the marginal cost system, stock of finished goods and work-in-progress are understated. After all, fixed costs are incurred in order to manufacture products and as such, these should form a part of the cost of the products. It is, therefore, not correct to eliminate fixed costs from finished stock and work-in-progress.

(iii) The exclusion of fixed overhead from the inventories affects the Profit and Loss Account and produces an unrealistic and conservative Balance Sheet, unless adjustments are made in the financial accounts at the end of the period.

(iv) In marginal costing system, marginal contribution and profits increase or decrease with changes in sales volume. Where sales are seasonal, profits fluctuate from period to period. Monthly operating statements under the marginal costing system will not, therefore, be as realistic or useful as in absorption costing.

(v) During the earlier stages of a period of recession, the low profits or increase in losses, as revealed in a magnified way in the marginal costs statements, may unduly create panic and compel the management to take action that may lead to further depression of the market.

5. a. 'Standard Costing is used for cost control whereas Kaizen Costing is used for cost reduction.' Justify this statement. 3

Type your answer here

Under Standard costing, it is assumed that current manufacturing conditions remain unchanged. The cost focus is on standard costs based on static conditions. The aim is to meet cost performance standards, Costs are controlled using variance analysis based on standard and actual costs. whereas under Kaizen Costing. It assumes continuous improvement. The cost focus is on actual costs assuming dynamic conditions. The aim is to achieve cost reduction targets. Costs are reduced by implementing continuous improvement (kaizen) to attain the target profit or to reduce the gap between target and estimated profit.

b. X uses traditional standard costing system. The inspection and setup costs are actually Rs. 1,760 against a budget of Rs. 2,000. ABC system is being implemented and accordingly, the number of batches is identified as the cost driver for inspection and setup costs. The budgeted production is 10,000 units in batches of 1,000 units, whereas actually, 8,800 units were produced in 11 batches.
Find the volume and total fixed overhead variance under the traditional standard costing system. — 5

Type your answer here

Fixed overhead expenditure variance = Rs. 240 (F)

Fixed overhead volume variance = Rs. 240 (A)

ROUGH WORK

Calculation of volume and total fixed overhead under Traditional Standard Costing System

Particulars	Workings	Amount
Budgeted overhead cost per unit	Rs.2,000/10,000 units	= Rs. 0.20
Actual overhead cost per unit	Rs.1,760/8,800 units	= Rs. 0.20
Total fixed overhead variance	Absorbed budgeted overhead - Actual overhead (Rs. 0.20 × 8,800 units) - Rs.1,760	= Nil
Fixed overhead expenditure variance	Budgeted overhead - Actual overhead 2,000 - 1,760	= Rs. 240 (F)
Standard absorption rate	Rs. 2,000/10,000 units	= Rs. 0.20 per unit
Fixed overhead volume variance	Standard absorption rate x (Budgeted units - Actual units) Rs.0.20 (10,000 units - 8,800 units)	= Rs. 240 (A)

c. DM is a denim brand specializing in the manufacture and sale of hand-stitched jeans trousers. DM manufactured and sold 10,000 pairs of jeans during a period. Information relating to the direct labour cost and production time per unit is as follows: — 4

	Actual Hours Per Unit	Standard Hours Per Unit	Actual Rate Per Hour	Standard Rate Per Hour
Direct Labour	0.65	0.60	Rs.120	Rs.100

During the period, 800 hours of idle time was incurred. In order to motivate and retain experienced workers, DM has devised a policy of paying workers the full hourly rate in case of any idle time. Calculate the idle time variance and labour efficiency variance.
Note: 0.65 hours per unit of actual time includes the idle time.

		Type your answer here (i) Idle Time Variance = Rs. 80,000 (A) (ii) Labour Efficiency Variance = Rs. 30,000 (F) **ROUGH WORK** (i) Idle Time Variance: Idle time variance = number of idle hours x standard rate = 800 hours × Rs. 100 = Rs. 80,000 (A) (ii) Labour Efficiency Variance: Total Hours = 10,000 units × 0.65 hours per unit = 6,500 hours. Active Hours = 6,500 hours - 800 idle hours = 5,700 hours. Standard Cost of Active Hours = Active Hours × Standard Rate = 5,700 hours × Rs. 100 per hour = Rs. 5, 70,000 Standard Hours = 10,000 units x 0.60 hours per unit = 6,000 hours Standard Cost = Standard Hours × Standard Rate = 6,000 hours × Rs. 100 per hour = Rs. 6, 00,000 Labour Efficiency Variance = Standard Cost of Active Hours - Standard Cost = Rs. 5, 70,000 – Rs. 6, 00,000 = Rs. 30,000 (F)	
6.	a.	What are the problems of Traditional Costing arising out of volume-based cost allocation to products? How can Activity-Based Costing help refining such costing system?	2+4
		Type your answer here Under traditional costing, overheads which occupy an important share of the total cost of the firm, are generally allocated on the basis of volume based allocation of rates. This allocation can be on the basis of labour hour, machine hour, % of labour cost, etc. It does not take into consideration the quantum of services actually consumed. As a result, the product cost gets distorted i.e., some products are over burdened and vice versa. The basic assumption in cost allocation is; the higher the volume, the greater the share of indirect costs to the product or service. This simplistic assumption does not hold good in reality. The Activity-Based Costing (ABC) is a system that focuses on activities as the fundamental cost objects and uses the cost of these activities for computing the costs of products. The Activity-Based Costing refines the problems of Traditional Costing System by the following means: (i) In ABC, the focus is on activities rather than products because activities in various departments may be combined and costs of similar activities ascertained, e.g., quality control, handling of materials, repairs to machines etc., If detailed costs are kept by activities, the total company costs for each activity can be obtained, analysed, planned and controlled. (ii) Under ABC, activities are managed and not products. Changes in activities lead to changes in costs. Therefore, if the activities are managed well, costs will fall and the resulting products will be more competitive. (iii) Allocating Overhead Cost to production based on a single cost driver can result in an unrealistic product cost because the traditional system fails to capture cause-and-effect relationships. To manage activities better and to make wiser economic decisions, managers need to identify the relationships of causes (activities) and effects (costs) in a more detailed and accurate manner.	

(iv) ABC highlights problem areas that deserve management's attention and more detailed analysis. Many actions are possible, on pricing, on process technology, on product design, on operational movements and on product mix. Traditional Costing can lead to under costing or over costing of products or services which distorts cost information. This distorted information leads to inappropriate crucial decisions e.g. pricing, product emphasis, make or buy etc.

ABC differs from the traditional system only in respect of allocations of overheads or indirect costs. Direct Costs are identified with, or assigned to, the cost object, in the same manner as is done in case of traditional costing system. Overhead costs are linked to the cost objects based on activities.

b. A Firm received an order to make and supply eight units of standard product which involve intricate labour operations. The first unit was made in 10 hours. It is understood that this type of production is subject to 80% learning rate. The workers are getting a wages rate of Rs. 12 per hour. **2+2**

(i) What is the total time and labour cost required to execute the above order?

(ii) If a repeated order of 24 units is also received from the same customer, what is the labour cost necessary for the second order?

Type your answer here

(i) Labour time required for first eight units =40.96 hours

Labour cost required for 8 units= Rs. 491.52

(ii) Labour time required for 2nd order for 24 units = 63.90 hours

Labour cost for 24 units = Rs. 766.80

ROUGH WORK

Production (Units)	Cumulative Average Time (hours)	Total Time (hours)
1	10	10
2	8	16
4	6.4	25.6
8	5.12	40.96
16	4.096	65.54
32	3.2768	104.86

Labour time required for first eight units = 40.96 hours
Labour cost required for 8 unit = 40.96 hour × Rs. 12/hr Rs. 491.52
Labour time for 32 units = 104.86 hours
Labour time for first eight units = 40.96 hours
Labour time required for 2nd order for 24 units = 63.90 hours
Labour cost for 24 units = 63.90 hours × Rs. 12/hr = Rs. 766.80

c. If the direct labour cost is reduced by 20% with every doubling of output, what will be the cost of labour for the sixteenth unit produced as an approximate percentage of the cost of the first unit produced? **2**

Type your answer here

40.96%

ROUGH WORK

1st	100%
2nd	80% x 100%
4th	80% of 2nd
8th	80% of 4th
16th	80% of 8th = 0.80 × 0.80 × 0.80 × 0.80 = 40.96%

7	a.	Write the steps to be followed in applying Vogel's Approximation Method for solving transportation problem .	4
		Type your answer here Vogel's Approximation Method method is preferred because the initial basic feasible solution obtained is either optimum or very close to the optimum solution. Therefore, the amount of time required to arrive at the optimum solution is greatly reduced. Various steps of this method are summarized as under: **Step 1**: Compute a penalty for each row and column in the transportation table. The penalty for a given row and column is merely the difference between the smallest cost and the next smallest cost in that particular row or column. **Step 2**: Identify the row or column with the largest penalty. In this identified row or column, choose the cell which has the smallest cost and allocate the maximum possible quantity to the lowest cost cell in that row or column so as to exhaust either the supply at a particular source or satisfy demand at a warehouse. If a tie occurs in the penalties, select that row/column which has minimum cost. If there is a tie in the minimum cost also, select that row/column which will have maximum possible assignments. It will considerably reduce computational work. **Step 3**: Reduce the row supply or the column demand by the amount assigned to the cell. **Step 4**: If the row supply is now zero, eliminate the row, if the column demand is now zero, eliminate the column, if both the row supply and the column demand are zero, eliminate both the row and column. **Step 5**: Recomputed the row and column difference for the reduced transportation table, omitting rows or columns crossed out in the preceding step. **Step 6**: Repeat the above procedure until the entire supply at factories are exhausted to satisfy demand at different warehouses.	
	b.	The owner of M Sports wishes to determine how many advertisements to place in the selected three monthly magazines A, B and C. His objective is to advertise in such a way that total exposure to principal buyer of expensive sports goods is maximised. Percentages of readers for each magazine are known. Exposure in any particular magazine is the number of advertisements placed multiplied by the number of principal buyers. The following data may be used: Particulars / Magazine: A, B, C Readers: 1 lakh, 0.6 lakh, 0.4 lakh Principal Buyer: 20%, 15%, 8% Cost per Advertisement(Rs.): 8,000, 6,000, 5,000 The budgeted amount is at most Rs. 1 lakh for the advertisements. The owner has already decided that magazine A should have not more than 15 advertisements and that of B and C each should have at least 8 advertisements. Present the objective function in the form of an equation using LPP subject to the constraints.	4
		Type your answer here The objective is to maximise (total exposure) Maximise Z = (20% of 100000)x_1 + (15% of 60,000)x_2 + (8% of 40,000)x_3 = 20,000x_1 + 9,000x_2 + 3,200x_3 Subject to constraints 8,000x_1 + 6,000 x_2 + 5,000 x_3 ≤ 1,00,000 (Budgeted amount) $x1 \leq 15$, $x_2 \geq 8$ and $x_3 \geq 8$ (Advertisement) $x1 \geq 0$, $x_2 \geq 0$ and $x_3 \geq 0$ (Non-negativity restrictions)	

c. Patients arriving at a village dispensary are treated by a doctor on a first-come-first-served basis. The inter-arrival time of the patients is known to be uniformly distributed between 0 and 80 minutes, while their service time is known to be uniformly distributed between 15 and 40 minutes. What is the average waiting time of the patient and the average idle time of the doctor using simulation? Carry out the simulation using the following sequences of random numbers. The numbers have been selected between 00 and 80 to estimate inter-arrival times and between 15 and 40 to estimate the service time required by the patients. — 4

Series 1	07	21	12	80	08	03	32	65	43	74
Series 2	23	37	16	28	30	18	25	34	19	21

Type your answer here

Average waiting time of patient = 12.9 minutes

Average waiting time of doctor = 11.5 minutes

ROUGH WORK

Simulation of data at village dispensary

No. of patients	Inter arrival Time Random No. (minutes)	Entry time in to queue (hrs)	Service Time Random No. (minutes)	Service Start time (hrs)	End time (hrs)	Waiting time of patient (minutes)	Idle time of doctor (minutes)
1	07	8.07	23	8.07	8.30	-	07
2	21	8.28	37	8.30	9.07	2	-
3	12	8.40	16	9.07	9.23	27	-
4	80	10.00	28	10.00	10.28		37
5	08	10.08	30	10.28	10.58	20	-
6	03	10.11	18	10.58	11.16	47	-
7	32	10.43	25	11.16	11.41	33	-
8	65	11.48	34	11.48	12.22	-	07
9	43	12.31	19	12.31	12.50	-	09
10	74	01.45	21	01.45	02.06	-	55
Total(in minutes)						129	115

Average waiting time of patient = 129/10 = 12.9 minutes

Average waiting time of doctor = 115/10 = 11.5 minutes

8. **You are required write Short Notes on any 4 out of 5 questions.** — **4×3= 12 Marks**

a. Business Process Re-engineering — 3

		Type your answer here Business Process Re-engineering (BPR) refers to the fundamental rethinking and redesign of business processes to achieve improvement in critical measures of performance such as cost, quality, service, speed and customer satisfaction. In contrast the concept of Kaizen, which involves small, incremental steps towards gradual improvement, re-engineering involves a giant leap. It is the complete redesign of a process with an emphasis on finding creative new way to accomplish an objective. It has been described as taking a blank piece of paper and starting from scratch to redesign a business process. Rather than searching continually for minute improvement, reengineering involves a radical shift in thinking about how an objective should be met. Re-engineering prescribes radical, quick and significant change. Admittedly, it can entail high risks, but it can also bring big rewards. These benefits are most dramatic when new models are discovered for conducting business.	
	b.	Treatment of Variances in cost accounts	3
		Type your answer here In Standard Cost Accounting Systems, which contain both actual and standard costs in the accounting records and financial statements, the question of adjustment of the cost variances at the end of the accounting period arises. Three methods of disposal of variances and the advantages and disadvantages of each are discussed below: 1. Transfer to Profit and Loss Account. 2. Allocation of Variances to Finished Stock, Work-in-Progress and Cost of Sales Account. 3. Transfer of Variances to the Reserve Account. Under the method Allocation of Variances to Finished Stock, Work-in-Progress and Cost of Sales Account, the variances are distributed over stocks of finished and partly finished products and to the cost of sales. The distribution of each variance is made to the three accounts on a percentage basis according to the closing balance (value) of each account.	
	c.	Six Sigma	3
		Type your answer here Six Sigma is a set of practices developed by Motorola to systematically improve process by eliminating defects. A defect is defined as non conformity of a product or service to its specifications. The term six Sigma refers to the ability of highly capable processes to produce output with specifications. In particular, processes that operate with six sigma quality produce at defect levels below 3.4 defects per million opportunities (DPMO). Six Sigma's implicit goal is to improve all process to that level of quality or better	
	d.	Uses of learning curve (Any 3)	3
		Type your answer here Learning curve is now being widely issued in business. Some of the uses are as follows: (i) Where applicable the learning curve suggests great opportunities for cost reduction to be achieved by improving learning. (ii) The learning curve concept suggests a basis for correct staffing in continuously expanding production. The curve shows that the work force need not be increased at the same rate as the prospective output. This also helps in proper production planning through proper scheduling of work; providing manpower at the right moment permitting more accurate forecast of delivery dates. Learning curve concept provides a means of evaluating the effectiveness of training programs. What level of cumulative cost reduction do they accomplish?	

		(iii) How does the learning curve for this group or shop compare with others? Any of the employees, who lack the aptitude to meet normal learning-curve, should be eliminated. (iv) Learning curve is frequently used in conjunction with establishing bid price for contracts. Usually, the bid price is based on the cumulative average unit cost for all the units to be produced for a given contract. If production is not interrupted, additional units beyond this quantity should cost at the incremental costs incurred, and not at the previous cumulative average. If the contract agreement so provides, a contract may be cancelled and production stopped before the expected efficiency is reached. This would mean that the company having quoted on the basis of cumulative average unit cost is at a disadvantage because it cannot reap the benefit of learning. The contractor must provide for these contingencies so that it will be reimbursed for such loss. (v) The use of learning curve, where applicable, is important in the working capital required. If the requirement is based on average cumulative unit cost, the revenues from the first few units may not cover the actual expenditures. For instance, if the price was based on the average cumulative unit cost of 328 hours the first unit when produced and sold will cause a deficit of 4.72 hours (8.00 – 3.28). Provision should therefore, be made to cover the deficit of working capital in the initial stages of production. (vi) As employees become more efficient, the rate of production increases and so more materials are needed, the work-in-progress inventory turns over faster, and finished goods inventory grows at an accelerated rate. A knowledge of the learning curve assists in planning the inventories of materials, work-in-progress, and finished goods. (vii) Learning curve techniques are useful in exercising control. Variable norms can be established for each situation, and a comparison between these norms and actual expenses can be made. Specific or average incremental unit cost should be used for this purpose. (viii) The learning curve may be used for make-or- buy decisions especially if the outside manufacturer has reached the maximum on the learning curve. Help to calculate the sensitive rates in wage bargaining.	
	e.	Simulation	3
		Type your answer here Simulation is a modeling and analysis tool that is widely used for the purpose of designing, planning and control of manufacturing systems. Simulation in general is to pretend that one deals with a real thing while really working with an imitation. In Operations Research, the imitation is a computer model of the simulated reality. The task of executing simulations provides insight and a deep understanding of physical processes that are being modeled. Simulation is generally referred to as computer simulation, which simulates the operation of a manufacturing system. A computer simulation or a computer model is a computer program, which attempts to simulate an abstract model of a particular system. A simple example of a simulation involves the tossing of a ball moto the air. The ball can be said to "simulate" a missile, for instance. That is, by experimenting with throwing balls starting at different initial heights and initial velocity vectors, it can be said that we are simulating the trajectory of a missile. Monte Carlo method of simulation is the most popular method of simulation. In Linear Programming, Simulation is called as the 'technique of last resort'. It means, when all other methods fails, we resort to Simulation as the last resort.	

	Section D You are required to answer all the questions in this section Instructions: Each question is followed by a space where you are required to type your answer.		1 × 12= 12 Marks
9.		Cosmetics dealing with eye, facial, and lip makeup category are the most prosperous industry in a country. While the cosmetics industry could be relatively strong as compared to other categories of consumers, the year 2020-21 has been very poor in terms of sales, almost all segments of this industry have witnessed a similar kind of downfall in terms of sales during COVID-19 because of closing of the offline stores at different locations throughout. Cosmetics are designed to enhance one's appearance (makeup), to conceal blemishes, enhance one's natural features (such as the eyebrows and eyelashes), add color to a person's face and, can be used to change the appearance of the face entirely to resemble a different person, creature or object. The cruelty-free (no animal testing), vegetarian (no byproducts of animal slaughter), and vegan (no animal ingredients at all) beauty market has exploded in recent years globally and has been finding its space in this country's market too. Moreover, with the advancement of vegan products in the country, Country consumers are paying extra attention to not only a particular shade of lipstick that suits them but also about how the lipstick is made. Furthermore, the increasing adoption of the vegan lifestyle and the growing health concerns about the negative impact of petroleum-based ingredients are driving the demand for vegan cosmetics. With the increasing internet penetration, the online market for the purchase of consumer goods has seen rapid growth in the last 3-4 years in Country. With the rise in the adoption of western culture, the colour cosmetics market is one of the fastest-growing markets in Country. As the aesthetic appeal in the young generation is rising, the penetration of colour cosmetics products in the Country market is increasing. Country is estimated as one of the fastest-growing countries, in terms of color cosmetics, in the Asian region. Country companies are venturing into organic colour cosmetics, due to its increasing demand, among the more affluent sections of the society. Furthermore, the rising beauty consciousness among individuals, the influence of social media, and inflating income levels are increasing the preference for customized, organic, and premium product variants, which is offering lucrative growth opportunities to leading market players operating in the country. In addition, physical store retailers are adopting innovative strategies, such as housing beauty studios with personalized beauty advisors, to drive customer's engagement and improve their shopping experience. Anticipated growth in the market can be attributed to growing disposable income leading to increasing purchasing power of the people. Emergence of online retail and increasing inclination of youth towards skin care and other grooming products is another key factor which is expected to drive the cosmetics market during the forecast period. Moreover, rising consumer awareness and preference to buy advanced skin care products which not only make them look beautiful but also enhance their skin type is also leading to huge demand for cosmetics products. Leading companies are working on bring more innovative products which suits the demand of the consumers. The increasing focus on personal health and hygiene represents one of the major factors influencing the demand for beauty and personal care products in Country.	

Particulars	A	B	C	D
Variable cost of production per unit	Rs.130	Rs.100	Rs.90	Rs.85
Labour hour required per unit	3	4	2	3
Market price per unit	Rs.150	Rs.146	Rs.140	Rs.130

S Ltd. has three different divisions namely X, Y, Z. All the divisions are very unique in terms of their performance. Among all the divisions, Division Z is profit center which produces four products namely A, B, C and D. Each product is sold in the external market also. Few relevant information are extracted which are expressed below:

After market survey and present requirement it was revealed that product D amongst all the product of Division Z can be transferred to division Y but the maximum quantity that might be required for transfer is 2,500 units of D.

The maximum sales in the external market are 2,800 units for A; 2,500 units for B ; 2,300 units for C and 1,600 units for D.

As there is no internal agreement between the divisions and overall objective is to maximize the profit as well as wealth, Division Y can purchase the same product at a slightly cheaper rate of Rs.125 per unit instead of receiving transfers of product D from division Z.

a. Which is the most preferred product and why ? 2

Type your answer here

The product C is most preferred product as maximum contribution per hour (Rs. 25) company can enjoy.

ROUGH WORK

Product	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
Market price per unit	150	146	140	130
Less: Variable cost of Production per unit	130	100	90	85
Contribution per unit	20	46	50	45
Contribution per hour	6.66	11.50	25	15
Ranking	IV	III	I	II

From the above table, it is clear that product C is most preferred product as maximum contribution company can enjoy.

b. Imagine yourself that you are financial advisor of S Ltd. After detailed study, show the optimum product mix when total available hours in division Z is : 4

(i) 20,000 hours and

(ii) 30,000 hours

Type your answer here

For 20,000 hrs.:

Product C= 2,300 units produced and 4,600 hours used

Product D=1,600 units produced and 4,800 hours used

Product B=2,500 units produced and 10,000 hours used

Product A=600 units produced and 600 hours used

For 30,000 hrs.:

Product C= 2,300 units produced and 4,600 hours used

Product D=1,600 units produced and 4,800 hours used

Product B=2,500 units produced and 10,000 hours used

Product A=2,800 units produced and 8,400 hours used

ROUGH WORK

Product	Max Demand (units)	Hrs./ unit	For 20,000 hrs.			For 30,000 hrs.		
			Unit produced	Hour used	Balance hours	Unit produced	Hour used	Balance hours
C	2,300	2	2,300	4,600	15,400	2,300	4,600	25,400
D	1,600	3	1,600	4,800	10,600	1,600	4,800	20,600
B	2,500	4	2,500	10,000	600	2,500	10,000	10,600
A	2,800	3	200	600	NIL	2,800	8,400	2,200

Working note:

(i) When 20,000 hours are available: Time required to meet the demand of 2,500 units of Product D for division Y is 7,500 hours. This requirement of time viz. 7,500 hours for providing 2,500 units of Product D for Division Y can be made by sacrificing the production of 1,725 units of product B (1,725 units x 4hours = 6,900 hours) and 200 units of product B (200 units x 3 hours = 600 hours)

(ii) When 30,000 hours are available: The required time for producing 2,500 units of Product D for division Y is 7,500 hours. This requirement can be made to the extent of 2,200 hours out of the balance hours (as shown in the above table, last column). The remaining requirement of 5,300 hours can be made by sacrificing the output of 1766.66 units of product A.

	c.	In your opinion, what should be the transfer price for each unit for 2,500 units of D if total available hours is 20,000 hours?	4

Type your answer here

Transfer price of 2,500 units of product D= Rs.2,95,850

Transfer price of Per unit of product D = Rs. 118.34

ROUGH WORK

Statement showing of fixation of transfer price for each unit for 2,500 units of D when 20,000 hours are available

Transfer price	2,500 units of product D	Per unit of product D
Variable cost (2,500 units × Rs.85)	Rs.2,12,500	85
Opportunity cost of contribution foregone by not producing 200 units of A (200 units × Rs.20)	Rs.4,000	1.6
Opportunity cost of contribution foregone by not producing 1725 units of B (1725 units × Rs.46)	Rs.79,350	31.74
Transfer Price	Rs.2,95,850	118.34

	d.	Is there any change in transfer price per unit of D for above mentioned units if available hours is 30,000 hours?	2

Type your answer here

Transfer price of 2,500 units of product D = Rs.2,47,833.20

Transfer price of Per unit of product D = Rs. 99.13

ROUGH WORK

Statement showing of fixation of transfer price for each unit for 2,500 units of D when 30000 hours are available

Transfer price	2,500 units of product D (Rs.)	Per unit of product D (Rs.)
Variable cost (2,500 units x Rs.85)	2,12,500	85
Opportunity cost of contribution foregone by not producing 1,766.66 units of A (1,766.66 units × Rs.20)	35,333.20	14.13
Transfer Price	2,47,833.20	99.13

END