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

The figures in the margin on the right side indicate full marks.

Where considered necessary, suitable assumptions may be made and

clearly indicated in the answer.

SECTION – A : STRATEGIC COST MANAGEMENT FOR DECISION MAKING

Answer to Question No. 1 & 6 in Section A, are compulsory.

Further, answer **any 3** from Question nos. 2, 3, 4 & 5**.**

1.   (a)   **Choose the most appropriate answer to the following questions with justification. 1 mark will be awarded for correct answer and 1 mark for justification.:**   **[8 × 2 = 16]**

     (i)   The cost incurred to ensure that failures do not happen is known as _____. Provide a justification for your answer.

         a.   External failure cost

         b.   Internal failure cost

         c.   Prevention cost

         d.   None of the above

     (ii)   Which of the following is not the quality parameter for service organizations and why?

         a.   Consistency

         b.   Friendliness

         c.   Durability

         d.   Promptness

     (iii)   Which one of the following is not a standard definition of 'Quality' and why?

         a.   Conformance to Specifications

         b.   Fitness for Use

         c.   Psychological Criteria

         d.   Physiological Criteria

     (iv)   Prevention costs are all costs incurred in the process of preventing poor quality from occurring. Which one of the following is not included in Prevention cost? Provide a justification.

         a.   Cost of creating and maintaining quality circles

         b.   Cost related to statistical process control activities

         c.   Costs related to System Development for prevention

         d.   WIP testing and inspecting

FINAL EXAMINATION
SET 1
MODEL QUESTION PAPER
TERM – JUNE 2023
PAPER - 16
STRATEGIC COST MANAGEMENT

(v)   The best way to define the principles that guide Lean Accounting and form the foundation for all of accounting's work and interaction with the organization are _____. Provide a justification for your answer.

    a.   Customer value:

    b.   Continuous improvement:

    c.   Respect for people:

    d.   All of the above.

(vi) A company is considering to accept a one-year contract which will require four skilled employees. The four skilled employees could be recruited on a one-year contract at a cost of ₹ 40,000 per employee. The employees would be supervised by an existing manager who earns ₹ 60,000 per annum. It is expected that supervision of the contract would take 10% of the manager's time.

    Instead of recruiting new employees, the company could retrain some existing staff who currently earns ₹30,000 per year. The training would cost ₹15,000 in total but if those employees were used they would need to be replaced at a total cost of ₹100,000. The relevant labour cost of the contract is _____.

    a.   ₹ 1,15,000

    b.   ₹1,00,000

    c.   ₹ 85,000

    d.   ₹ 1,10,000

(vii) A firm has some material which originally cost ₹ 45,000. It has a scrap value of ₹12,500 but if reworked at a cost of ₹ 7,500 it could be sold for ₹17,500. What would be the incremental effect of reworking and selling the material?

    a.   A Loss of ₹ 27,500

    b.   B Loss of ₹2,500

    c.   C Profit of ₹ 5,000

    d.   D Profit of ₹10,000

(viii) The product of XYZ Company is sold at a fixed price of ₹1,500 per unit. As per company's estimate, 500 units of the product are expected to be sold in the coming year. If the value of investments of the company is ₹15 lakhs and it has a target ROI of 15%, the target cost would be_____.

    a.   ₹ 930

    b.   ₹ 950

    c.   ₹ 1,050

    d.   ₹ 1,130

2. **(a)** Answer both the questions

     (i)   'Value chain is a powerful tool for disaggregating a company into its strategically relevant activities' - explain the elements of the value chain.

     (ii)   "Value chain analysis help an organization in gaining competitive advantage" – Explain the validity of the above statement in a dynamic business world.

                                                               [4+2=6]

   (b) Answer both the questions

     (i)   "A traditional approach to quality management is that there is an optimal level of quality effort, that minimizes total quality costs, and there is a point beyond which spending more on quality yields a benefit that is less than the additional cost incurred".

         Describe the principles of Total Quality Management (TQM) in the above context? Distinguish those from the traditional approach to quality management?

     (ii)   Explain the notion of continuous improvement. What is the cornerstone of continuous improvement?   **[3+3=6]**

3. **(a)** A Company manufacturing a highly successful line of cosmetics intends to diversify the product line to achieve fuller utilization of its plant capacity. As a result of considerable research made the company has been able to develop a new product called 'EMO'. EMO is packed in tubes of 50 grams capacity and is sold to the wholesalers in cartons of 24 tubes at ₹ 240 per carton. Since the company uses its spare capacity for the manufacture of EMO, no additional fixed expenses will be incurred. However, the cost accountant has allocated a share of ₹ 4,50,000 per month as fixed expenses to be absorbed by EMO as a fair share of the company's present fixed costs to the new production for costing purposes. The company estimated the production and sale of EMO at 3,00,000 tubes per month and on this basis the following cost estimates have been developed

	₹ per carton
Direct Materials	108
Direct Wages	72
All overheads	54
Total costs	**234**

After a detailed market survey, the company is confident that the production and sales of EMO can be increased to 3,50,000 tubes and the cost of empty tubes, purchased from outside will result in a saving of 20% in material and 10% in direct

wages and variable overhead costs of EMO. The price at which the outside firm is willing to supply the empty tubes is ₹1.35 per empty tube. If the company desires to manufacture empty tubes in excess of 3,00,000 tubes, new machine involving an additional fixed overheads ₹ 30,000 per month will have to be installed.

Required:

(i)   Discuss with reasons as the Cost Accountant of the company whether it should make or buy the empty tubes at each of the three volumes of production of EMO namely 3,00,000; 3,50,000 and 4,50,000 tubes.

(ii)   At what volume of sales will it be economical for the company to install the additional equipment for the manufacture of empty tubes?

(iii) Determine the profitability on the sale of EMO at each, of the aforesaid three levels of output based on your decision and showing the cost of empty tubes as a separate element of cost.   **[3+2+3=8]**

(b) A company makes three products X, Y and Z. All three products use the same type of labour which is limited to 1,000 hours per month. Individual details are as follows;

Product	X	Y	Z
Contribution/unit	₹ 25	₹ 40	₹32
Labour hours/unit	5	6	8
Maximum demand	50	100	400

Suggest the management on the optimal product mix.   **[4]**

4. (a) Mr Belle has recently developed a new improved video cassette and shown below is a summary of a report by a firm of management consultants on the sales potential and production costs of the new cassette. Sales potential: The sales volume is difficult to predict and will vary with the price, but it is reasonable to assume that at a selling price of ₹10 per cassette, sales would be between 7,500 and 10,000 units per month. Alternatively, if the selling price was reduced to ₹9 per cassette, sales would be between 12,000 and 18,000 units per month. Production costs: If production is maintained at or below 10,000 units per month, then variable manufacturing costs would be approximately ₹8.25 per cassette and fixed costs ₹12,125 per month. However, if production is planned to exceed 10,000 units per month, then variable costs would be reduced to ₹7.75 per cassette, but the fixed costs would increase to ₹16,125 per month. Mr. Belle has been charged ₹2,000 for the report by the management consultants and, in addition, he has incurred ₹3,000

development costs on the new cassette. If Mr. Belle decides to produce and sell the new cassette it will be necessary for him to use factory premises which he owns, but are leased to a colleague for a rental of ₹400 per month. Also he will resign from his current post in an electronics firm where he is earning a salary of ₹1,000 per month.

Required:

a)   Draw inference from the information given above and identify the following

     (i)   an opportunity cost,

     (ii)   a sunk cost.

b)   Making whatever calculations you consider appropriate, analyze the report from the consultants and advise Mr. Belle of the potential profitability of the alternatives shown in the report.

c)   You are required to analyze the basis on which the above decisions are applied and state the assumptions considered necessary or matters which may require further investigation or comment should be clearly stated.

[2+4+2=8]

(b)   Company X is forced to choose between two machines A and B. The two machines are designed differently but have identical capacity and do exactly the same job. Machine A costs ₹1,50,000 and will last for 3 years. It costs ₹40,000 per year to run. Machine B is an 'economy' model costing only ₹1,00,000, but will last only for 2 years, and costs ₹60,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10%. Suggest the management as to which machine it should buy. **[4]**

5.   **(a)**   You have been provided with the following data for S plc for September:

Accounting method: Variances	Absorption (₹)	Marginal (₹)
Selling Price	1,900 (A)	1,900 (A)
Sales Volume	4,500 (A)	7,500 (A)
Fixed overhead expenditure	2,500 (F)	2,500 (F)
Fixed overhead volume	1,800 (A)	n/a

During September production and sales volumes were as follows:

	Sales	Production
Budget	10000	10000
Actual	9500	9700

Required:

a) Calculate:

　(i)　the standard contribution per unit;

　(ii)　the standard profit per unit;

　(iii)　the actual fixed overhead cost total.

b) Using the information presented above, analyze how different variances are calculated on the basis of the choice of marginal or absorption costing.

[6 + 2=8]

(b) From past experience a company operating a standard cost system has accumulated the following information in relation to variances in its monthly management accounts:

Percentage of total number of variances

1. Its variances fall into two categories:

Category 1: those that are not worth investigating	64%
Category 2: those that are worth investigating	36%
	100%

2. Of Category 2, corrective action has elimiated 70 per cent of the vairances, but the remainder have continued.

3. The cost of investigation averages ₹350 and that of correcting variances averages ₹550.

4. The average size of any variance not corrected is ₹525 per monthsnd the company's policy is to assess the present value of such costs at 2% per month for a period of five months.

You are required to prepare two decsion trees, to represent the position if an investigation is

(i)　carried out;

(ii)　not carried out.　　　　　　　　　　　　　　　　　　**[2+2=4]**

6. SBA is a company that produces televisions and components for televisions. The company has two divisions, Division S and Division B. Division S manufactures

components for televisions. Division S sells components to Division B and to external customers. Division B uses five of the components in each of the televisions that it manufactures, and sells televisions directly to external customers.

Division S

Budgeted Variable manufacturing cost per component	₹
Direct Material	14
Direct Labour	18
Variable Overhead	12

The following information relating to next year is also available

Fixed Cost	₹5,60,000
Production Capacity	175000 components
External demand	150000 components
Potential demand from Division B	80000 components
The anticipated external market price for a component is	₹ 50

Division B

Sales Price	₹ 450
Budgeted variable manufacturing cost per television	
Direct Material	₹ 40
Direct Labour	₹ 62
Variable overhead	₹16

In addition to the variable costs above, each television produced needs five components. Fixed costs are budgeted to be ₹14,60,000 for next year. Annual sales of televisions are expected to be 16,000 units.

Transfer pricing policy

Transfer prices are set at opportunity cost.

Division S must satisfy the demand of Division B before selling components externally.

Division B is allowed to purchase components from Division S or from external suppliers.

Required:

1. Assuming that Division B buys all the components it requires from Division S: Produce a profit statement for each division detailing sales and costs, showing external sales and internal company transfers separately where appropriate.

2. A specialist external supplier has approached Division B and offered to supply 80,000 components at a price of ₹42 each. The components fulfill the same function as those manufactured by Division S. The manager of Division B has accepted the offer and has agreed to buy all the components it requires from this supplier.

    • Develop and submit a revised profit statement for each division and for the total SBA company

3. Discuss the potential implications for SBA of outsourcing the production of one type of component that it manufactures **[8]**

SECTION – B : QUANTITATIVE TECHNIQUES IN DECISION MAKING

Answer to Question No. 7 & 11 in Section B, are compulsory.

Further, answer **any 2** from Question nos. 8, 9 & 10**.**

7. **Choose the most appropriate answer to the following questions giving justification.**

           [2 + 2 = 4]

(i) Optimistic time and pessimistic time of an activity are respectively 4 days and 16 days. Variance of duration of the activity will be –
   a.   4 days
   b.   2 days
   c.   3 days
   d.   None of the above.

(ii) Dummy row or column is added in an assignment problem –
   a.   To prevent a solution to become degenerate.
   b.   To reduce the total cost of assignment.
   c.   To increase the profit function.
   d.   To balance total activities and total resources.

8. (a) An animal feed company must produce 200 kg. of a mixture consisting of ingredients X_1 and X_2. The ingredient X_1 cost ₹3 per kg. and X_2 cost ₹5 per kg. Not

more than 80 kg. of X_1 can be used and at least 60 kg. of X_2 must be used. Find the minimum cost mixture, using LP technique. **[6]**

(b) Consider a problem of assigning four officers to four tasks. The time (hours) required to complete the tasks is given below:

Officer	Tasks			
	A	B	C	D
Officer 1	4	7	5	6
Officer 2	-	8	7	4
Officer 3	3	-	5	3
Officer 4	6	6	4	2

Officer 2 cannot be assigned to task A and officer 3 cannot be assigned to task B. Find all the optimal assignment schedules. **[8]**

9. (a) Infer the optimum solution of the Game using Dominance Principle

$$\begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix}$$ **[8]**

(b) (i) What do you mean by Data Mining

(ii) Discuss briefly applications of R Programming in the real world. **[3+3=6]**

10. (a) Z.P.L.C experience difficulty in its budgeting process because it finds it necessary to quantify the learning effect as new products are introduced.

Substantial product changes occur and result in the need for retraining.

An order for 30 units of a new product has been received by Z.P.L.C so far, 14 have been completed; the first unit required 40 direct labour hours and a total of 240 direct labour has been recorded for the 14 units. The production manager expects an 80% learning effect for this type of work.

The company uses standard absorption costing. The costs attributed to the centre in which the unit is manufactured are as follows:

Head	Cost (₹)
Direct Material	₹ 30.00 per unit
Direct Labour	₹ 6.00 per unit
Variable Overhead	₹ 0.50 per direct labour hour
Fixed Overhead	₹ 6,000 per 4 week operating period.

There are ten direct employees working a five-day week, eight hours per day. Personal and other downtime allowances account for 25% of total available time. The company usually quotes a four-week delivery period for orders. You are required to:

Determine whether the assumption of an 80% learning effect is a reasonable one in this case, by using the standard formula $Y = ax^b$

Where
Y = the cumulative average direct labour time per unit (productivity).

a = the average labour time per unit for the first batch.

x = the cumulative number of batches produced.

b = the index of learning.

(i) Calculate the number of direct labour hours likely to be required for an expected second order of 20 units.

(ii) Use the cost data given to produce an estimated product cost for the initial order, examine the problems.

Use logarithmic tables to find the values of Logarithm and Anti-Logarithm.

[4+4=8]

(b) Assume the Cost in Rupee term for manufacturing x number of a product per day is $C(x) = 14400 + 550x + 0.01x^2$. Suggest the no. of units of the product that should be manufactured per day so that the Average Cost is minimum. Also find the Average Cost and the total cost at this level of production. **[6]**

Case study

11. Problems of Linear Programming with objective of minimizing Total Cost of transportation of a particular commodity from different Sources to various Destinations is solved using the methodology of Transportation technique. Traditionally such problems involve one Objective function. But in real life, problems involve more than one Objective function. An example of such type, is transportation of perishable items or deteriorating items. For these items minimization of deterioration is equally important along with that of cost of transportation.

Egg is a commodity which comes under the category of deterioration in the form of its breakage. Any broken egg is of zero value to the manufacturing firms. Thus minimization

of breakage of eggs during transportation is one of the most important objectives of the egg transportation problem. At the same time there are the other important objectives too, like minimization of distance travelled to supply, optimization of time taken to supply etc. In fact, these factors are all related to the minimization of deterioration. As eggs are traditionally transported through roads in our country, which are not of best possible quality as far as smoothness is concerned, chances of breakage increase with increased distance travelled. Similarly, optimization of time taken to reach the Destination (which has a relationship with the speed of the transporting vehicle) is important because more the speed of the vehicle less is the time taken to reach but with a higher chance of breakage of eggs. So it is quite clear that logistics and supply chain for eggs is a multi-objective problem of transportation.

Help of software is needed to find solution of such problems without any hassle. In fact, the solutions obtained are heuristic type where some compromise among the optimum values of the individual functions is done to reach the ultimate goal.

A problem of transportation of eggs is given as follows –
Suppose there are three sources A, B & C with capacities (in lakhs of eggs) 8, 5 & 3 respectively to supply eggs to three destinations I, II & III having respective demands (in lakhs of eggs) of 5, 3 and 2. The distance in kilometres between the sources and destinations are given in the following matrix.

From Source	To Destination		
	I	II	III
A	551	314	280
B	521	267	341
C	396	142	193

Software provided the following optimal allocation of eggs to the different cells of the matrix while going for distance minimization: - A – III = 2, B – I = 2, B – II = 3 and C – I = 3
Based on the above, the minimum distance to be travelled is given to be 1464 Kms. which has the beak-up of (280 + 521 + 267 + 396).

The objective of minimization of Percentage Breakage of eggs is taken care of based on the following data

FINAL EXAMINATION
MODEL QUESTION PAPER
SET 1
TERM – JUNE 2023
PAPER - 16
STRATEGIC COST MANAGEMENT

From Source	To Destination @ 30 Kmph			To Destination @ 35 Kmph			To Destination @ 40 Kmph		
	I	II	III	I	II	III	I	II	III
A	5.00	2.85	2.54	5.50	3.13	2.80	6.00	3.42	3.05
B	4.77	2.42	3.10	5.20	2.66	3.40	5.67	2.91	3.71
C	3.61	1.29	1.75	3.95	1.42	1.93	4.13	1.55	2.00

Optimal allocations for different Speeds of vehicles as provided by the software are given in the tables below.

From Source	To Destination @ 30 Kmph			To Destination @ 35 Kmph			To Destination @ 40 Kmph			Supply in Lakhs
	I	II	III	I	II	III	I	II	III	
A			2			2			2	8
B	2	3		2	3		2	3		5
C	3			3			3			3
Demand in Lakhs	5	3	2	5	3	2	5	3	2	

Using the methodology similar to that of Distance minimization, the total breakage percentage for a speed of 30 Kmph is found to be 13.34 and the average breakage percentage is 3.335.

Total Transportation cost is found to be ₹ 2,80,000/-

Based on the above information answer the following questions –

1. Instead of using the software if the problem is to be solved manually then formulate the first step.

2. Is the figure of average breakage percentage correct for a speed of 30 Kmph? Justify.

3. What is the Transportation Cost of an egg per kilometre of distance travelled?

4. Formulate a matrix for minimizing the time taken to supply when the vehicle speed is 35 Kmph.   **[8]**