Total No. of Questions – 7

Total No. of Printed Pages – 16

Time Allowed – 3 Hours

Maximum Marks – 100

# CSM

Answers to questions are to be given only in English except in the case of candidates who have opted for Hindi medium. If a candidate has not opted for Hindi medium, his/her answers in Hindi will not be valued.

Question No. **1** is compulsory.

Answer any **five** questions from the remaining **six** questions.

Working notes should form part of the answer.

No statistical or other table will be provided with this question paper.

Wherever necessary, candidates may make appropriate assumptions and clearly state them.

**Marks**

1. (a) The following are cost data for three alternative ways of processing work cases in an office system :  5

| | A Manual (₹) | B Semi Automatic (₹) | C Fully Automatic (₹) |
|---|---|---|---|
| Total fixed cost per month | 3,000 | 9,000 | 25,000 |
| Variable cost per case | 48 | 28 | 8 |

Calculate cost indifference points. Interpret your result. State for what volumes of cases will you prefer each of A, B and C.

(b) Classify the following items under appropriate categories of quality    5
costs, viz., Prevention Costs (PC), Appraisal Costs (AC), Internal
Failure Costs (IFC) and External Failure Costs (EFC) :

(i) Unplanned replacement to customers

(ii) Correction of a bank statement

(iii) Design review

(iv) Equipment accuracy check

(v) Staff training

(vi) Reprocessing of a loan operation

(vii) Product liability warranty

(viii) Product acceptance

(ix) Wastage of material

(x) Planned maintenance of equipment

(Candidates may opt for the following format and fill in the appropriate
Roman numerals under each column)

| Costs → | PC | AC | IFC | EFC |
|---------|----|----|-----|-----|
| Q. Nos. → | | | | |

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(c) The unit profit matrix based on four factories and three sales depots of a    5
company and unbalanced quantities of demand and supply are tabulated
below. The main object of the company is to maximize profit. Assume
that there is no profit in case of surplus production.

| | Factories | Sales Depots | | | Supply (Nos.) |
|---|---|---|---|---|---|
| | | S1 | S2 | S3 | |
| Towns | F1 | 6 | 6 | 1 | 10 |
| | F2 | –2 | –2 | –4 | 150 |
| | F3 | 3 | 2 | 2 | 50 |
| | F4 | 8 | 5 | 3 | 100 |
| Demand (Nos.) | | 80 | 120 | 150 | |

Formulate the above as a usual transportation minimization problem
and find the initial solution by using Vogel's Approximation Method
(VAM).

(d) A and B are two customers of XYZ Electronics Ltd., a manufacturer of    5
audio players.

Selling price per unit is ₹ 5400. Its cost of production per unit is ₹ 4,420.

Additional costs are :

Order Processing Cost                    ₹ 2,000 per order

Delivery Costs                           ₹ 3,500 per delivery

Details of customers A and B for the period are given below :

|  | Customer A | Customer B |
|---|---|---|
| Audio Players purchased (nos.) | 350 | 500 |
| No. of orders | 5 (each of 70 units) | 10 (each of 50 units) |
| No. of deliveries | 5 | 0 |

The company's policy is to give a discount of 5% on the selling price on orders for 50 units or more, and to further give 8% discount on the undiscounted selling price if a customer uses his own transport to collect the order. Assume that production levels are not altered by these orders.

(i) You are required to analyse the profitability by comparing profit per unit for each customer.

(ii) Comment on the discount policy on delivery.

2. (a) Innovation Ltd. has entered into a contract to supply a component to a company which manufactures electronic equipments.    **8**

Expected demand for the component will be 70000 units totally for all the periods. Expected sales and production cost will be

| Period | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Sales (units) | 9500 | 17000 | 18500 | 25000 |
| Variable cost per unit | 30 | 30 | 32.50 | 35 |

Total fixed overheads are expected to be ₹ 14 lakhs for all the periods.

The production manager has to decide about the production plan.

The choices are :

Plan 1 : Produce at a constant rate of 17500 units per period. Inventory holding costs will be ₹ 6.50 per unit of average inventory per period.

Plan 2 : Use a Just-In-Time (JIT) system

Maximum capacity per period normally            · 18000 units

It can produce further up to 10000 units per period in overtime.

Each unit produced in overtime would incur additional cost equal to 30% of the expected variable cost per unit of that period.

Assume zero opening inventory.

(i)   Calculate the incremental production cost and the savings in inventory holding cost by JIT production system.

(ii)  Advise the company on the choice of a plan.

(b)  $R_3C_2$ denotes the element at the intersection of the third row and $2^{nd}$     **8**
     column. Under this notation, $R_1C_1$, $R_2C_1$, $R_3C_1$, $R_3C_2$, $R_3C_3$, $R_4C_3$, $R_4C_4$ were the only zero elements in a 4×4 minimisation assignment problem after the row minimum and column minimum operations.

(i)   In the next step to draw lines to cover zeroes, a student drew 4 horizontal lines covering rows $R_1$, $R_2$, $R_3$ and $R_4$. Will he arrive at the optimal assignment at the next step ? Why ? Explain the concept.

(ii)  Independent of (i), if you are given the additional information that $R_2C_2$ element is lesser than the Row 1 and Row 2 non-zero values, how will you arrive at the optimal solution ?

3.  (a)  Alpha Ltd. uses standard costing system for manufacturing its single    8
         product 'APS'.

         Standard cost card is as follows :

|                                      | Per unit (₹) |
|--------------------------------------|:------------:|
| Selling Price                        | 120          |
| Direct Material (1 kg per unit)      | 20           |
| Direct Labour (6 hrs @ ₹ 8 per hour) | 48           |
| Variable Overheads                   | 24           |
| Contribution                         | 28           |

Actual and budgeted activity levels in units for the month of September are :

|            | Budget  | Actual  |
|------------|---------|---------|
| Sales      | 50,000  | 51,200  |
| Production | 50,000  | 52,000  |

Actual sales revenue and variable costs for the month of September are given as under :

| Sales                       | 6133760 |
|-----------------------------|---------|
| Direct Material             | 1065600 |
| Direct Labour (3,00,000 hrs)| 2442000 |
| Variable Overheads          | 1228000 |

**Calculate :**

(i)   Direct Labour Rate Variance

(ii)  Direct Labour Efficiency Variance

(iii) Sales Volume Variance

(iv)  Sales Price Variacne

(v)   Comment on your findings in (i) and (ii) above.

(b)   The following information is given for a certain project :   **8**

| Activity | Normal Duration | Crash Duration | Difference | Normal Cost | Crash Cost | Difference | Activity slope |
|---|---|---|---|---|---|---|---|
| | (Days) | (Days) | (Days) | (₹) | (₹) | (₹) | (₹/day) |
| | I | II | III = I – II | IV | V | VI = V – IV | VII = VI/III |
| 1-2 | 9 | 6 | 3 | 640 | 700 | 60 | 20 |
| 1-3 | 8 | 5 | 3 | 500 | 575 | 75 | 25 |
| 1-4 | 15 | 10 | 5 | 400 | 550 | 150 | 30 |
| 2-4 | 5 | 3 | 2 | 100 | 120 | 20 | 10 |
| 3-4 | 10 | 6 | 4 | 200 | 260 | 60 | 15 |
| 4-5 | 2 | 1 | 1 | 100 | 140 | 40 | 40 |

(i)   What is the normal project duration ?

(ii)  Perform step-by-step crashing to reduce the project duration by 5 days. What is the cost incurred for the optimal crashing exercise ?

(iii)  Independent of (ii) above, if the Project Manager is able to save as per rates in Column VII of the above table for every day relaxed for the activities, compute the number of days and associated savings for 5 days of relaxation, in the order of optimality, without extending the project duration as per (i). The Project Manager is interested in this exercise to schedule resources.

4.    (a)   JCL Corporation manufactures and sells two products RB and RD. Three types of materials, A, B and C are required for producing these products. Projected information for 2015-16 is given below :                     8

| Product | Projected sales for 2015-16 | Inventory (in units) | | Direct Labour Requirement |
|---|---|---|---|---|
| | Units | on 1-4-2015 | on 31-3-2016 | Hours/Unit |
| RB | 75,000 | 25,000 | 31,250 | 4 |
| RD | 50,000 | 10,000 | 11,250 | 6 |

Raw material stock and usage are as follows :

| Direct Material | Required per unit | | Inventory on 1-4-2015 | Inventory on 31-3-2016 |
|---|---|---|---|---|
| | RB | RD | | |
| A | 5 kg | 5.00 kg | 40000 kg | 45000 kg |
| B | 2.50 kg | 3 kg | 36250 kg | 40000 kg |
| C | 0 | 1 kg | 7500 kg | 8750 kg |

You are required to prepare the following for 2015-16 :

(i)   Production budget (in units)

(ii)  Direct material purchase budget in quantities for A, B and C.

(iii) After (i) and (ii), you are told that only 6,00,000 labour hours will be available for production. If there is no requirement to hold the stated level of finished goods closing inventory, what would be the principal budget factor ? Substantiate your view with appropriate figures.

(b) Mr. X has ₹ 10 lacs which he wants to invest in the share market in anticipation of having good returns. He wants to invest only in two stocks and one mutual fund with an investment allowed in each stock or mutual fund not being more than ₹ 7 lacs.                                  8

| | Expected rate of Return | Risk rating (on a scale of 0 to 10) |
|---|---|---|
| Stock L | 15% | 5 |
| Stock M | 18% | 8 |
| Mutual Fund | 13% | 4 |

He does not want to accept an average rate of return below 12% or a risk factor above 6.

How much money he should invest in each alternative so as to obtain the highest annual total return ?

Formulate the above as a linear program and present the inequalities with coefficients in their simplest integer forms.

**Marks**

5. (a) Four products P, Q, R and S are produced by profit centre Division A. **12**

Each product is sold in the external market also. Data for the period are as follows :

|  | **P** | **Q** | **R** | **S** |
|---|---|---|---|---|
| Market price per unit (₹) | 70 | 69 | 56 | 46 |
| Variable cost of production per unit (₹) | 66 | 59 | 36 | 37 |
| Labour hours per unit | 3 | 2 | 2 | 3 |
| Specific fixed costs (₹) per 10,000 units of product | 2500 | 12600 | 15000 | 18000 |

Product S can be transferred to Division B but the maximum quantity that might be required for transfer is 20,000 units of S. The specific fixed costs given above are avoidable if a product is not made. They are incurred for every 10,000 units.

The maximum sales (units) in the external market are :

P 30,000

Q 31,000

R 28,000

S 18,000

Division B can purchase the same product at a slightly cheaper price of ₹ 45 per unit instead of receiving transfers of product S from Division A without any extra transport/inspection costs. B can also take partial supplies from A.

The total labour hours available in Division A is 192000 hours.

(i)   What is A's optimal product mix and the corresponding contribution net of specific fixed costs ?

(ii)  How many units should A transfer to B and at what price ?

(iii) Is it in the company's interest to transfer 20,000 units of S to B ?

(b)   The budgeted cost data of a product manufactured by XYZ Co. Ltd. is     4

furnished as below :

Budgeted units to be produced – 200000

Variable cost (₹)              32 per unit

Fixed cost (₹)                 16 lacs

It is proposed to adopt cost plus pricing approach with a mark up of 25% on full budgeted cost basis.

However, research by the marketing department indicates that demand of the product in the market is price sensitive. The likely market responses are as follows :

| Selling price (₹ per unit) | 44 | 48 | 50 | 56 | 60 |
|---|---|---|---|---|---|
| Annual Demand (units) | 168000 | 152000 | 140000 | 128000 | 108000 |

Analyse the above situation and determine the best course of action.

6.   (a)   X Ltd. makes a single product with the following details :          8

| Description | Current Situation | Proposed Change |
|---|---|---|
| Selling Price (₹/unit) | 10 | |
| Direct Costs (₹/unit) | 5 | |
| Present number of setups per production period, (before each production run, setup is done) | 42 | |
| Cost per set up (₹) | 450 | Decrease by ₹ 90 |
| Production units per run | 960 | 1008 |
| Engineering hours for production period | 500 | 422 |
| Cost per engineering hour (₹) | 10 | |

The company has begun Activity Based Costing of fixed costs and has presently identified two cost drivers, viz. production runs and engineering hours. Of the total fixed costs presently at ₹ 96,000, after the above, ₹ 72,100 remains to be analysed. There are changes as proposed above for the next production period for the same volume of output.

(i)   How many units and in how many production runs should X Ltd. produce in the changed scenario in order to break-even ?

(ii)  Should X Ltd. continue to break up the remaining fixed costs into activity based costs ? Why ?

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(b)  A dietician wants to simulate arrivals of her patients and her    8

consultation time with the following random numbers. Her assistant has

already prepared the random number allocation tables.

The dietician wants to have an idea of her idle time and patients'

waiting time. She starts her consultation at 10:00 a.m. and wants to give

an appointment an interval of 20 minutes. The Random Number table is

as follows :

| Arrival of patient | 15 | 4 | 35 | 67 | 75 | 86 | 25 |
|---|---|---|---|---|---|---|---|
| Consultation time | 17 | 15 | 12 | 58 | 60 | 72 | 30 |

Random Number Allocation Table : I

| Patient Punctuality | Probability | Cumulative Probability | Random No. |
|---|---|---|---|
| Minutes early    3 | 0.05 | 0.05 | 00 – 04 |
|                  2 | 0.18 | 0.23 | 05 – 22 |
|                  1 | 0.40 | 0.63 | 23 – 62 |
| On time | 0.25 | 0.88 | 63 – 87 |
| Minutes late    2 | 0.08 | 0.96 | 88 – 95 |
|                 4 | 0.04 | 1.00 | 96 – 99 |

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Random Number Allocation Table : 2

| Consultation Time | Probability | Cumulative Probability | Random No. |
|---|---|---|---|
| 15 | 0.13 | 0.13 | 00 – 12 |
| 18 | 0.15 | 0.28 | 13 – 27 |
| 20 | 0.28 | 0.56 | 28 – 55 |
| 25 | 0.34 | 0.90 | 56 – 89 |
| 30 | 0.10 | 1.00 | 90 – 99 |

(i) Simulate the arrival and consultation times and find out the dietician's idle times and patients' waiting times.

(ii) If clients are sensitive to waiting, how would you advise the dietician as a Management Accountant, based on the results of your exercise ?

7. Answer any **four** out of the following **five** questions :

(a) A company is planning a new product. Market research information suggests that 40000 units of the product can be sold at a maximum of ₹ 25 per unit. The company seeks a minimum mark-up of 25% on product cost. It is estimated that the lifetime costs of the product will be as follows :

(1) Research and development, design costs ₹ 1,50,000

(2) Manufacturing costs ₹ 16 per unit

(3) End of life costs ₹ 70,000

(4) Promotion and capacity cost ₹ 20,000.

Should the product be manufactured ?

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(b) State the most appropriate pricing policy to be adopted in the following     4
independent situations :

(Situations need not be copied. Only the Roman numeral and policy
need to be mentioned in the answer book.)

(i) Modern patented drug entering the market.

(ii) The latest version of a mobile phone is being launched by an
established, financially strong company.

(iii) An established company has recently entered the stationery
market segment and launched good quality paper for printing at
home and office.

(iv) A car manufacturer is launching an innovative, technologically
advanced car in the highly priced segment.

(c) What are the steps involved in Zero Based Budgeting ?                          4

(d) Proposal A is being evaluated against Proposal B. Fill up column IV of        4
the following table :

| I | II | III | IV |
|---|---|---|---|
| Sl. No. | Type of Cost | Classification | Condition under which the classification happens |
| (i) | Variable cost per unit | Irrelevant | |
| (ii) | Unavoidable fixed costs | Relevant | |
| (iii) | Out of pocket costs in future | Relevant | |
| (iv) | Sunk cost | Irrelevant | |

(Only Columns I and IV are required to be presented in the answers)

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(e)   State whether and why the following statements are valid or not valid :    4

(Statements need not be copied into answer book.)

   (i)    Target costing is not applicable to a monopoly market.

   (ii)   Target costing ignores non-value added activities.

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