

M. COM DEGREE END SEMESTER EXAMINATION - MARCH 2024
SEMESTER 2 - COMMERCE

COURSE : 21P2COMT10 - OPERATIONS MANAGEMENT TECHNIQUES

(For Regular 2023 Admission and Improvement/Supplementary 2022/2021 Admissions)

Duration : Three Hours

Max. Weights: 30

PART A**Answer any 8 questions****Weight: 1**

1. What are 'total' 'free' and 'independent' float? (U, CO 5)
 2. State the term arrival pattern in relation to queuing theory. (U, CO 4)
 3. What is float? (R, CO 5)
 4. An animal feed company must produce at least 200 kgs of a mixture consisting of ingredients X1 and X2 daily. X1 costs Rs. 3 per kg and X2 Rs. 8 per kg. No more than 80kg of X1 can be used and atleast 60 kgs of X2 must be used. Formulate the mathematical model to the problem. (A, CO 2)
 5. What are slack and surplus variable? (U, CO 2)
 6. What is pay off matrix? (U, CO 4)
 7. What is zero sum game? (U, CO 4)
 8. What is forward pass in CPM? (U, CO 5)
 9. What is Probabilistic model? (R, CO 1)
 10. What are unbalanced transportation problems? (U, CO 3)
- (1 x 8 = 8)**

PART B**Answer any 6 questions****Weights: 2**

11. Explain the use of O.R. in management? (U, CO 1)
12. Find the optimum solution to the following assignment problem showing the cost (Rs.) for assigning workers to jobs.

| | | Job | |
|---------|----|-----|----|
| workers | X | y | z |
| A | 18 | 17 | 16 |
| B | 15 | 13 | 14 |
| C | 19 | 20 | 21 |

(A, CO 3)

13. A manufacturer of furniture makes two products, chairs and tables. Processing of these products is done on two machines A and B. A chair requires 2 hours on machine A and 6 hours on machine B. A table requires 5 hours on machine A and no time on machine B. There are 16 hours of time per day available on machine A and 30 hours on machine B. Profit gained by the manufacturer from chair is Re. 1 and from table is Rs. 5 respectively. Formulate the problem into a LPP in order to maximize the total profit. (A, CO 2)
14. Write a note on Bayesian Rule. (A, CO 4)

15. The cost of manufacture of the product at different production shops are:

| Shop | Variable cost | Fixed cost |
|------|---------------|------------|
| A | 14 | 7000 |
| B | 16 | 4000 |
| C | 15 | 5000 |

(A, CO 3)

Find the optimum quantity to be supplied from each shop to different warehouses at minimum total cost.

16. Draw the network for the project whose activities with their relationships are given below.

A,C,D can start simultaneously; $E > B, C$; $F, G > D$; $H, I > E, F$; $J > I, G$; $K > H$; $B > A$

(A, CO 5)

17. Discuss in brief the duality in linear programming.

(U, CO 2)

18. Use graphic method to solve the following game

| | | Player Y | | | | |
|----------|---|----------|----|-----|----|----|
| | | I | II | III | IV | V |
| Player X | 1 | 6 | 3 | -1 | 0 | -3 |
| | 2 | 3 | 2 | -4 | 2 | -1 |

(A, CO 4)

(2 x 6 = 12)

PART C

Answer any 2 questions

Weights: 5

19. Solve graphically the following problems:

Maximize $Z = 300X_1 + 400X_2$

Subject to $5X_1 + 4X_2 \leq 200$

$3X_1 + 5X_2 \leq 150$

$5X_1 + 4X_2 \geq 100$

$8X_1 + 4X_2 \geq 80$

$X_1, X_2 \geq 0$

(A, CO 2)

20. Find the minimum cost for transportation, applying transportation technique.

| | 1 | 2 | 3 | 4 | 5 | 6 | REQUIRED |
|-----------|---|---|---|---|---|---|----------|
| A | 2 | 0 | 4 | 0 | 5 | 3 | 4 |
| B | 1 | 6 | 6 | 0 | 1 | 0 | 3 |
| C | 0 | 7 | 0 | 2 | 4 | 0 | 2 |
| D | 2 | 6 | 5 | 4 | 1 | 3 | 4 |
| E | 4 | 1 | 4 | 0 | 3 | 4 | 2 |
| AVAILABLE | 5 | 2 | 3 | 1 | 2 | 2 | |

(A, CO 3)

21. An ink manufacturer produces a certain type of ink at a total average cost of Rs 3 per bottle and sells at a price of Rs 5 per bottle. The ink is produced over the weekend and is sold during the following week. According to past experience, the weekly demand has never been less than 78 or greater than 80 bottles in his place.

You are required to formulate the loss table.

The following is a pay-off table. From it, form a regret (opportunity loss) table.

| Pay off Table | | | |
|------------------|-----|-----|-----|
| States of nature | A1 | A2 | A3 |
| E1 | 156 | 153 | 150 |
| E2 | 156 | 158 | 155 |
| E3 | 156 | 158 | 160 |

(A, CO 4)

22. Tasks A, B, C H, I constitute a project. The notation $A < B$ means that the task A must be finished before B can begin. With this notation $A < D$; $A < E$; $B < F$; $C < G$; $D < F$; $C < H$; $F < I$; $G < I$
 Draw a graph to represent the sequence of tasks and find the minimum time of completion of the project, when the time(in days) of completion of each task is as follows and minimum time for the completion of the project.

| TASK | TIME |
|------|------|
| A | 8 |
| B | 10 |
| C | 8 |
| D | 10 |
| E | 16 |
| F | 17 |
| G | 18 |
| H | 14 |
| I | 9 |

(A, CO 5)

Find the critical path and the minimum time for the completion of the project.

(5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

| CO | Course Outcome Description | CL | Questions | Total Wt. |
|------|--|----|---------------------|-----------|
| CO 1 | To understand the meaning and evolution of Operations Management Techniques | U | 9, 11 | 3 |
| CO 2 | To understand the concept of Linear Programming and its application for business solution. | A | 4, 5, 13, 17, 19 | 11 |
| CO 3 | To learn the transportation and assignment techniques for business application | A | 10, 12, 15, 20 | 10 |
| CO 4 | To understand the decision theory and quantitative approach to managerial decision making. | An | 2, 6, 7, 14, 18, 21 | 12 |
| CO 5 | To learn the techniques of Networking and different types of Networking. | A | 1, 3, 8, 16, 22 | 10 |

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;