

(8 pages)

Reg. No. :

Code No. : 12085 E Sub. Code : EECO 43

B.Com. (CBCS) DEGREE EXAMINATION,
APRIL 2025

Fourth Semester

Commerce

Elective – OPERATIONS RESEARCH

(For those who joined in July 2023 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The feasible region in a Linear Programming problem is:
 - (a) The area satisfying all constraints
 - (b) The area satisfying only one constraint
 - (c) The area outside the graph
 - (d) The area maximizing cost

2. The graphical method of solving LPP can only be used when there are:
 - (a) More than 3 variables
 - (b) Only 2 decision variables
 - (c) At least 5 constraints
 - (d) No constraints
3. The North-West Corner Rule is used for:
 - (a) Finding an optimal solution to the transportation problem
 - (b) Finding an initial feasible solution
 - (c) Reducing transportation costs
 - (d) Assigning tasks to workers
4. The Vogel's Approximation Method (VAM) provides:
 - (a) An initial solution closer to the optimal solution
 - (b) The final optimal solution
 - (c) The highest transportation cost
 - (d) A random allocation of resources

5. A game is said to be fair when:
- (a) The sum of payoffs is zero
 - (b) All players have equal probability of winning
 - (c) Both players use the maximum strategy
 - (d) No dominant strategy exists
6. The Dominance Property in Game Theory states that:
- (a) A dominated strategy should be eliminated
 - (b) The optimal strategy is always to minimize losses
 - (c) Players should choose a random strategy
 - (d) Each player has an equal chance of winning
7. _____ inventory model deals with uncertain demand.
- (a) EOQ model
 - (b) Single Period Probabilistic Inventory Model
 - (c) Deterministic Inventory Model
 - (d) Fixed Order Quantity Model

8. Material Requirement Planning (MRP) is used for _____.
- (a) Determining the materials needed for production
 - (b) Ordering random inventory levels
 - (c) Managing financial investments
 - (d) Assigning workers to jobs
9. CPM stands for:
- (a) Critical Path Method
 - (b) Cost-Path Model
 - (c) Critical Performance Measurement
 - (d) Cumulative Process Model
10. Slack time in network analysis refers to:
- (a) The extra time available for an activity without delaying the project
 - (b) The minimum time required to complete a project
 - (c) The time taken to complete all critical activities
 - (d) The maximum time required for an activity

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Brief about the different approaches to Operations Research.

Or

- (b) What are the advantages and disadvantages of the Simplex Method?

12. (a) What are the key differences between the North-West Corner Method and Least Cost Method?

Or

- (b) Discuss the significance of the Stepping Stone Method in Transportation Problems.

13. (a) What are the different strategies followed by players in a game?

Or

- (b) Explain the concept of the minimax criterion in Game Theory.

14. (a) What is Material Requirement Planning (MRP)? Explain its advantages.

Or

- (b) A company sells 5000 units of a product annually. The ordering cost is Rs. 200 per order, and the holding cost per unit per year is Rs.5. find the Economic Order Quantity (EOQ).

15. (a) Explain the concept of slack time in network analysis.

Or

- (b) What are the key applications of PERT in project scheduling?

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Explain the advantages and disadvantages of Formulating LPP.

Or

- (b) A company manufactures two products, A and B. Each unit of A requires 2 hours of labor and 3 kg of raw material, while each unit of B requires 4 hours of labor and 2 kg of raw material. The total available labor hours are 40, and the total raw material available is 30 kg. The profit per unit for A is Rs.5, and for B, it is Rs.4.

Formulate the problem as an LPP to maximize profit.

17. (a) Find out the transportation cost by using least cost method.

	W ₁	W ₂	W ₃	Supply
S ₁	7	6	9	20
S ₂	5	7	3	28
S ₃	4	5	8	17
Demand	21	25	19	65

Or

- (b) A company wants to assign 4 workers (A,B,C,D) to 4 tasks. The cost matrix is as follows:

	Task 1	Task 2	Task 3	Task 4
A	9	2	7	8
B	6	4	3	7
C	5	8	1	8
D	7	6	9	4

Solve using the Hungarian method.

18. (a) Discuss the role of Simulation in business decision-making. What are its advantages and limitations?

Or

- (b) Solve the following game using the Dominance Property:

	B1	B2	B3	B4
A1	3	4	2	1
A2	6	2	5	4
A3	2	1	3	6
A4	4	5	6	3

19. (a) What is Reorder Point (ROP)? How is it determined in deterministic and probabilistic inventory systems?

Or

- (b) A company is considering shifting from traditional inventory management to JIT. Discuss the impact on costs, order frequency, supplier relationships, and risk of stock outs.

20. (a) Explain the steps involved in crashing a project and how it affects project costs.

Or

- (b) A project consists of the following activities with their time estimates in days:

Activity	Predecessor	Duration (Days)
A	—	5
B	A	3
C	A	4
D	B	6
E	C	2
F	D, E	5

- (i) Draw the project network diagram.
(ii) Find the Critical Path and Project Completion Time.