# 0110N636

Candidate's Seat No :_____

**B.Sc Sem.-6 (Rep) Examination**

**SE 311**

**Mathematics (D) Oper. Res**

**Time : 2-30 Hours]** **October-2024** **[Max. Marks : 70**

**Instruction: (1) All the questions are compulsory**

**(2) Notations and Terminology are standard**

**(3) Figures to the right indicates the full marks**

Q1 (A) Derive the EOQ (Economic Order Quantity) Model with Finite replenishment rate. 9

(B) The demand of an item is uniform at a rate of 25 units per month. The fixed cost is Rs. 15 each time a production run is made. The production cost is Rs. 1 per item, and the inventory carrying cost is Rs. 0.30 per item per month. If the shortage cost is Rs. 1.50 per item, per month, determine how often should a production run be made and what size it should be? 9

**OR**

Q1 (A) Explain the order level lot size (OLLS) system . 9

(B) A commodity is to be supplied at a constant rate of 200 units per day. Supplies of A contract has a requirement for cement that amounts to 300 bags per day. No shortages are allowed. Cement costs Rs. 2 per bag, inventory carrying cost is 10% of the average inventory valuation per day and it costs Rs. 20 to purchase order. Find the optimal quantity to purchase and minimum cost of purchase quantity 9

Q2 (A) Explain the terms in detail: (1) Float (slack) of an activity 9

(2) Error in network

(B) Listed in the table are the activities and sequencing necessary for the completion of the project. Draw the network Diagram of activities for the project. 9

| Activity | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Immediate Predecessor | - | A | A | c | B | C | D,E | G | H | F | I,J | K | L | J | M,N |

**OR**

Q2 (A) Explain the basic differences between PERT and CPM. 9

(B) An architect has been awarded a contract to prepare for an urban renewal project. The job consists of the following activities and their estimated times: 9

| Activity | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| Immediate Predecessor | - | A | B | B | C | D | C | E,F | G,H |
| Duration (months) | 5 | 7 | 2 | 3 | 1 | 2 | 1 | 3 | 10 |

I. Draw the network diagram of activities for the project.

II. Indicate Critical Path

(P.T.O)

Q3 (A) Define two person zero sum game. Also Explain the Principles of Dominance in Game Theory. 9

(B) Find the optimum strategy and value of the game of the following Pay-off matrix using the method of Oddments 9

| | Player B | | | |
|---|---|---|---|---|
| Player A | $B_1$ | $B_2$ | $B_3$ | $B_4$ |
| $A_1$ | 8 | -2 | 9 | -3 |
| $A_2$ | 6 | 5 | 6 | 8 |
| $A_3$ | -2 | 4 | -9 | 5 |

**OR**

Q3 (A) Let $E(p,q)$ be such that both $\min_q \max_p E(p,q)$ and $\max_p \min_q E(p,q)$ exists, then show that $\max_p \min_q E(p,q) \leq \min_q \max_p E(p,q)$. 9

(B) Find the optimum strategy and value of the game of the following Pay-off matrix using Matrix method 9

| | Player B | | | |
|---|---|---|---|---|
| Player A | $B_1$ | $B_2$ | $B_3$ | $B_4$ |
| $A_1$ | -1 | 2 | 3 | 0 |
| $A_2$ | -4 | -1 | -1 | 0 |
| $A_3$ | -1 | 1 | 1 | -4 |
| $A_4$ | 4 | -1 | 2 | -7 |

Q4 Attempt any eight in short: 16

1. Give any two limitations of the EOQ model in inventory system.
2. Define: Lead Time and Planning horizon
3. Explain set up cost and purchase cost related to the inventory system.
4. What is difference between continuous review and periodic review to determine cycle time.
5. Mention different Phases of project Management.
6. Explain dummy activity in the network diagram.
7. Explain (1) Merge event (2) Burst event
8. Develop a network:

| Activity | A | B | C | D |
|---|---|---|---|---|
| Immediate Predecessor | - | - | A | B |

9. Define: Fair game
10. Define: Pay off and pay off matrix
11. State the necessary and sufficient condition for the existence of a saddle point in game theory.
12. Explain Maxi min principal