

MAY 2012

P/ID 6011/MBL

Time : Three hours

Maximum : 80 marks

PART A — ($8 \times 5 = 40$ marks)

Answer any EIGHT questions.

All questions carry equal marks.

1. What are the different types of models?
2. Write a short note on the importance of operation research in production management.
3. What are the properties of the Linear programming model?
4. What are the steps in maximization model?
5. What are the assignment problem's describe mathematical formulation of an assignment problem?
6. Explain how the assignment problem can be treated as a particular case of transportation problem? Why this method is not preferred?
7. A car park contains 5 car's. The arrival of car's is Poisson at a mean rate of 10 per hour. The length of time each car spends in the car park is negative exponential distribution with mean of 2 hour's. How many cars are in the car park on average?

8. Test the following matrix to see is the Markov chain regular :

$$P = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{pmatrix} 0 & x & x & 0 \\ x & 0 & 0 & x \\ x & 0 & 0 & x \\ 0 & x & x & 0 \end{pmatrix} \end{matrix}$$

9. Explain various types of inventory.
10. What is an inventory system? Explain the terms
- (a) shortage cost
 - (b) lead time
 - (c) reorder point.
11. Define (a) pure and mixed strategies (b) value of the game.
12. Find the saddle points and solve

$$\begin{matrix} & \text{Player } B \\ \text{Player } A & \begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix} \end{matrix}$$

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

All questions carry equal marks.

13. Solve the following L.P.P. by the graphical method :

$$\text{Minimize } z = 3x_1 + 5x_2$$

Subject to

$$-3x_1 + 4x_2 \leq 12$$

$$x_1 \leq 4$$

$$2x_1 - x_2 \geq -2$$

$$x_2 \geq 2$$

$$2x_1 + 3x_2 \geq 12 \text{ and } x_1, x_2 \geq 0.$$

14. Solve by simplex method

$$\text{Maximize } z = 2x_1 - 4x_2 + 5x_3 - 6x_4$$

$$x_1 + 4x_2 - 2x_3 + 8x_4 \leq 2$$

$$-x_1 + 2x_2 + 3x_3 + 4x_4 \leq 1$$

$$x_1 \ x_2 \ x_3 \ x_4 \geq 0.$$

15. Solve the assignment problem :

		Job			
		P	Q	R	S
Machine	A	18	26	17	11
	B	13	28	14	26
	C	38	19	18	15
	D	19	26	24	10

16. Given an average arrival rate of 20 per hour is it better for a customer to get service rate of 22 customer or at one of the two channel in parallel with mean service rate of 11 customer for each of the two channel assume that both queue's are M/M/S types.
17. Find the optimum sequence for the following sequencing problem.

	Jobs							
	A	B	C	D	E	F	G	H
M_1	14	26	17	11	9	26	18	15
M_2	21	15	16	21	22	12	13	25

Find all so the minimum total elapsed time and idle times on the machine M_1 and M_2 .

18. In a game of matching coin's with two player's suppose A win one unit value when there are two heads wins nothing when there are two tails and loose 1/2 unit value when there are one head and one tail. Determine the pay off matrix the best strategy for each player and the value of the game.