

MAY 2013

P/ID 6011/MBL

Time : Three hours

Maximum : 80 marks

PART A — (8 × 5 = 40 marks)

Answer any EIGHT questions.

1. Describe the uses of operation research in business.
2. State the characteristics of a good model.
3. State the concept of degeneracy in simplex method.
4. Describe the advantages of assignment problem.
5. State the assumptions for sequencing models.
6. Describe the reasons for carrying inventory.
7. What are the cost involved in a queuing system?
8. Describe the assumptions in the rule of the game.
9. What do you understand by pure strategies and mixed strategies?

10. Solve graphically and find the minimum value of

$$z = -x_1 + 2x_2$$

Subject to

$$-x_1 + 3x_2 \leq 10$$

$$x_1 + x_2 \leq 6$$

$$x_1 - x_2 \leq 2$$

$$x_1, x_2 \geq 0.$$

11. Solve the following 2-person zero-sum game

		Player B		
		8	-3	7
Player A	6	-4	5	
		-2	2	-3

12. The annual requirements for a particular raw material are 2000 units costing Re. 1 each to the manufacturer. The ordering cost is Rs. 10 per order and the carrying cost 16% per annum of the average inventory. Find economic order quantity.

PART B — (4 × 10 = 40 marks)

Answer any FOUR questions.

13. Use the simplex method to solve the following LPP.

$$\text{Maximize } z = 3x_1 + 5x_2 + 4x_3$$

Subject to

$$2x_1 + 3x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

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

14. Find optimal assignment schedule and total cost for the following data :

Workers	Jobs (costs in Rs.)			
	W	X	Y	Z
A	1000	1200	400	900
B	600	500	300	800
C	200	300	400	500
D	600	700	300	1000

15. Provide the optimal job sequence involving three machines M_1 , M_2 and M_3 for the following.

Time on machine	Jobs				
	J ₁	J ₂	J ₃	J ₄	J ₅
M_1	7	12	11	9	8
M_2	8	9	5	6	7
M_3	11	13	9	10	14

16. In a replacement problem, the cost of machine is Rs. 6100/- and its scrap value is only Rs. 100. The maintenance costs are as follows :

Years : 1 2 3 4 5 6 7 8

Costs : 100 250 400 600 900 1250 1600 2000

When should the machine be replaced?

17. Solve the following game by using rule of dominance of game theory

$$\begin{pmatrix} 2 & -2 & 4 & 1 \\ 6 & 1 & 12 & 3 \\ -3 & 2 & 0 & 6 \\ 2 & -3 & 7 & 1 \end{pmatrix}$$

18. What were the post-world war II factors so important that these lead to development of operation research?