

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**B.Sc. DEGREE EXAMINATION – MATHEMATICS****FIFTH SEMESTER – NOVEMBER 2016****MT 5507/MT 5504 – OPERATIONS RESEARCH**

Date: 03-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART – A**ANSWER ALL QUESTIONS****(10 x 2 = 20 marks)**

1. Define optimal feasible solution.
2. What are the essential characteristics of operations research?
3. What is transportation problem?
4. What is an unbalanced assignment problem?
5. Define saddle point in a game.
6. What types of games are solved graphically?
7. Write any two differences between PERT and CPM.
8. Define critical path in a network.
9. What is Economic order quantity?
10. What is shortage cost?

PART – B**ANSWER ANY FIVE QUESTIONS.****(5 x 8 = 40 marks)**

11. Solve graphically: Minimise $z = 5x_1 + 4x_2$ subject to the conditions $x_1 - 2x_2 \leq 1, x_1 + 2x_2 \geq 3x_1, x_2 \geq 0$.
12. Solve by simplex method: Maximise $z = x_1 + 2x_2 + x_3$ subject to the conditions
 $2x_1 + x_2 - x_3 \leq 2, -2x_1 + x_2 - 5x_3 \geq -6, 4x_1 + x_2 + x_3 \leq 6, x_1, x_2, x_3 \geq 0$.
13. Find an initial solution by North West Corner Rule method:

	D ₁	D ₂	D ₃	
S ₁	6	10	15	2
S ₂	4	6	16	5
S ₃	12	5	8	9
	1	8	7	16

14. Solve the assignment problem:

	M ₁	M ₂	M ₃	M ₄
J ₁	5	26	13	15
J ₂	3	9	18	3
J ₃	10	7	3	2
J ₄	5	11	9	7

15. Solve the following game:

	B ₁	B ₂	B ₃	B ₄
A ₁	1	7	3	4
A ₂	5	6	4	5
A ₃	7	2	0	3

16. Solve the following game using graphical method

Player B

$$\begin{array}{c}
 \text{Player A} \\
 \left[\begin{array}{cc}
 -6 & 7 \\
 4 & -5 \\
 -1 & 2 \\
 -2 & 5 \\
 7 & -6
 \end{array} \right]
 \end{array}$$

17. Discuss the shortest route problem.

18. The demand for an item is 100 units per day. For placing an order a cost of Rs.400 is incurred. Unit Cost is Rs.10. Holding cost is Rs.0.08 per day. Determine the EOQ and time between two orders.

PART – C

ANSWER ANY TWO QUESTIONS.

(2 x 20 = 40 marks)

19. Solve by Big-M method: Maximize $z = x_1 + 2x_2$ subject to the conditions

$$x_1 - x_2 \geq 3, \quad 2x_1 + x_2 \leq 10, \quad x_1, x_2 \geq 0.$$

20. Solve the following transportation problem:

	M ₁	M ₂	M ₃	M ₄	
W ₁	8	10	7	6	50
W ₂	12	9	4	7	40
W ₃	9	11	10	8	30
	25	32	40	23	120

21. a) Solve the following game:

$$\left(\begin{array}{cccc}
 5 & -10 & 9 & 0 \\
 6 & 7 & 8 & 1 \\
 8 & 7 & 15 & 1 \\
 3 & 4 & -1 & 4
 \end{array} \right)$$

b) What is the maximal flow problem? Explain in detail with diagram.

c) What is the difference between transportation and assignment problem?

(14+3+3)

22. a) What is price break in inventory control? Is it advisable to accept always the price break?
b) Define spanning tree in a network.
c) Find the critical path of a project having the tasks as given below:

Job	Time	Job	Time
(1, 2)	2	(5, 8)	5
(2, 3)	7	(6, 7)	8
(2, 4)	3	(6, 10)	4
(3, 4)	3	(7, 9)	4
(3, 5)	5	(8, 9)	1
(4, 6)	3	(9, 10)	7

(3+3+14)

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