

OPERATIONS RESEARCH

Time : 3 hours

Max Marks : 60

PART-AAnswer all **five** units ($05 \times 10 = 50$ Marks)**UNIT-I**

1. (a) Discuss the various steps in Operations research in brief.
- (b) Discuss the various steps in simplex method.

OR

2. Solve the following LPP by graphical method

Maximize $Z = 5X_1 + 3X_2$

Subject to constraints

$2X_1 + X_2 \leq 1000$

$X_1 \leq 400$

$X_1 \leq 700$

$X_1, X_2 \geq 0$

UNIT-II

3. A product is produced by 4 factories F1, F2, F3 and F4. Their unit production cost are Rs.2,3,1, and 5 only. Production capacity of the factories are 50,70,40 and 50 units respectively. The product is supplied to 4 stores S1, S2, S3 and S4., the requirements of which are 25,35,105 and 20 respectively. Unit cost of transportation are given below

	S1	S2	S3	S4
F1	2	4	6	11
F2	10	8	7	5
F3	13	3	9	12
F4	4	6	8	3

Find the optimal transportation plan such that total production and transportation cost is minimum.

OR

4. (a) Describe the various steps in the Hungarian method used for solving Assignment Problem?
- (b) Solve the following assignment problem

	I	II	III	IV
A	44	80	52	60
B	60	56	40	72
C	36	60	48	48
D	52	76	36	40

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UNIT-III

5. Six Jobs to be processed on machine A and B in the sequence of AB. Determine the optimal sequence and total elapsed time and idle time for each machine

Job	Machine A (time in hours)	Machine B (time in hours)
A	11	12
B	13	11
C	14	11
D	15	10
E	9	11
F	11	8

OR

6. Six Jobs to be processed on machine A and B in the sequence of AB. Determine the optimal sequence and total elapsed time and idle time for each machine

Job	Machine A (time in hours)	Machine B (time in hours)
A	10	5
B	7	4
C	5	7
D	3	8
E	2	6
F	4	3

UNIT-IV

7. Solve the following game graphically whose payoff matrix for the player A is given in the table

		Player B	
		I	II
Player A	I	2	4
	II	2	3
	III	3	2
	IV	-2	6

OR

8. (a) Discuss the various rules of dominance
(b) Solve the following game

		Player B			
		I	II	III	IV
Player A	I	-5	2	1	20
	II	5	5	4	6
	III	4	-2	0	-5

UNIT-V

9. (a) Explain the various difference between PERT and CPM.
(b) Explain the various application of Project management in the industry.

OR

10. The following table lists the jobs of a network along with their time estimates.

Activity	t_o (in minutes)	t_m (in minutes)	t_p (in minutes)
1-4	3	9	27
1-3	3	6	15
1-2	6	12	30
4-5	1	4	07
3-5	3	9	27
3-6	2	5	08
5-6	6	12	30
2-6	4	19	28

- a) Draw the project network.
b) Calculate the project completion time?

PART-B

Compulsory Question. (01 × 10 = 10 Marks)

11. Case Study:

Calculate the following for the given data

- i) Critical Path
ii) ES,EF,LS,LF

Activity	Duration (in hours)
1-2	2
2-3	3
2-4	5
3-5	4
3-6	1
4-6	6
4-7	2
5-8	8
6-8	7
7-8	4
