B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year IV Semester
Core Major - Paper VIII
OPERATIONS RESEARCH - I

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Write the mathematical formulation of LPP.
2. What is OR?
3. Write the criteria for decision making under uncertainity
4. What are the different environment under decision?
5. Define decision tree.
6. What is meant by EVPI?
7. Define pay-off matrix.
8. Define saddle point.
9. What is meant by total elapsed time?
10. Define Idle time.
11. Define pure strategy.
12. Define objective function.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Solve the following LPP by the graphical method
    Maximize $z = 4x_1 + 3x_2$
    Subject to $x_1 - x_2 \leq -1$, $-x_1 + x_2 \leq 0$ and $x_1, x_2 \geq 0$
14. Explain the criterion for decision under risk.
15. Explain the rules of drawing a decision tree.
16. Solve the following 2x4 game graphically.

    Player B

    Player A $\begin{pmatrix} 1 & 0 & 4 & -1 \\ -1 & 1 & 2 & 5 \end{pmatrix}$
17. What are the assumptions made while solving a sequencing problem?
18. Explain the advantages of LPP.

19. Write the characteristics of game theory.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Use simplex method to solve the LPP.
Maximize $z = 4x_1 + 10x_2$
Subject to $2x_1 + x_2 \leq 50$,
$2x_1 + 5x_2 \leq 100$,
$2x_1 + 3x_2 \leq 90$ and
$x_1, x_2 \geq 0$

21. You are given the following pay-off table

	States of Nature			
Alternative	S_1	S_2	S_3	S_4
A_1	1	3	8	5
A_2	2	5	4	7
A_3	4	6	6	3
A_4	6	8	3	5

Decide the best course of action according to
(i)Maximax criterion; (ii)Maximin criterion; (iii)Minimax regret criterion; (iv)Laplace criterion.

22. The demand for a seasonal product is as given below:

Demand during the season	Probability
40	0.10
45	0.20
50	0.30
55	0.25
60	0.10
65	0.05

The product costs Rs.60 per unit and sells at Rs.80 per unit. If the units are not sold within the season, they will have no market value.
(i)Determine the optimum number of units to be produced.
(ii)Calculate EVPI and interpret it.

23. Using dominance, solve the game whose pay-off matrix is given by

$$\begin{array}{c} \\ A \end{array} \begin{array}{c} \begin{array}{cccc} & & B & \\ \end{array} \\ \begin{pmatrix} 18 & 4 & 6 & 4 \\ 6 & 2 & 13 & 7 \\ 11 & 5 & 17 & 3 \\ 7 & 6 & 12 & 2 \end{pmatrix} \end{array}$$

24. There are five jobs, each of which is to be processed through two machines in the order , processing hours are as follows.

Jobs	1	2	3	4	5
m_1	3	8	5	7	4
m_2	4	10	6	5	8

Determine the optimum sequence for the five jobs and minimum total elapsed time. Find also the idle time of machines .