B.Sc. DEGREE EXAMINATION,NOVEMBER 2019
II Year IV Semester
Operations Research - I

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

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

Answer any **TEN** questions

1. Define Operations Research?
2. What do you understand by 'feasible solution'?
3. Define Linear programming?
4. How the opportunity loss values are calculated
5. Define decision under uncertainity
6. What do you mean by 'Decision under risk'
7. What do you mean by 'Decision tree'
8. Define saddle point
9. What do you mean by dominance rule in game theory
10. Define two person zero sum game
11. What do you mean sequencing problem
12. State any four assumption of sequencing problem

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

Answer any **FIVE** questions

13. Using graphical method, find the minimum value of
    $Z = X_1 + X_2$,
    subject to the constraints
    $X_1 + X_2 \geq 2$,
    $3X_1 + X_2 \geq 3$,
    $4X_1 + 3X_2 \geq 6$,
    $X_1, X_2 \geq 0$.
14. Explain the scope of OR.

15. The following matrix gives the payoff of different strategies S1, S2 and S3 against conditions N1, N2, N3 and N4.

	N1	N2	N3	N4
S1	4000	-100	6000	18000
S2	20000	5000	400	0
S3	20000	15000	-2000	1000

Indicate the decision taken under i) Pessimistic ii) Optimistic iii) Equal probability

16. A man has the choice of running hot-snack stall or an ice-cream stall at a seaside resort during summer season. If it is a fairly cool summer, he should make Rs.5,000 by running hot-snack stall, but if the summer is quite hot he can only expect to make Rs.1,000. On the other hand, if he operates the ice-cream stall, his profit is estimated Rs.6,500 in the summer, but only Rs.1,000 if it is cool. There is 40% chance of the summer being hot. Should he opt for running the hot-snack stall or the ice-cream stall? Give mathematical argument.

17. Explain the steps involved in decision tree analysis.

18. For a game with the following pay-off matrix, determine the best strategies as well as the value of the game for players A and B

Player B

Player A $\begin{bmatrix} -1 & 2 & -2 \\ 6 & 4 & -6 \end{bmatrix}$

19. Find the sequence that minimizes the total elapsed time required to complete the following jobs on two machines M1, M2 in the order M1, M2

Jobs :	A	B	C	D	E	F
M1 :	4	8	3	6	7	5
M2 :	4	3	7	2	8	4

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

Answer any **THREE** questions

20. Solve the following LPP using simplex method

Max $Z = 4X + 10Y$ subject to the constraints

$2X + Y \leq 10$; $2X + 5Y \leq 20$; $2X + 3Y \leq 18$, $X, Y \geq 0$;

21. The following pay off matrix indicates the profit values in an uncertain situation

Strategy	State of Nature			
S1	300	-10	500	1700
S2	1900	400	30	0
S3	1900	1400	-200	90
S4	-110	900	300	1400

Determine which strategies will be selected using the criteria i) Maximin ii)Minimax iii) Maximax iv) minimin v) Laplace vi) Hurwitz(degree of optimism = 0.5)

22. Under an employment promotion programme it is proposed to allow sale of newspaper on the buses during off-peak hours. The vendor can purchase the newspaper at a concessional rate of 25 paise per copy aginst the selling price of 40 paise. Any unsold copies are however, a dead loss. A vendor has estimated the following probability distribution for number of copies demanded.

No. of copies	15	16	17	18	19	20
Probability	0.04	0.19	0.33	0.26	0.11	0.07

How many copies should he order so that his expected profit will be maximum

23. Solve the following game by using dominance property

		Player B					
		I	II	III	IV	V	VI
	1	4	2	0	2	1	1
	2	4	3	1	3	2	2
Player A	3	4	3	7	-5	1	2
	4	4	3	4	-1	2	2
	5	4	3	3	-2	2	2

24. Solve the following sequencing problem. Each job has to go through Mi(i= 1 to 6) in the order M1, M2,. . . , M6. Processing time(in hours) is given below.

	M1	M2	M3	M4	M5	M6
Job A	18	8	7	2	10	25
Job B	17	6	9	6	8	19
Job C	11	5	8	5	7	15
Job D	20	4	3	4	8	12