B.Sc. DEGREE EXAMINATION,APRIL 2020
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 Operation Research.
2. What is meant by Linear Programming Problem?
3. Define Slack and Surplus variables.
4. What are the different types of decision making environment?
5. Define EMV.
6. What is meant by two-person zero sum game?
7. Define the term mixed strategy.
8. What is saddle point?
9. What is "no passing" rule in a sequencing algorithm?
10. Define sequencing.
11. Define Pay-off matrix.
12. Write any two limitations of Operation Research.

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

Answer any **FIVE** questions

13. Write down the steps in the formulation of LPP.
14. Use the graphical method to solve the following LPP.

    Maximize Z = 40 X_1 + 80 X_2

    Subject to

    $2X_1 + 3X_2 \leq 48$, $X_1 \leq 15$, $X_2 \leq 10$ $X_1, X_2 \geq 0$
15. Explain Decision Tree Analysis and its advantages in detail.
16. The following matrix gives the pay-off of different strategies S_1, $S_2$and S_3against conditions N_1 , N_2 , N_3.

	State of Nature		
Strategies	N_1	N_2	N_3
S_1	700000	300000	150000
S_2	500000	450000	0
S_3	300000	300000	300000

Which strategy should the concerned best on the basis of

a) Maximin criterion b) Maximax criterion c) Minimax regret criterion
d) Laplace criterion

17. Define Game theory and write its application.

18. Explain a maximin and minimax principle and determine the value of the game for the following pay-off matrix.

	Player B		
Player A	20	12	15
	11	10	12
	15	11	10

19. Determine a sequence of these jobs that minimize the total elapsed time T. Also find idle time for machine A and B.

Jobs	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

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

Answer any **THREE** questions

20. Solve the following LPP using SIMPLEX Method.
Maximize Z = $12X_1 + 15X_2 + 9X_3$
Subject to
$8X_1 + 16X_2 + 12X_3 \leq 250$;
$4X_1 + 8X_2 + 10X_3 \geq 80$;
$7X_1 + 9X_2 + 8X_3 = 105$;
X_1, X2, X3 ≥ 0

21. Explain different types of decision making criterion under uncertainty.

22. The pay-off of three acts A_1,A_2 and A_3 and the Events E_1,E_2 and $E_3$are given below.

	Three acts		
State of nature	A_1	A_2	A_3
E_1	25	-10	-125
E_2	400	440	400
E_3	650	740	750

The probabilities of the state of nature are 0.1, 0.7 and 0.2 respectively. Calculate and tabulate EMV and conclude which would prove to be the best course of action.

23. Solve the following game using graphical method and find its value of the game.

	Player B			
Player A	B_1	B_2	B_3	B_4
A_1	2	2	3	-2
A_2	4	3	2	6

24. Write the Optimum sequencing algorithm for determining the Optimum sequence for n jobs on three machines.