B.Com. (ISM) DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Major- Paper XI
OPERATIONS RESEARCH

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define Operations Research.
2. What is Linear Programming Problem?
3. What is a Transportation Problem?
4. What is PERT Technique?
5. What is Decision Theory?
6. State any two advantages of Transportation model.
7. What is LPP?
8. What is unbalanced assignment problem?
9. What is free float?
10. What is pure strategy and mixed strategy?
11. What is Network analysis?
12. What is simplex method?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. What are the different types of models used in Operations Research?
14. What are the different method of solving Game theory?
15. Maximize $Z = 30x_1 + 20x_2$

    subject to the constraints

    $2x_1 + x_2 \leq 800$

    $x_1 + 2x_2 \leq 1000$

    $x_1, x_2 \geq 0$

    obtain the solution by graphical method

16. A project work consists of four major jobs for which four major contractors have submitted tenders.The tender documents quoted in thousands of Rupees are given with the matrix as

		Jobs			
		J1	J2	J3	J4
Contracters	C1	15	27	35	20
	C2	21	29	33	17
	C3	17	25	37	15
	C4	14	31	39	21

Find the assignment which minimises the total of the project cost. Each contractor has to be assigned one job.

17. A project consists of 12 jobs.Draw a project network.

Job	Duration	Job	Duration
1-2	2	6-7	8
2-3	7	6-10	4
2-4	3	7-9	4
3-4	3	8-9	1
3-5	5	9-10	7
4-6	3		
5-8	5		

18. A dietician wishes to mix two types of food in such a way that the Vitamin contents of the mixture contains atleast 8 units of Vitamin A and 10 units of Vitamin B.Food I contains 2 units per kg of Vitamin A and 1 unit per kg of Vitamin B while the food II contains 1unit per kg of Vitamin A and 2 units per kg of Vitamin B.It Costs Rs.5 per kg to purchase food 1 and Rs.8 per Kg to purchase Food II.Prepare a mathematical model of the problem stated above.

19. Find the IBFS by North west corner rule.

	A	B	C	a_i
F_1	10	9	8	8
F_2	10	7	10	7
F_3	11	9	7	9
F_4	12	14	10	4
b_j	10	10	8	

Section C $(2 \times 15 = 30)$ Marks

Answer any **TWO** questions

20. Solve the following LPP using simplex method

Max $Z = 45x_1 + 80x_2$

subject to $5x_1 + 20x_2 \leq 400$

$10x_1 + 15x_2 \leq 450$

$x_1, x2 \geq 0$

21. Find the minimum cost solution for the following transportation problem which has cost structure as To Availabilities

		To			Availabilities
From		16	19	12	14
		22	13	19	16
		14	28	8	12
Requirements		10	15	17	

22. A Project has the following time schedule

Activity	Time in Months	Activity	Time in Months
1-2	2	3-7	5
1-3	2	4-6	3
1-4	1	5-8	1
2-5	4	6-9	5
3-6	8	7-8	4
		8-9	3

(i)Construct the network

(ii)Find the total float for each activity

(iii)Find the critical path and the project duration.

23. Explain the Maximin principle with following pay-off matrix for player A.

Player B

Player A $\begin{bmatrix} 20 & 12 & 15 \\ 11 & 10 & 12 \\ 15 & 11 & 10 \end{bmatrix}$