B.Sc. DEGREE EXAMINATION,APRIL 2020
III Year V Semester
Resource Management Techniques

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

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

Answer any **TEN** questions

1. Define Operations Research.
2. Write any two applications of Operations Research.
3. What is a slack variable?
4. What is a feasible region in solving a Linear Programming problem Using graphical Method?
5. List the Various methods for Solving a transportation problem.
6. What is meant by unbalanced assignment problem?
7. Compare assignment and transportation model.
8. Define sequencing problem.
9. Define Pay-off matrix.
10. Define activity and event.
11. What is PERT?
12. What are the three types of time estimates calculated in PERT technique?

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

Answer any **FIVE** questions

13. Solve the following LPP by graphically.

    $Maxz = 8x_1 + 5x_2$
    $subjectto$
    $2x_1 + x_2 \leq 500$
    $x_1 \leq 150$
    $x_2 \leq 250$
    $x_1, x_2 \geq 0$

14. Write an algorithm for Solving a Linear Programming problem using Simplex method.

15. Determine the initial basic feasible solution to the following transportation problem using row minima method.

To / From					Availability
	5	2	4	3	12
	4	8	1	6	15
	4	6	7	5	8
Demand	7	12	17	9	

16. A Salesman has to visit five cities A,B,C,D and E. The distance (in hundred miles) between the five cities is as follows

$$\begin{array}{cc} & \begin{matrix} A & B & C & D & E \end{matrix} \\ \text{From} & \begin{pmatrix} \infty & 7 & 6 & 8 & 4 \\ 7 & \infty & 8 & 5 & 6 \\ 6 & 8 & \infty & 9 & 7 \\ 8 & 5 & 9 & \infty & 8 \\ 4 & 6 & 7 & 8 & \infty \end{pmatrix} \end{array} \begin{matrix} A \\ B \\ C \\ D \\ E \end{matrix}$$

Fine the order in which the Salesman has to visit the cities so that the covers all the cities by travelling minimum distance.

17. Find the sequence that minimizes the total elapsed time required to complete the following tasks on two machines

Job	A	B	C	D	E	F
Machine I	1	4	6	3	5	2
Machines II	3	6	8	8	1	5

18. Two players A and B match coins. If the coins match then A wins two units of value if the coin do not match then B wins 2 units of value. Determine the optimum strategies for the players and the value of the game.

19. Given the following data draw the network

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor	-	A	A	A	B	C	C	C,D	E,F	G,H	I,J

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

Answer any **THREE** questions

20. Solve the following LPP by Simplex Method

$MaxZ = 3x_1 + 2x_2$
$Subjectto$
$x_1 + x_2 \leq 4$
$x_1 - x_2 \leq 2$
$x_1, x_2 \geq 0$

21. Solve the following transportation problem

		Destination				
		D_1	D_2	D_3	D_4	Availability
	O_1	1	2	1	4	30
Origin	O_2	3	3	2	1	50
	O_3	4	2	5	9	20
Requirement		20	40	30	10	100

22. A company is faced with the problem of assigning four different salesman to four territories for promoting its sales. Territories are not equally rich in their sales potential and the salesman also differ in their ability to promote sales. The following table gives the expected annual sales (in thousands of Rs.) for each salesman if assigned to various territories. Find the assignment of salesman so as to maximize the annual sales.

		$Territories$			
		1	2	3	4
$Salesmen$	1	60	50	40	30
	2	40	30	20	15
	3	40	20	35	10
	4	30	30	25	20

23. Solve the 6 x 2 game problem graphically

$$\begin{pmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{pmatrix}$$

24. Draw the network and determine the critical path for the given data.

Jobs	1-2	1-3	2-4	3-4	3-5	4-5	4-6	5-6
Duration	6	5	10	3	4	6	2	9

Find the total float, free float and independent float of each activity.