B.Sc. DEGREE EXAMINATION,NOVEMBER 2019
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. What is operation research?

2. What is meant by linear programming?

3. What is meant by Vogel's approximation method?

4. Define assignment problem.

5. Find the optimal sequence of jobs for the following problem:

Job	A	B	C	D	E
M1	5	1	9	3	10
M2	2	6	7	8	4

6. Define total elapsed time in sequencing.

7. What is zero-sum game?

8. What is meant by payoff matrix?

9. Differentiate between PERT and CPM.

10. Define Activity in networking.

11. Define feasible solution.

12. Define value of the game.

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

Answer any **FIVE** questions

13. Solve the LPP by graphical method

    Maximize z = 5x + 8y
    Subject to
    3x + 2y $\leq$ 36
    x + 2y $\leq$ 20
    3x + 4y $\leq$ 42
    and x $\geq$ 0
    y $\geq$ 0

14. Find initial basic feasible solution for the transportation problem by North West Corner method.

	A	B	C	D	E	Supply
I	2	11	10	3	7	4
II	1	4	7	2	1	8
III	3	9	4	8	12	9
Demand	3	3	4	5	6	21

15. There are six jobs each of which is to be processed through two machines A,Bin the order AB. Processing Hours are as follows:

Jobs :	1	2	3	4	5	6
A :	1	3	8	5	6	3
B :	5	6	3	2	2	10

Determine the optimum sequence for the six jobs and minimum total elapsed time.

16. Solve the following game whose pay-off matrix is given below:

$$\begin{bmatrix} 9 & 3 & 1 & 8 & 0 \\ 6 & 5 & 4 & 6 & 7 \\ 2 & 4 & 3 & 3 & 8 \\ 5 & 6 & 2 & 2 & 1 \end{bmatrix}$$

17. A project schedule has the following characteristics

Activity	Time	Activity	Time
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

Construct PERT network and find the critical path.

18. Describe the characteristics of operation research.

19. Explain the mathematical formulation of an assignment problem.

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

Answer any **THREE** questions

20. Solve the following :

Maximize $Z = 15x_1 + 6x_2 + 9x_3 + 2x_4$
Subject to $2x_1 + x_2 + 5x_3 + 6x_4 \leq 20$
$3x_1 + x_2 + 3x_3 + 25x_4 \leq 24$

$7x_1 + x_4 \leq 70$

$x_1, x_2, x_3, x_4 \geq 0$

21. Determine an initial basic feasible solution to the following transportation problem using VAM.

Distribution centres

		D1	D2	D3	D4	Availability
	S1	11	13	17	14	250
Origin	S2	16	18	14	10	300
	S3	21	24	13	10	400
	Requirement	200	225	275	250	

22. Find the sequence that minimises the total elapsed time required to complete the following tasks on the machines in the order 1-2-3. Find also the minimum total elapsed time and idle times for the machines.

Task Time on	A	B	C	D	E	F	G
Machine 1	3	8	7	4	9	8	7
Machine 2	4	3	2	5	1	4	3
Machine 3	6	7	5	11	5	6	12

23. Solve the following game using dominance property

$$\text{Player } A \begin{array}{c} \text{Player } B \\ \begin{pmatrix} 5 & -10 & 9 & 0 \\ 6 & 7 & 8 & 1 \\ 8 & 7 & 15 & 1 \\ 3 & 4 & -1 & 4 \end{pmatrix} \end{array}$$

24. A project consists of the following activities and time estimates:

Activity	Least time (days)	Greatest time (days)	Most likely time (days)
1-2	3	15	6
1-3	2	14	5
1-4	6	30	12
2-5	2	8	5
2-6	5	17	11
3-6	3	15	6
4-7	3	27	9
5-7	1	7	4
6-7	2	8	5

a) Draw the network

b) What is the probability the project will be completed in 27 days.