TM251185E

Reg. No :.....

Name :.....

MASTER'S DEGREE (C.S.S) EXAMINATION, NOVEMBER 2024

2024 ADMISSIONS REGULAR

SEMESTER I - CORE COURSE Commerce and Management

CM1C04TM - Management Optimisation Techniques

Time : 3 Hours **Maximum Weight : 30**

Part A

I. Answer any Eight questions. Each question carries 1 weight **(8x1=8)**

1. Explain a model in operations research.
2. List the characteristics of Operations research.
3. Explain the terms Feasible Solution and Optimal Solution in relation to Linear Programming problem.
4. Elaborate a linear programming problem.
5. Explain non-degenerate basic feasible solution.
6. Explain the term Assignment problem.
7. Write a note on decision tree.
8. Explain decision theory.
9. Explain the term 'Earliest Start Time' and 'Latest Start Time'.
10. Describe PERT.

Part B

II. Answer any Six questions. Each question carries 2 weight **(6x2=12)**

11. OR is the art of winning a war without actually fighting it. Comment.
12. Write a note on (a) Unit vector (b) Surplus variables (c) Basic variables (d) Minimum ratio
13. Solve graphically:
    Maximise Z= x+3y
    Subject to,
    $2x + y \leq 20$
    $x + 2y \leq 20$
    $x \geq 0$, $y \geq 0$
14. Describe (a) North West Corner Rule (b) Lowest Cost Entry Method (c) Vogel's Approximation Method.
15. Given below is the time (days) required when a particular programme is assigned to a particular programmer.

	Programmers			
Programmes	A	B	C	D
1	12	10	8	9
2	8	9	11	7
3	11	14	12	10
4	9	9	8	9

    Assign the programmers to the programmes in such a way that the total computing time is least.
16. Write a note on the components of a decision problem.
17. A truck owner finds from his past records that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as follows:

Year	1	2	3	4	5	6	7	8

Maintenance cost	1000	1300	1700	2200	2900	3800	4800	6000
Resale price	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the truck.

18. The following table gives the activities in a construction project and other relevant information.

Activity	1-2	1-3	2-3	2-4	3-4	4-5
Duration	20	25	10	12	6	10

(a)Draw the network diagram (b) Find total float for each activity (c) Which are the critical activities?

Part C

III. Answer any Two questions. Each question carries 5 weight **(2x5=10)**

19. Discuss the various applications of Operations Research in detail.

20. Solve the LPP using simplex method:

Max $Z= 6x_1 + 4x_2$

Subject to, $-2x_1 + x_2 \leq 2$

$x_1 - x_2 \leq 2$

$3x_1 + 2x_2 \leq 9$

$x_1, x_2 \geq 0$

21. Five different machines can do any of the five required jobs with different profits resulting from each assignment as shown below.

	Machines					
Job		A	B	C	D	E
	1	30	37	40	28	40
	2	40	24	27	21	36
	3	40	32	33	30	35
	4	25	38	40	36	36
	5	29	62	41	34	39

Find out the maximum profit possible through optimal assignment.

22. The cost of a machine is Rs. 4,600 and installation charge is 1500 and its scrap value (resale value) is only Rs.100/- . The maintenance costs are found from experience to be as under:

Year	1	2	3	4	5	6	7	8
Maintenance cost in Rs.	100	250	400	600	900	1250	1600	2000

When should the machine be replaced?