QP CODE: 2242202943

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Reg No : .....

Name : .....

M.C.A DEGREE EXAMINATION, NOVEMBER 2022

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT201 - OPTIMIZATION TECHNIQUES FOR COMPUTER APPLICATIONS

2020 Admission Onwards

76CD25D6

Time: 3 Hours Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1. What is Linear Programming ?
2. Discuss the steps involved in mathematical formulation of LPP.
3. Which type of problems are solved by simplex method?
4. Explain how do you solve the Big M method?
5. Explain Transportation table
6. Explain North West Corner method.
7. Explain LPP form of an Assignment problem.
8. Explain maximin minimax principles.
9. What is mean by queue discipline?
10. What is a network ?
11. What are the disadvantages of simulation ?
12. Define total elapsed time and idle time in sequencing problems.

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) A company produces two articles A and B. There are two different departments through which the articles are processed such as assembly and finishing. The potential capacity of the assembly department is 60 hours a week and that of the finishing department is 48 hours a week.The production of one unit of A requires 4 hours in assembly and 2 hours in finishing. Each of unit B requires 2 hours in assembly and 4 hours in finishing. If profits are Rs.8 for each unit of A and Rs.6 for each unit of B, find out the number of units of A and B to be produced each week to get the maximum profit.

OR

b) Solve the following LPP using graphical method:-
Min C =3 x_1+5x_2
Subject to -3x_1+4x_2 ≤ 12, 2x_1-x_2 ≥ -2, 2x_1+3x_2 ≥ 12, x_1 ≤ 4, x_2 ≥2, and x_1 , x_2 ≥0

14. a) Solve the following problem by simplex method
Maximize Z=3x_1+5x_2+7x_3
Subject to 3x_1+2x_2+4x_3≤100, x_1+4x_2+2x_3≤100, x_1+x_2+3x_3≤100, x_1, x_2,x_3 ≥0

OR

b) Maximize Z = 3x_1 + 2x_2 subject to the constraints : 2x_1 + x_2 ≤ 2, 3x_1+4x_2 ≥ 12, x_1, x_2 ≥ 0
Use Big M method to solve the above LP Model.

15. a) Determine the optimal transportation cost and quantities to be supplied from different factories to different markets.

Factory	Market				
	W1	W2	W3	W4	
F1	11	20	7	8	50
F2	21	16	10	12	40
F3	8	12	18	9	70
	30	25	35	40	

OR

b) A departmental head has four subordinates,and four tasks to be performed.The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty.His estimates of the time each man would take to perform each task,is given in the matrix below.

Tasks	Man			
	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

How should the tasks be allocated one to a man ,so as to minimize the total man hours?

16. a) Solve the following game problem.

	Player B	
Player A	-6	7
	4	-5
	1	-2
	2	5
	7	-6

OR

b) Explain characteristics of the queueing system.

17. a) A small maintainance project consists of the following jobs whose precedence relationships is given below:-

Job	**1-2**	**1-3**	**2-3**	**2-5**	**3-4**	**3-6**	**4-5**	**4-6**	**5-6**	**6-7**
Duration(days)	15	15	3	5	8	12	1	14	3	14

a)Draw an arrow diagram representing the project.

b)Find the total float for each activity.

c)Find the critical path and the total project duration.

OR

b) A tourist car operator finds that during the past 100 days the demand for the car had been varied as shown below:

Trips per day	0	1	2	3	4	5
Number of days	8	12	15	30	20	15

Using random numbers simulate the demand for a 10 days
[Use the random numbers:10,56,42,01,80,06,26,57,79,55]

(5×9=45 marks)