M.C.A DEGREE EXAMINATION, AUGUST 2023

Second Semester

MASTER OF COMPUTER APPLICATION

CORE - MCACT201 - OPTIMIZATION TECHNIQUES FOR COMPUTER APPLICATIONS

2020 Admission Onwards

79FB7CA5

Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1.   What are the basic assumptions in LPP ?

2.   Discuss Canonical Form of LPP.

3.   What you mean by Artificial variable in LPP ? Explain it with an example.

4.   What you mean by Duality in LPP?

5.   Write a note on transportation problem.

6.   Explain Vogel's method for finding intial basic feasible solution.

7.   Write a note on Assignment problem.

8.   What is mean by saddle point?

9.   What are customer's behaviour in a queue?

10.   What are the two basic planning and control techniques in a network anlysis ?

11.   Define critical activity and critical path.

12.   Explain briefly how 'n' jobs on 2 machines problem can be solved?

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) An animal feed company must produce 200 kgs of a mixture consisting of ingredients X_1 and X_2 daily. X_1 costs Rs.30 per kg and X_2 Rs. 80 per kg. No more than 80kgs of X_1 can be used and at least 60 kgs of X_2 must be used .Formulate a mathematical model to the problem.

OR

b) Solve the following LPP using graphical method:- Minimize $Z = X_1 + X_2$

Subject to $2 X_1 + X_2 \geq 4$, $X_1 + 7 X_2 \geq 7$,

$X_1, X_2 \geq 0$

14. a) Solve the LPP

Max $Z = 2x - 3y + 4z$

Subject to the constraints $4x - 3y + z \leq 3$, $x + y + z \leq 10$, $2x + y - z \leq 10$, $x \geq 0$, $y \geq 0$, $z \geq 0$

OR

b) Use Big M method to minimize $Z = 4 X_1 + 3 X_2$

Subject to

$2X_1 + X_2 \geq 10$, $-3X_1 + 2X_2 \leq 6$, $X_1 + X_2 \geq 6$, $X_1, X_2 \geq 0$

15. a) Solve the following transportation problem

	A	B	C	D	Supply
I	1	5	3	3	34
II	3	3	1	2	15
III	0	2	2	3	12
IV	2	7	2	4	19
Demand	21	25	17	17	

OR

b) Find the Assignments of salesman to various districts which will result minimum cost.

Salesman	District			
	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

16. a) Solve the game

	Player B		
Player A	6	-3	7
	-3	0	4

OR

b) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Service time on an average is 36 minutes. Calculate the following. (i) Average length of non-empty queue. (ii) The probability that the queue size exceeds 10. (iii) Average waiting time?

17. a) Consider the following data for activities in a given project.

Activity	A	B	C	D	E	F
Predecessor	_	A	_	B,C	C	D,C
Time(days)	5	4	7	3	4	2

Draw an arrow diagram for the project.Compute the earliest and latest event time.What is the minimum project completion time?List the activities in the critical path.

OR

b) Ten jobs are required to be processed on two machines M1 and M2 in the order, M1 M2. Processing times are given below. Determine an optimal sequence and evaluate the total elapsed time.

Job :	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
M1 :	7	8	10	3	7	4	5	8	5	6
M2 :	4	2	6	6	5	7	2	6	7	6

(5×9=45 marks)