QP CODE: 220200943

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M.C.A. DEGREE EXAMINATION, MARCH 2022

Second Semester

Core - MCACT201 - OPTIMIZATION TECHNIQUES FOR COMPUTER APPLICATIONS

2020 Admission Onwards

1C6477FE

Time: 3 Hours   Maximum: 75 Marks

Part A

*Answer any **ten** questions*

*Each question carries **3** marks*

1. What are the two forms of LPP ?

2. Define feasible Solution of LPP.

3. What are surplus variables? Explain with an example.

4. How do you solve a problem using simplex method?

5. What do you mean by degeneracy in transportation problem?

6. Explain Leat Cost method in Transportation problem.

7. Explain the Difference between transportation and assignment problem.

8. What do you mean by strategy in game theory? Explain.

9. What is fair game?

10. What are the three common errors in the construction of netwoks ?

11. Explain PERT.

12. What are the assumptions in sequencing problems ?

(10×3=30 marks)

Part B

*Answer **all** questions*

*Each question carries **9** marks*

13. a) A furniture company produces tables and chairs. The production process for each is similar in that both require a certain number of hours of carpentry work and a certain number of labour hours in the painting department. Each table takes 4 hours of carpentry and 2 hours in the painting department. Each chair requires 3 hours of carpentry and 1 hour in the painting department. During the current production period, 240 hours of carpentry time are available and 100 hours in painting is available. Each table sold yields a profit of Rs. 7; each chair produced is sold for a profit of Rs.5. Formulate the LPP.

OR

   b) Solve the following LPP using graphical method:- Max P = 2x+3y Subject to x + 2y ≤ 2, 4x+3y ≥ 12 and x , y ≥0

14. a) Maximize Z= 40 x_1+30 x_2 Subject to x_1+x_2≤ 12, 2x_1+x_2≤ 16, x_1, x_2≥ 0
   Solve by simplex method.

OR

   b) Use penalty(or Big M) method to solve the following
   Maximize Z= 3x_1-x_2
   Subject to
   $$2x_1+x_2 ≥ 2, x_1+3x_2 ≤ 3, x_2 ≤ 4, x_1, x_2 ≥0$$

15. a) Given X_{13} = 50 units, X_{14} = 20 units,X_{21} = 55 units,X_{31} = 30 units ,X_{32} = 35 units and X_{34} = 25 units .Is it an optimal solution to the transportation problem.If not optimal,find the optimal solution.

					Available Units
	6	1	9	3	70
	11	5	5	8	55
	10	12	4	7	90
Required Units	85	35	50	45	

b) Solve the following assignment problem so as to minimise the cost.

Workers	Job			
	I	II	III	IV
A	32	26	35	38
B	27	24	26	32
C	28	22	25	34
D	10	10	16	16

16. a) Solve the game.

	Player B				
Player A	6	3	-1	0	-3
	3	2	-4	2	-1

OR

b) A customer arrives at a one window drive in a bank according to Poission distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes. The space in front of the window, including that for the serviced car can accommodate a maximum of three cars. Other cars wait outside this space. (i)What is the probability that the arriving customer can drive directly to the space in front of the window? (ii) What is the probability that the arriving customer will have to wait outside the indicated space? (iii) How long is an arriving customer expected to wait before starting service.

17. a) The following table gives the activities and duration of a construction project.

Activity	A	B	C	D	E	F	G	H	I
Predecessor	_	_	_	A	A	B,D	C	C	F,G
Time(days)	8	10	8	10	16	17	18	14	9

1)Construct the network diagram
2)Compute the earliest and latest event time
3)Determine the critical path and project duration

OR

b) There are 7 jobs, each of which has to go through the machines A and B in the order AB. Processing times (in hours) are given as follows:

Jobs	:	J1	J2	J3	J4	J5	J6	J7
Machine A	:	3	12	15	6	10	11	9
Machine B	:	8	10	10	6	12	1	3

Determine a sequence of these jobs that will minimize the total elapsed time .Also calculate the various idle times.

(5×9=45 marks)