

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI-86

(For candidates admitted during the year 2015 -2016)

SUBJECTCODE: 15MT/ME/OT55

B.Sc. DEGREE EXAMINATION – December 2020

COURSE: MAJOR ELECTIVE

TIME: 90 MINUTES

PAPER: OPTIMIZATION TECHNIQUE

MAX.MARKS: 50

SECTION – A

ANSWER ALL THE QUESTIONS (3 × 2 = 6)

1. Define non-degeneracy in a transportation model.
2. Obtain the completion time of the jobs for the data given below using SPT rule

Job	1	2	3	4	5	6	7	8
Processing Time (minutes)	5	8	6	3	10	14	7	3

3. Find the value of the Game and check whether it is a fair or strictly determinable game.

1	9	6	0
2	3	8	-1
-5	-2	10	-3
7	4	-2	-5

SECTION - B

ANSWER ANY THREE QUESTIONS (3 × 8 = 24)

4. Solve the following LPP by graphical method

$$\text{Minimize } Z = 5x_1 + 8x_2$$

$$\text{Subject to } x_1 \leq 4$$

$$x_2 \geq 2$$

$$x_1 + x_2 = 5$$

$$x_1, x_2 \geq 0$$

5. Find the sequence that minimizes the total elapsed time required to complete the following task on two machines; find minimum total elapsed time and the idle time of the machines.

Task	A	B	C	D	E	F	G	H	I
M ₁	2	5	4	9	6	8	7	5	4
M ₂	6	8	7	4	3	9	3	8	11

6. A and B play a game in which each has three coins, a 5P, a 10P and a 20P. Each player selects a coin without the knowledge of the other's choice. If the sum of the coins is an odd amount, A wins B's coin; if the sum is even, B wins A's coin. Find the best strategy for each player and the value of the game. Also state the nature of the game.

7. Solve the following assignment problem to minimize the total processing time of the jobs on the machines.

	M1	M2	M3	M4	M5	M6
J1	12	10	15	22	18	8
J2	10	18	25	15	16	12
J3	11	10	3	8	5	9
J4	6	14	10	13	13	12
J5	8	12	11	7	13	10

SECTION-C

ANSWER ANY ONE QUESTION (1 × 20 = 20)

8. a) Using simplex method solve the LPP.

$$\text{Maximize } Z = 3x_1 + 2x_2 + 5x_3$$

$$\text{Subject to } x_1 + x_2 + x_3 \leq 9$$

$$2x_1 + 3x_2 + 5x_3 \leq 30$$

$$2x_1 - x_2 - x_3 \leq 8$$

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

b) Solve the transportation problem by VAM, the unit transportation cost in rupees, demand and supplies are as given below.

		<i>DESTINATION</i>			
		D ₁	D ₂	D ₃	SUPPLY
<i>ORIGIN</i>	A	5	6	9	100
	B	3	5	10	75
	C	6	7	3	50
	D	6	4	10	75
DEMAND (UNITS)		70	80	120	

(12+8)

9. a) For the project consisting of the following activities, draw the network diagram; determine the critical path and the total project duration. Also compute total float, independent float, free float and interfering float for each of the activities.

Activity	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

b) What are the limitation of CPM and PERT model? Explain the application of PERT? (15+5)

