Code No: D-17811/N

FACULTY OF MANAGEMENT

M.B.A (CBCS) II Semester (New) Examination, November 2022
Subject: Operations Research
Paper – MB – 203

Time: 3 Hours **Max. Marks: 80**

PART – A

Note: Answer all the questions. **(5 x 4 = 20 Marks)**

1. What are the uses of LPP?
2. Write about sensitivity analysis?
3. Explain the restricted Assignment problem?
4. Write about Resource smoothing?
5. What are the advantages and limitations of using simulation?

PART – B

Note: Answer all the questions. **(5 x 12 = 60 Marks)**

6. a) Explain the various applications of operations research?

(OR)

b) Use the graphical method to find the maximum value of $Z = 10x_1 + 6x_2$

Subject to constraints $5x_1 + 3x_2 \leq 30$

$x_1 + 2x_2 \leq 18$

Where $x_1, x_2 \geq 0$

7. a) Use the simplex method to find the maximum value of $Z = 107x_1 + x_2 + 2x_3$

Subject to the constraints $14x_1 + x_2 - 6x_3 + 3x_4 = 7$

$16x_1 + x_2 - 6x_3 \leq 5$

$3x_1 - x_2 - x_3 \leq 0$

Where $x_1, x_2, x_3, x_4 \geq 0$

(OR)

b) Use the dual simplex method to Minimize $Z = 6x_1 + 7x_2 + 3x_3 + 5x_4$

Subject to constraints $5x_1 + 6x_2 - 3x_3 = 4x_4 \geq 12$

$x_2 + 5x_3 - 6x_4 \geq 10$

$2x_1 + 5x_2 + x_3 + x_4 \geq 8$

Where $x_1, x_2, x_3, x_4 \geq 0$

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8. a) Find the optimal solution for the following transportation problem.

		To Warehouses					
		W1	W2	W3	W4	W5	Available
From	F1	7	6	4	5	9	40
	F2	8	5	6	7	8	30
	F3	6	8	9	6	5	20
	F4	5	7	7	8	6	10
	Required	30	30	15	20	5	

(OR)

b) Solve the following assignment problem

	I	II	III	IV	V
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	13

9. a) A small project is composed of seven activities whose time estimates are listed in below table.

Activity	Estimated direction in weeks		
	Optimistic	Most likely	Pessimistic
	a	m	b
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

Draw the project network
Find the critical path
Find the probability of the project being completed within 19 weeks.

(OR)

b) Explain the following terms:

(i) Earliest time, (ii) Total activity time, (iii) Event slack and (iv) Critical path

10. a) Briefly explain the following terms with reference to the Game theory.

(i) Saddle point, (ii) Pure strategy, (iii) Pay-off and (iv) Mixed strategy.

(OR)

b) The rate of arrival of customers at a public telephone booth follows Poisson distribution, with an average time of 10 minutes between one customer and the next. The duration of a phone call is assumed to follow exponential distribution, with mean time of 3 minutes.

(i) What is the probability that a person arriving at the booth will have to wait?
(ii) What is the average length of the non-empty queues that form from time to time?
(iii) Estimate the fraction of a day that the phone will be in use?
(iv) What is the probability that it will take him more than 10 minutes altogether to wait for phone and complete his call?

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