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Reg. No. : .....

Name : .....

Third Semester B.B.A. LL.B. (Five Year Integrated) Degree Examination, October 2021

Paper III — OPERATIONS RESEARCH

Time : 3 Hours Max. Marks : 80

I. Explain any **five** of the following in not more than **60** words. Each questions carries **2** marks.

1. What do you understand by Simplex method?

2. What is an unbalanced assignment problem?

3. Describe some important replacement decision.

4. What do you understand by Decision theory?

5. Distinguish between pure and mixed strategies.

6. What is a two person zero sum game?

7. What is a network diagram?

8. What is MODI method?

(5 × 2 = 10 Marks)

II. Answer any **four** questions. Each question carries **4** marks.

1. Explain the uses of OR in management.

2. Discuss the limitations of Network techniques.

P.T.O.

3. Explain the MODI method of testing optimality of a solution.

4. The cost per year of running of a machine is given below:

Year:	1	2	3	4	5	6	7
Running cost :	5,000	6,000	7,000	9,000	11,500	14,000	17,000
Resale value:	15,000	7,500	3,750	1,875	1,000	1,000	1,000

The purchase price of the machine is Rs. 30,000. Determine when the replacement will be due?

5. Solve the game:

	Player B	
Player A	–2	–1
	2	–3

6. Construct a network for the following relationship:

Beginning event:	A	A	B	C	C	D	E
Ending event:	B	C	D	D	E	F	F

(4 × 4 = 16 Marks)

III. Answer any **four** questions. Each question carries **6** marks.

1. Discuss in brief 'duality' in Linear Programming.

2. What is an unbalanced assignment problem? How is it solved?

3. Distinguish between PERT and CPM.

4. Solve the following problem graphically:

Maximize $Z = 8x_1 + 12x_2$

$$X_1 + X_2 \leq 9$$
$$X_1 > 2$$
$$X_2 > 3$$
$$2x_1 + 5x_2 < 36$$

5. Find out the maximum profit possible through optimal assignment from the following:

	Machines				
	30	37	40	28	40
	40	24	27	21	36
Job	40	32	33	30	35
	25	38	40	36	36
	29	62	41	34	39

6. Determine the optimal transportation cost and quantities to be supplied from different factory to different markets:

	Market				
Factory	W_1	W_2	W_3	W_4	
F_1	11	20	7	8	50
F_2	21	16	10	12	40
F_3	8	12	18	9	70
	30	25	35	40	

(4 × 6 = 24 Marks)

IV. Answer any **three** questions. Each question carries **10** marks.

1. What do you understand by graphic method of solving a LP problem? And explain the limitations of graphical method.

2. A project schedule has the following characteristics:

Activity	Time	Activity	Time
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

(a) Construct network diagram.

(b) Compute T_E and T_L for each event.

(c) Find EST, LST, EFT and LFT.

(d) Find critical path and project duration.

3. Draw a network diagram for the project whose activities and their precedence relationships are given below.

Activity:	A	B	C	D	E	F
Predecessor:	—	—	—	A,B	A,C	B,C

4. From the cost matrix availability at each plant and requirement at each warehouse, you are required to solve the following transportation problem :

	Warehouse				
Plant ↓	W_1	W_2	W_3	W_4	Availability
P_1	190	300	500	100	70
P_2	700	300	400	600	90
P_3	400	100	600	200	180
Requirement	50	80	70	140	340

5. What are the advantages of Linear Programming?

(3 × 10 = 30 Marks)
