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Reg. No. : .....

Name : .....

Third Semester B.B.A. LL.B. (Five Year Integrated) Degree Examination, August 2019

Paper III — OPERATIONS RESEARCH

Time : 3 Hours Max. Marks : 80

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

1. Define Operations Research.
2. What are artificial variables?
3. Write a note on North West Corner Method.
4. What do you understand by degeneracy in transportation problem? How would you solve degeneracy?
5. What is the principle of dominance?
6. What do you mean by Replacement theory?
7. What is PERT?
8. What is slack variables?

(5 × 2 = 10 Marks)

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

1. What are the basic assumptions in Linear Programming?
2. How is Operations Research useful in taking management decisions?

P.T.O.

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

4. Solve the game :

		Player B	
Player A		–2	–1
		2	–3

5. Solve the following LPP with simplex method :

Minimize : $Z = 9x_1 + 10x_2$

Subject to : $2x_1 + 4x_2 \geq 50$

$4x_1 + 3x_2 \geq 24$

$3x_1 + 2x_2 \geq 60$

Where $x_1, x_2, \ldots, \geq 0$.

6. Solve the following assignment problem so as to minimize the cost :

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

(4 × 4 = 16 Marks)

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

1. Explain the applications of Queuing theory.

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

3. Distinguish between PERT and CPM.

4. The purchase price of a machine is Rs. 3,200 and the salvage value is Rs. 200. When should it be replaced?

Year :	1	2	3	4	5	6	7
Running cost :	500	600	800	1000	1300	1600	1200

5. Solve the following payoff matrix :

	Player A				
	9	3	1	8	0
Player B	6	5	4	6	7
	2	4	3	3	8
	5	6	2	2	1

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

	Market				
Factory	W1	W2	W3	W4	
F1	11	20	7	8	50
F2	21	16	10	12	40
F3	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 is a transportation problem? Explain the techniques used for solving a transportation problem and testing its optimality.

2. You are given a payoff table. From it form a regret (opportunity loss) table.

	Acts		
State of nature	A1	A2	A3
E1	156	153	150
E2	156	158	155
E3	156	158	160

3. The following is a pay off matrix :

		Y	
X	1	–2
	2	–1

What is the value of the game? Who will be the winner of the game? Why?

4. Draw a net work 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

5. What are the features of Operation Research?

(3 × 10 = 30 Marks)
