F – 1009

Reg. No. : .....

Name : .....

Third Semester B.B.A. LL.B. (Five Year Integrated) Degree Examination, September 2018
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) What is meant by modeling in Operations Research ?
2) What are slack variables ?
3) Write a note on Vogel's Approximation Method.
4) Explain EMV criteria.
5) What are assignment problems ?
6) What do you mean by EOQ ?
7) What is saddle point ?
8) What is transportation problem ? **(5×2=10 Marks)**

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

1) Outline the phases of a Systematic Operations Research.
2) Distinguish between Transportation problem and Assignment problem.
3) Discuss the limitations of network techniques.
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 following game by applying the dominance principle :

		B	
	1	7	2
A	6	2	5
	5	1	5

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 do you mean by Operation Research models ? Explain the applicability of different models.

3) Solve the following problem graphically :

Maximize $Z = 8x + 12x_2$

$x_1 + x_2 < 9$

$x_1 > 2$

$x_2 > 3$

$2x_1 + 5x_2 < 36$

4) 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

5) Explain basic assumptions in linear programming.

6) 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	1,000	1,300	1,600	1,200

(4×6=24 Marks)

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

1) What is the problem of decision making ? How decision theory helps in this process and explains the decision making under the situations of risk and uncertainty ?

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) 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) A minor project consists of the following jobs. Draw an arrow diagram representing the project. Calculate the EST, LST, EFT and LFT and floats of all activities. Also obtain critical activities and project duration :

1 – 2	2 – 3	2 – 4	3 – 5	3 – 6	4 – 6	4 – 7	5 – 8	6 – 8	7 – 8
4	6	10	8	2	12	4	15	14	8

5) What are the benefits of Network Analysis ?

(3×10=30 Marks)