

**First Year MHA Degree Regular/Supplementary Examinations
November 2021
Operations Research
(2013 Scheme)**

Time: 3 Hours

Max Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers • Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together • Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary • Ordinary calculator can be used

Essays:

(2x20=40)

1. Solve the transportation problem to minimize the cost.

		Destination				
		1	2	3	4	Supply
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	1200

2. The failure rates of 1000 bulbs used in a hospital is summarised below. The cost of replacing an individual bulb is Rs. 60. If all the bulbs are replaced simultaneously it would cost Rs. 25 per bulb.

End of month	1	2	3	4	5	6
Probability of failure to date	0.05	0.20	0.40	0.65	0.85	1.00

Find out the optimal replacement policy, i.e., individual replacement policy or group replacement policy. If group replacement policy is optimal, then find at what equal intervals should all the bulbs be replaced.

Short Essays:

(2x10=20)

3. Explain about single channel with infinite capacity sum.
4. Hospital lab has four technicians, and four tasks to be performed. The technicians differ in efficiency and the tasks differ in their intrinsic difficulty. This estimate of the times each technician would take to perform each task is given in the effectiveness matrix below.

	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

How should the tasks be allocated, one each to a technician, so as to minimize the total man hours

Short notes:

(8x5=40)

5. Discuss the requirements and applications of linear programming problem.
6. Explain about the evolution of operations research.
7. Elaborate about two-person zero sum game with mention of the strategies involved.
8. Explain about the various costs involved in inventory problems
9. Elaborate about sequencing problems with “n jobs and 3 machines”.
10. Mention the applications of simulation.
11. What is PERT (Programme Evaluation and Review technique).
12. Brief about the dominance rule of rows and columns in game theory.