

First Year MHA Degree Examinations, Feb 2012

PAPER VI - OPERATIONS RESEARCH

Time: 3 Hours

Max Marks: 100

- Answer all the questions
- Draw diagrams wherever necessary

Essays:

(2x20=40)

1.

The following table lists the jobs of a net work along with their time estimates			
Job			
	Optimistic	Most likely	Pessimistic
1 -2	3	6	15
1-6	2	5	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-5	3	6	15
6-7	3	9	27
5-8	1	4	7
7-8	4	19	28

- I. Draw the project net work.
- II. Calculate the length and variance of the critical path
- III. What is the approximate probability that the jobs on the critical path will be completed with in 41 days

2. A company is spending Rs. 1000/- on transportation of its units from three plants to four distribution centers. It has calculated the cost of transportation from different plants to distribution centers, given below in Rs. The supply and demand of units is also given below, Will the company save some money by optimum scheduling and how much.

Plant	Distribution Centre				Availability
	01	02	03	04	
P1	19	30	50	12	7
P2	70	30	40	60	10
P3	40	10	60	20	8
Requirement	5	8	7	10	

Short Essays:

(2x10=20)

3. The cost of a machine is Rs.6,000/- and its scrap value is only Rs.100/-. The maintenance cost are found from experience to be as under:

Year:                    1   2   3   4   5   6   7   8  
 Maintenance cost: 100 250 400 600 900 1250 1600 2000

When should the machine be replaced?

4. A big housing colony replaces the common neon lights at the rate of 16 per day. It costs Rs. 100/- to place an order. A neon light kept in storage costs Rs. 2/- a day. Assume that there is no lead time and that shortages are not allowed. What is the EOQ. How frequently should the orders be placed. What is the optimal cost (variable costs only).

**Short notes:**

**(8x5=40)**

5. Simulation and its application in decision making.
6. List any four limitations of an OR-approach to solving practical problems.
7. Patients arrive at a doctor's clinic at random and the average rate of arrival is 5 per hour. You may assume that the number of arrivals during an hour follows a Poisson distribution. Determine the probability that during a period of one hour, there is no arrival. Also find the probability that during one hour there are more than 2 arrivals.
8. Define and discuss queue discipline.
9. Explain Hungarian method of assignment problem.
10. Uses of critical path method.
11. Game Theory.
12. Write down the dual of the following problem:

$$\begin{aligned} \text{Min: } Z &= 2x_1 + 3x_2 \\ \text{s.t } x_1 + x_2 &> 10 \\ 2x_1 + 3x_2 &> 24 \\ x_1, x_2 &> 0 \end{aligned}$$

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