

**First Year MHA Degree Supplementary Examinations March 2024  
Operations Research  
(Common for 2013 and 2016 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. An inventory manager in a hospital expects the annual demand for surgical implants to be 30,000. Annual carrying cost is INR 100 per implant and ordering cost is INR 300. They operate 275 days a year.
  - a) Compute EOQ.
  - b) How many times per year should they reorder.
  - c) What is the length of an order cycle.
  - d) What is the total annual cost if the EOQ quantity is ordered.
  - e) What does EOQ signify and state the key assumptions of simple EOQ model.
2. For the project below,
  - a) Identify the various paths.
  - b) Identify the critical path and explain its relevance.
  - c) What is the shortest completion time of project.
  - d) Compute path slack.

Activity	Predecessor	Normal time Weeks
A	-	7
B	A	3
C	A	4
D	B, C	5
E	D	2
F	D	4
G	F, E	5

**Short Essays: (2x10=20)**

3. Outline the basic structure of a typical queuing system seen in hospitals and the critical performance parameters of any queuing system.
4. Discuss the application of Pure strategy and mixed strategy in the context of game theory.

**Short notes: (8x5=40)**

5. What are the considerations in deciding the Reorder point.
6. How does Monte Carlo simulation come up with possible predictions of future scenarios.
7. What considerations are important in capital equipment replacement.
8. What insight does duality and sensitivity analysis give in Linear programming.
9. What is the importance of safety stock in inventory management.
10. Discuss the steps in model formulation in Operations Research.
11. Outline the logic applicable in a transportation model.
12. Elaborate the role of sequencing in operations management.

\*\*\*\*\*