UE-5720

M. A. / M. Sc. (Sem. - IV) Examination, June - 2025

MATHEMATICS

Paper - MATH - 401

Operations Research - II

Time Allowed : **Three Hours**

Max. Marks : **100**

This question paper contains two sections as under :

https://pyqlelo.com

https://www.uokonline.com

Section-A ***Max. Marks-20***

This section will have 10 questions, having 02 questions from each unit with no internal choice. Answer in about 20 words. All questions will have equal marks. ***(02×10=20)***

Section-B ***Max. Marks-80***

This section will have 10 questions, having 02 questions from each unit, one question to be attempted from each unit. Words limit approximately 400-500 words. Questions may have sub divisions. All questions will have equal marks. ***(16×05=80)***

SECTION - A

1 (i) What is the basic idea of deterministic dynamic programming?

(ii) Define a probabilistic model in dynamic programming.

(iii) What is EOQ model used for?

(iv) State any one assumption of a simple inventory model.

(v) What is unconstrained optimisation?

(vi) What is the K-T condition in constrained optimisation?

(vii) Define quadratic programming.

(viii) What is meant by separable programming?

(ix) What is full form of M/M/1 in queueing theory?

(x) What is steady state solution in queue model?

SECTION - B

UNIT - I

2 Solve a deterministic dynamic programming problem involving shortest path using a stagewise approach.

OR

Formulate a probabilistic dynamic programming model for inventory control with uncertain demand.

UNIT - II

3 Derive a EOQ formula and calculate EOQ for demand = 1000 units/yr. ordering cost = 200, holding cost = 2/unit/yr.

OR

A store sells 5000 unit/yr. Ordering cost is 100 and holding cost 0.50 per unit/yr. Find EOQ and minimum total cost.

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UNIT - III

4 Solve the unconstrained problem

Max $f(x) = -x^2 + 6x - 8$

OR

Use K.T. conditions to solve

Max $f(x\ y) = xy$, S.t. $x + y \leq 10$.

UNIT - IV

5 Solve quadratic programming problem

Max $Z = 3x + 2y - x^2 - y^2$ S.t. $x + y \leq 5$.

OR

Explain and solve a simple separable programming problem with linear constraints.

UNIT - V

6 In an M/M/1 system with $\lambda = 2$, $\mu = 3$ customers/yr. Compute average number of customers in the system.

OR

A queue has arrival rate 4/hr and service rate 5/hr. Find the average waiting time in the queue (M/M/1 model).
