Exam.Code:716
Sub. Code: 5522

1125

Master of Business Economics

Third Semester

MBE-7101: Operation Research

Time allowed: 3 Hours

Max. Marks: 80

NOTE: *Attempt five questions in all, selecting one question from each Unit.* All questions carry equal marks.

x-x-x

UNIT - I

I. Using the graphical method, find the maximum value of

$z = 7x_1 + 10x_2$

subject to the constraints

$x_1 + x_2 \leq 30000$

$x_2 \leq 12000$

$x_1 \geq 6000$

$x_1 \geq x_2$

$x_1, x_2 \geq 0$

II. A company manufactures a product from its two plants P_1 and P_2 with a capacity of 200 units and 100 units per month. It supplies the product to four shops at S_1, S_2, S_3, and S_4 having a demand of 75, 100, 100 and 30 units respectively per month. The profit per unit differs with shops as given below in Rs.

	S_1	S_2	S_3	S_4
P_1	90	90	100	110
P_2	50	70	130	85

UNIT - II

III. The annual demand for an item is 3200 units. The unit cost is Rs. 6/- and inventory carrying cost is 25% per annum. If the cost of one procurement is Rs. 150/- find out

a) Economic Order Quantity
b) No of orders per year
c) Time between two consecutive orders
d) The optimal cost
e) Mention assumptions made, if any.

IV. A company buys in lots of 500 boxes which is a 3-month supply. The cost per box is Rs. 125 and the ordering cost is Rs. 150. The inventory cost is estimated at 20% of unit value.

a) What is the total annual cost of the existing inventory policy ?
b) How much money could be saved by employing the economic order quantity?

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UNIT - III

V.

a) Discuss the application of dynamic programming in decision making. How is this different from linear programming?

b) Explain Convex and Concave functions as related to non-linear programming. Discuss Kuhn - Tucker conditions.

VI.

a) Discuss various steps of Goal programming model Formulation. How does GP help in decision making?

b) Give the characteristics of Integer programming. Explain the cutting plane method.

UNIT – IV

VII. In a bank where there is a single server, the arrival rate of customers is 5 per hour and service rate is 8 per hour, Assuming the conditions for the single channel queuing model, find out :

a) The probability that the serve is idle.

b) The probability that there are at least two customers in the system.

c) Expected time that a customer spends in queue.

VIII.

a) Find the saddle point in the following case and also the game value.

		B	
		4	2
A		-2	-3
		-4	-5

b) Discuss Simulation and its application in decision making. Explain Monte Carlo simulation giving examples.

UNIT - V

IX. Discuss Simulation and its application in decision making. Explain Monte Carlo simulation giving examples.

X. Discuss the costs associated with queuing system. Also explain the concept of optimum servicing rate and optimum cost.

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