[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 918 **B**

Unique Paper Code : 62361201

Name of the Paper : Operational Research II: Inventory and Marketing Management

Name of the Course : **B.A. Programme**

Semester : II

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **Five** Questions out of **Seven.**
3. **All** questions carry equal marks.

1. (a) What do you understand by inventory management? Describe the relevant costs related to it. (7)

   (b) What are the various ways in which the inventory is classified? Describe ABC analysis in detail. (8)

P.T.O.

2. (a) Derive the optimal order quanfity for an inventory system in which production rate is infinite, demand rate is deterministic, continuous and constant and shortages are allowed and are fully backlogged. (7)

(b) Each unit of an item costs a company Rs. 45/- with annual holding cost of 20% of unit cost, the annual demand for the item is constant at 1500 units and each order costs Rs. 150/- to place. Calculate the EOQ and also the total cost of stocking the item. If the supplier delivers batches of 300 units only, how does this affect the cost? (8)

3. (a) In recent years, the demand for a seasonal product has had the following pattern.

Units	1	2	3	4	5	6	7	8
Probabilit y	0.05	0.1	0.15	0.2	0.2	0.15	0.1	0.05

It costs Rs. 80 to buy each unit and the selling price is Rs. 120. How many units would you buy for the season? What is the expected cost? Would your decision change if the product has a scrap value of Rs. 20? (7)

(b) The annual demand for a product is 500 units. The annual storage charge per unit is 10%. The ordering cost is Rs. 180 per order. The range of amount ordered and the unit cost charged are as follows :

Quantity	Unit Cost (Rs.)
$0 \leq q < 500$	25.00
$500 \leq q < 1500$	24.80
$1500 \leq q < 3000$	24.60
$3000 \leq q$	24.00

Find the optimal order quantity. (8)

4. (a) Define marketing management. Explain the old and new concepts of marketing. (7)

(b) A small store with 9 categories of item has the following costs and annual demands :

Item	A	B	C	D	E	F	G	H	I
Unit Cost (Rs.)	3	2	3	8	2	10	1	5	20
Annual demand	200	2500	100	3000	1000	1000	500	200	100

Perform an ABC analysis of these items. (8)

5. (a) Explain the concept of demand and supply. State and prove Elasticity Theorem. (7)

(b) What are the objectives of a firm in fixing the market price of its product? (8)

6. (a) Formulate a Media Allocation problem as an Integer Programming Problem. (7)

(b) Derive the condition for joint optimization of advertising and selling price when quality is fixed. (8)

7. (a) Suppose the aggregate Brand Switching behaviour displayed by a group of customers from one period to another is described as :

From	To A	To B
A	0.8	0.2
B	0.4	0.6

What will be the market share of A and B in steady state assuming that initial market share of both the brands is 50%. (7)

(b) Classify the market structure depending upon the nature of competitive conditions giving one example of each. (8)