[This question paper contains 5 printed pages.]

5609 *Your Roll No.....*

B.A. Prog./II Sem. **B**

OPERATIONAL RESEARCH : Paper B

Inventory and Marketing Management

(Admissions of 2011 and onwards)

Time : 3 Hours *Maximum Marks : 75*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any **five** *questions in all, selecting at least* **two** *questions from each section.* **All** *questions carry equal marks.*

SECTION A

(*Inventory Management*)

1. (a) What are the different types of Inventory held by the organization and discuss various types of costs incurred in the inventory system.

   (b) Derive a discrete and deterministic demand economic lot size model when the supply is instantaneous and shortages are not allowed.

(8,7)

P.T.O.

2. (a) Derive an expression of "Economic order quantity" for a generalised economic lot size model when lead time is zero. Shortages are allowed and production rate is finite.

   (b) Discuss a production scheduling model where I_0 is the initial inventory. (9,6)

3. Differentiate between "All Unit" and "Incremental" quantity discount.

   A hardware store procures and sells hardware items. Information on an item is given below

   Expected annual saleP = 8000 units

   Ordering cost = Rs. 180 per order

   Holding cost = 10% of average unit cost

   The item can be purchased according to the following schedule –

Lot Size	Unit Price (Rs.)
1 – 999	Rs. 22.00/-
1000 – 1499	Rs. 20/-
1500 – 1999	Rs. 19/-
2000 and above	Rs. 18.50/-

   Determine best order size. (15)

4. (a) Find the optimal order quantity for a continuous & instantaneous demand single period stochastic inventory model when costs are independent of time.

(b) A manufacturing company has determined from an analysis of its accounting and production data for a certain part that (i) Its demand is 9000 units per annum and is uniformly distributed over the year (ii) Its cost price is Rs. 2/- per unit (iii) Its ordering cost is Rs. 40/- per order (iv) The inventory carrying charge is 9% of the inventory value.

Further it is known that the lead time is uniform and equals 8 working days and that the total working days in a year are 300.

Determine

(i) EOQ (Economic order quantity), length of inventory cycle, T.

(ii) Total ordering and holding cost associated with the policy of ordering an amount equal to EOQ.

(iii) Reorder level. (15)

SECTION B

(*Marketing Management*)

5. (a) How is the study of operational Research help in Marketing ?

   (b) Classify the market structure depending upon the nature of competitive conditions, giving an example of each. (7,8)

6. (a) What is the role of brand switching analysis in marketing management. Explain in detail.

   (b) State and prove the elasticity theorem. (8,7)

7. (a) Discuss the various objectives kept in mind by the firm in setting market price of the product.

   (b) Derive the equilibrium conditions for taping a joint optimum decision by a firm with respect to quality promotional budget and price. (7,8)

8. The marketing department of a MNC is planning to advertise its product in two medias in – Newspaper and Magazine. The potential buyers of the product are (i) people in the age gp 18-45 years (ii) having income of more than Rs. 15000/- per month.

The weightage attached to the two characteristics are 0.3 and 0.7 respectively. Data for the problem collected as follows –

	Newspaper	Magazine
Media	5,00,000	2,00,000
People in the age gp 18-45 yrs	2,00,000	1,00,000
Income > 15000 pm	50,000	60,000
Average Noting Score	0.3	0.5
Cost per advertisement	Rs. 10,000	Rs. 15,000
No. of editions per year	365	52

The budget available is Rs. 25 lakh. The company wishes to advertise at least once in a week for newspaper and at least once in a month for the magazine. Formulate it as an Integer Programming Problem. (15)