LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS

FOURTH SEMESTER – NOVEMBER 2012

# MT 4205 - BUSINESS MATHEMATICS

Date : 05/11/2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

# PART A

# Answer ALL the questions: ( 10 X 2 = 20)

1. Find the equilibrium price and quantity for the functions and

2. If the demand law is find the elasticity of demand in terms of x.

1. Find if .
2. Find the first order partial derivatives of .
3. Evaluate
4. Prove that .
5. If and , find .
6. If , find .
7. If  then find *A* and *B*
8. Define Linear Programming Problem.

**PART B**

**Answer any FIVE of the following: (5x 8=40)**

1. The total cost C for output x is given by . Find (i) Cost when output is 4 units (ii) Average cost of output of 10 units (iii) Marginal cost when output is 3 units.
2. If  then prove that .
3. Find the first and second order partial derivatives of .
4. Integrate  with respect to x.
5. Prove that (i) , if f(x) is an even function.

(ii) , if f(x) is an odd function.

1. If  then show that .
2. Compute the inverse of the matrix .
3. Integrate  with respect to x.

**PART C**

**Answer any TWO questions: ( 2 X 20 = 40)**

1. (a) If AR and MR denote the average and marginal revenue at any output, show that elasticity of demand is equal to . Verify this for the linear demand law .

(b) If the marginal revenue function for output x is given by , find the total revenue by integration. Also deduce the demand function.

1. (a) Let the cost function of a firm be given by the following equation: where C stands for cost and x for output. Calculate (i) output, at which marginal cost is minimum (ii) output, at which average cost is minimum (iii) output, at which average cost is equal to marginal cost .

(b) Evaluate .

1. (a) Find the maximum and minimum values of the function .

(b) Solve the equations  by Crammer’s rule.

1. (a) The demand and supply function under perfect competition are  and respectively. Find the market price, consumer’s surplus and producer’s surplus.

(b) Food X contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and costs 12 paise per gram. Food Y contains 8 units of vitamin A per gram and 12 units of vitamin B per gram and costs 20 paise per gram. The daily minimum requirements of vitamin A and vitamin B are 100 units and 120 units respectively. Find the minimum cost of the product mix using graphical method.

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