



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.A. DEGREE EXAMINATION – ECONOMICS**

**FIFTH SEMESTER – NOVEMBER 2014**

**EC 5404 - MATHEMATICS FOR ECONOMISTS**

Date : 12/11/2014  
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

**PART A**

Answer any FIVE of the following questions:-

[ 5x4=20 marks]

1. Define 'Limits'.
2. Distinguish between 'Left Side Limit' and 'Right Side Limit'.
3. State the conditions for Continuity of a function.
4. State the conditions for Relative Maxima and Minima of  $Z = f(X, Y)$ .
5. Find  $\frac{dy}{dx}$  if (a)  $y = \frac{z^2}{z^2+1}$ ,  $Z = \sqrt{2x+1}$ .  
(b)  $y = (x^4 + 5)^2$
6. Find the total differential if  $Z = 2X^3 - 4XY^2 + 3Y^3$ .
7. Evaluate  $\int x \sqrt{2x^2 + 1} dx$ .

**PART B**

Answer any FOUR of the following questions:-

[4X10=40 marks]

8. Explain the properties of limits.
9. Discuss the types of functions with examples.
10. Explain the conditions for relative Maxima, Minima and Saddle point in  $Z = f(x, y)$ .
11. Find the relative Maximum and Minimum (if any) of the function  $F = 2x^3 - 3x^2 - 12x + 13$ .  
Also plot the graph for the function.

Given the total cost function  $C = 1000 + 100Q - 10Q^2 + 1/3Q^3$ , find:

- a. The Marginal Cost function
  - b. The slope of Marginal Cost function.
  - c. The Output at which Marginal Cost is equal to Average Variable Cost.
12. State and prove Euler's Theorem.
  13. Given the Consumption function  $C = C(Y) = 1000 - \frac{5000}{3+Y}$ .
    - (i) Find the marginal propensity to consume when  $Y = 97$ .
    - (ii) Find the marginal propensity to save when  $Y = 97$ .
    - (iii) Determine whether MPC and MPS move in the same direction when  $Y$  changes.

## PART C

Answer any TWO of the following question: -

[2X20=40 marks]

14. Examine the significance of partial differentiation in economic analysis.
15. A monopolist produces his product in two different plants and his total cost functions of the two plants are given by

$$TC_1 = 10 - 2Q_1 + Q_1^2$$

$$TC_2 = 15 - 6Q_2 + 2Q_2^2$$

If the average revenue function is given by  $AR = 50 - 2Q$ , where  $Q = Q_1 + Q_2$ , find:

- His profit maximizing output to be produced in plants 1 and 2
  - His maximum profit.
16. The quantity demanded and the corresponding price are determined by the demand and supply functions  $P = 36 - q^2$  and  $P = 6 + \frac{q^2}{4}$  respectively. Determine the corresponding Consumers' surplus and Producers' surplus.
17. Maximize  $U = q_1q_2$  where  $U$  is Utility,  $q_1$  is quantity of good I and  $q_2$  is quantity of good II subject to  $10q_1 + 15q_2 = 100$ .

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