



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. DEGREE EXAMINATION – ECONOMICS

FIFTH SEMESTER – NOVEMBER 2015

EC 5404 - MATHEMATICS FOR ECONOMICS

Date : 14/11/2015

Dept. No.

Max. : 100 Marks

Time : 09:00-12:00

PART A

Answer any **FIVE** of the following questions:-

[5x4=20 marks]

1. State any four properties of 'Limits'.
2. State the conditions for Maxima, Minima and Point of Inflexion for the function $Y = f(x, y)$.
3. Differentiate Indefinite integral and Definite integral with suitable examples.
4. State the Power, Product, Quotient and Chain rules of differentiation.
5. Given the function $Y = \frac{(2x_1 - x_2^2)}{(x_1^2 + 3x_2)}$ find $\frac{\partial Y}{\partial x_1}$ and $\frac{\partial Y}{\partial x_2}$.
6. Find the total differential if $Z = 2x^3 - 4xy^2 + 3y^3$.
7. Evaluate $\frac{x+5}{x+2} dx$.

PART B

Answer any **FOUR** of the following questions:-

[4X10=40 marks]

8. Using suitable examples explain the various types of functions.
9. Define Lagrangian multiplier and state the conditions for relative Maxima / Minima for a function in $Z = f(x, y)$ subject to the constraint $g(x, y) = c$.
10. Show that AC and MC curves intersect at the lowest point of AC.

11. Find the relative values (if any), of the function $y = 2x^3 - 3x^2 - 12x + 13$ and also plot the graph of the function.
12. Given the Marginal cost function $MC = C^1(Q) = 3Q^2 - 4Q + 6$ and the Total Fixed cost is 8, can we claim that the Average cost is Minimum when $Q = 2$?
13. A Monopolist has the following total revenue (R) and total cost (C) functions $R = 30Q - Q^2$
 $C = Q^3 - 15Q^2 + 10Q + 100$,
 Find a) Profit maximizing Output.
 b) Maximum Profit.
 c) Equilibrium Price.
14. Minimize $U = x_1^2 - x_1x_2 + 2x_2$ subject to the constraint $2x_1 + 4x_2 = 12$.

PART C

Answer any **TWO** of the following question:-

[2X20=40 marks]

15. Examine the significance of differentiation in economic analysis.
16. Discuss the properties of Cobb- Douglass production function.
17. 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:

- a. The profit maximizing output to be produced in plants 1 and 2
 - b. The maximum profit.
18. The quantity demanded and the corresponding price under pure competition 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.
