

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.A. DEGREE EXAMINATION – ECONOMICS
FIFTH SEMESTER – NOVEMBER 2013
EC 5404 - MATHEMATICS FOR ECONOMISTS

Date : 18/11/2013
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer any FIVE questions in about 75 words each

(5 x 4 = 20)

1. Differentiate $y = (x^2 + 3)(2x)$

2. Compute

$$\lim_{x \rightarrow 3} \frac{x^2 - 9}{5x - 15}$$

3. If the total cost of a monopolist is 'C', who produces total output 'Q', what will be the new total cost

- when a tax of 't' per unit of output is levied
- when a subsidy of 's' per unit of output is applied

4. Distinguish a left hand side limit from a right hand side limit.

5. Evaluate

$$\int (x^2 - 4x^2 + x) dx$$

6. Find $\frac{dz}{dx}$ for $y = x^2 + 3x$ and $z = y^2 + 1$

7. Write the first four derivatives of $y = 4x^4 - 2x^3 + 5x^2 - 2x$

PART – B

Answer any FOUR questions in about 300 words each

(4 x 10 = 40)

8. Find the maximum and minimum values of the following function

$$Y = x^3 - 12x + 12$$

9. The demand function faced by a firm is $p = 500 - 0.2x$ and its cost function is $C = 25x + 10000$, where p is price, C is cost and x is output. Find the output at which the profits of the firm are maximum. Also find the price it will charge.

10. The total cost function is $C = 4Q - Q^2 + 2Q^3$

- At what level of output will the average cost be minimum?
- Show that at minimum of average cost, $AC = MC$.

11. Prove that the rate of fall of MR curve is twice the rate of fall of AR curve.

12. Explain the various properties of limits.
13. State and prove the Euler's theorem.
14. Explain the use of differentiation technique in the field of economics.

PART – C

Answer any TWO questions in about 900 words each

(2 x 20 = 40)

15. Given the demand function $p = 90 - x^2$ and the cost function $C = 10 + 2x^2 + 3x^3$, determine the profit maximizing output of a monopolistic firm. What would be the impact of a tax of Rs.10 per unit of output on price and profit?
16. Find the consumer surplus and the producer surplus for an item whose supply and demand functions are given by: $S(x) = 4x + 2$ and $D(x) = 20 - x^2$ for x thousands of units and prices in rupees.
17. Derive the relation between Average and Marginal cost curves.
18. Determine the critical points and locate any relative minima, maxima and saddle points of function f defined by $f(x, y) = 2x^2 + 2xy + 2y^2 - 6x$
