LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A. DEGREE EXAMINATION – ECONOMICS

FIFTH SEMESTER – APRIL 2017

EC 5404 - MATHEMATICS FOR ECONOMISTS

Date: 03-05-2017   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART A

Answer any 5 questions in about 75 words each: (5x4=20)

1. What are the applications of differentiation in Economics?
2. What are the types of limits?
3. Find the derivative of $x^2 \log x$.
4. What is a point of Inflexion?
5. Evaluate $\lim_{x \to 1} \frac{x^2 - 3x + 2}{x^2 - 4x + 3}$
6. Find the derivative of $y = x e^x$

7. Evaluate $\int (x^2 - 4x^2 + x) dx$
8. Write the first four derivatives of $y = 5x^4 + 3x^3 - 12x^2 + 56x$

PART – B

Answer any FOUR questions in about 300 words each: (4x10=40)

8. Show that $x.\frac{dz}{dx} + y.\frac{dz}{dy} = -z$, if $z = \frac{x+y}{x^2 + y^2}$

9. If $z = x^3 - 3x^2y + 2y^2x - 5$ then find out second order partial derivatives.

10. Evaluate $\int x^2 e^{3x} dx$

11. Find $\frac{d^3y}{dx^3}$ for $y = e^{3x}$

12. Minimize $f(x,y) = x^2 + 2y^2 - xy$ subject to $x + y = 8$

13. State and prove Euler's theorem.

14. The total cost function of a firm is given by $TC = 2Q^3 - 3Q^2 - 10Q$

       a) At what level of output will the AC be minimum?

       b) Show that at minimum point of AC it will be equal to MC

Answer any TWO questions in about 900 words each   **(2x20=40)**

15. The demand function of a firm is given by 8P+Q-64=0 and the firm's AC is given as
    AC $= \frac{8}{Q} + 6 - 0.4Q + 0.08Q^2$. Determine the level of output at which:
    a. TR is maximum
    b. MC is minimum
    c. Profit is maximum

16. Explain the relationship between Average Cost and Marginal cost curves and use diagram and suitable examples to substantiate your answer.

17. Determine the equilibrium price and quantity for a market with following demand and supply functions, Pd = 20-2p; Ps = 40-6p. Assume that a specific tax of 1Re is imposed per unit. Compute the changes in equilibrium price and quantity.

18. Given the demand and supply functions Pd = 4-x^2 and Ps = x+2 respectively. Find Consumer's surplus and Producers' surplus.

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