STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 86
(For Candidates admitted during the academic year 2011 – 2012 & thereafter)

SUBJECT CODE: 11EC/MC/MM14

B.A. DEGREE EXAMINATION NOVEMBER 2014
BRANCH IV – ECONOMICS
FIRST SEMESTER

COURSE : MAJOR – CORE
PAPER : MATHEMATICAL METHODS FOR ECONOMICS-I
TIME : 3 HOURS **MAX.MARKS: 100**

SECTION – A

I. ANSWER ALL QUESTIONS. **(10 X2=20)**

1. Show that the lines are parallel
   $4x - 5y + 3 = 0$
   $8x - 10y = 0$
2. Sketch the illustrative graph of average fixed cost as a function of output.
3. Represent the types of curves according to the value of eccentricity as
   (i) e=1 (ii) e>1
   (iii) e<1.
4. Write down the equation of ellipse.
5. Solve : $\lim_{x \to -1} \frac{x^2 + 4x + 3}{x^2 - 7x - 8}$
6. Find dy/dx: $y = x^3 e^{3x}$
7. Find second order differentiation: $y = 32x^3$
8. If the MR is Rs. 25 and the elasticity of demand with respect to price is Rs.2, find AR?
9. Find partial derivatives: $Z = \frac{5x^2}{5x - y + 4}$
10. The total revenue (R) and total cost (C) functions of a firm are given by:
    $R = 30Q - Q^2$; $C = 20 + 4Q$, Where Q is the output, Find the equilibrium output of the firm.

SECTION – B

II. ANSWER ANY FIVE QUESTIONS. **(5X8=40)**

11. (i) Convert 120 into radians.
    (ii) Express 0.1815 into degrees.
    (iii) Find the co-ordinates of midpoint of the line joining (-3,4) and (7,-7)
    (iv) Plot a point (3,4) and find the distance from origin.
12. Find the co-ordinates of the focus and the directrix of the parabola for the given equations
    (i) $y^2 = 4x + 4y$
    (ii) $x^2 + 4x + 2y = 0$.

..2..

13. Trace the following curve and then find their vertex, focus and directrix
$y^2-4y+4x = 0$

14. Find the value of limits: (1) $\lim_{x\to 0} \frac{\sqrt{x+1}-1}{x}$

(2) $\lim_{x\to \infty} \frac{\sqrt{x+1}-1}{x}$

15. (1) Let $Y= 3x^2+9x+8$ and $Z = x^3+10$. Evaluate the derivatives with respect to x at x=1 as Z/Y.
(2) Find dy/dx in the following: $y=10^x+\log (2x+1)+x^2-6$

16. Diagrammatically explain the conditions for profit maximization.

17. A monopolist firm has the following total cost and demand functions:
$C=aQ^2+bQ+c$; $P=\beta - \alpha Q$. What is the profit maximizing output level when the firm is assumed to fix the output?

SECTION - C

III. ANSWER ANY TWO QUESTIONS. (2X20=40)

18. Find all the second order partial derivatives of the following:
(a) $Z = \frac{x+4}{2x+5y}$

(b) $Z = x^3e^{2y}$

19. (i) Plot a point (2,-4.8). Drop perpendiculars AB and AC to the x-axis and y-axis respectively. Calculate the lengths of the diagonals of OBAC.
(ii) Find the intercepts on axes of x and y for the following: 2x-4y-3=0.
(iii) Find the equation of a circle which passes through 3 point: (0,1), (5,1), (2,-3).

20. Discuss the function of a function rule and explain with illustration.

21. Graphically explain the three stages of production function.

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