STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 86
(For Candidates admitted during the academic year 2004 – 2005 and thereafter)

SUBJECT CODE: EC/PE/MM14

M.A. DEGREE EXAMINATION NOVEMBER 2007
BRANCH III – ECONOMICS
FIRST SEMESTER

COURSE : ELECTIVES
PAPER : MATHEMATICAL METHODS - I
TIME : 3 HOURS **MAX.MARKS : 100**

SECTION – A

ANSWER ANY FIVE QUESTIONS **(5 X 8 = 40)**

1. Explain Continuity of a function at a point giving suitable example.

2. a) Explain the significance of first and second derivatives in economics. Give examples.
   b) Examine Convexity of the function
   $$y = 2x - 3 + \frac{1}{x}$$

3. Establish the relationship between AR,MR and elasticity of demand given the demand function
   $$p = \sqrt{20 - Q.}$$

4. The demand and cost functions of the product produced by a discriminating monopolist are.
   $x_1 = 21 - 0.1P_1$
   $x_2 = 50 - 0.4P_2$
   $C = 10x + 2000.$
   Where x_1 & x_2 are the quantities of the product sold by the monopolist in 2 markets. & P_1 & P_2 are the respective prices charged in the market. C – Cost & $x =$ total output, $x = x_1 + x_2$. Determine the prices that the monopolist would charge in the two markets so that Profits are maximized.

5. Explain the properties of Cubb-Douglas Production function.

6. Derive the slope of indifference Curve.

7. Evaluate $\int x^2 e^x dx.$

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SECTION – B

ANSWER ANY THREE QUESTIONS (3 X 20 = 60)

8. A firm under imperfect competition has the following demand and cost fuctions: $P = 50 - x; C = 20 + 2x + 3x^2$.
   a) Detemine equilibrium Price & quantity which will maxmise Profit.
   b) If a tax of Rs 5 per unit of product is imposed determine price & quantity that will maxmise Profit.
   c) If a tax of t per unit of product imposed determine the tax rate which maximises the total tax revenue.
   d) If a tax of 20% imposed on sales. determine the equilibrium quantity.
9. Maximise utility Funtional $u = (x+2)(y+1)$ subject to the budget Constraint $4x + 6y = 130$.
10. a) Show that elasticity of substitution of the CES Production Function is constant.
    b) Prove Euler's Theorem for CES Production Function.
11. Derive Slutsky's equation.
12. Explain Solow's model.

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