SUBJECT CODE: 15EC/PE/ME14

M.A. DEGREE EXAMINATION NOVEMBER 2015
BRANCH   III – ECONOMICS
FIRST SEMESTER

COURSE   : ELECTIVE
PAPER   : MATHEMATICS FOR ECONOMICS
TIME   : 3 HOURS   **MAX. MARKS: 100**

SECTION – A

ANSWER ANY FIVE QUESTIONS: **(5x8=40)**

1. Derive the solutions for an open – input output model.

2. Solve the following simultaneous system by using Cramer's rule:

    $$2 X + 3 Y + 4Z = 29$$
    $$3x + 2 y + 5 z = 32$$
    $$5x + y + 2 z = 25$$

3. Derive the relationship among Marginal Revenue, Average Revenue and Price elasticity of demand. Test that relationship when demand function is $P = 420 – 4Q - 12 Q^2$.

4. A cycle manufacturer has the following short run production function:
    $Q = - \frac{5}{6} L^3 + 31 L^2$ where Q is output and L is labour service.

    a) Show that, where AP is maximum, Marginal product is equal to AP.

    b) Find the value of L for which output is a maximum. Hence find out the maximum output of the manufacturer.

5. Explain the possible applications of Linear Programming in Economic analysis.

6. Find the profit maximizing output and the total profit at that point if the marginal revenue and marginal functions are given by (using integration).

    $MR = 25 - 5 X - 2 X^2$ and $mc = 15 – 2 x – x^2$.

7. Solve the difference equation $3 y_{x+1} – 9 y_x + 8 = 0$ and find the particular solution if $y_0 = \frac{1}{3}$.

SECTION – B

ANSWER ANY THREE QUESTIONS: **(3x20=60)**

8. Determine the characteristic roots and vectors of the matrix $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$

9. State and prove the properties of Cobb – Douglas Production function.

10. If the demand functions for   x   and   y are

    $P = 36 - 3x$ and $q = 40 - 5y$ and the joint cost function is
    $C = x^2 + 2xy + 3y^2$ determine the quantities and prices that maximize profit for the monopolist and find the maximum profit.

11. Solve the following Linear Programming problem by simplex method.

    $$\text{Maximise} \qquad T = x - y + 3z$$
    $$\text{Subject To} \qquad x + y + z \leq 10$$
    $$2X - z \leq 2$$
    $$2x - 2y + 3z \leq 0$$

    $$X \ ; \ y \ ; z \ \geq 0$$

12. The demand and supply functions of a firm under pure competition are, respectively.

    $$P = 32 - 2Q^2 \qquad \text{and} \qquad p = \frac{1}{3}Q^2 + 2Q + 5$$

    Find   a) consumers' surplus and

              b) producers' surplus.

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