

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted from the academic year 2015– 2016)

SUBJECT CODE: 15EC/AC/MM25

B. A. DEGREE EXAMINATION, APRIL 2016
BRANCH IV - ECONOMICS
SECOND SEMESTER

COURSE : AALIED – CORE
PAPER : MATHEMATICAL METHODS FOR ECONOMICS- II
TIME : 3 HOURS **M MAX. MARKS: 100**

SECTION – A

ANSWER ANY TEN QUESTIONS. EACH ANSWER NOT TO EXCEED 50 WORDS:
(10 X 2 = 20)

1. Find out the straight line equation joining (5, 7) and (10, 17).
2. Express Linear function and Quadratic function graphically.
3. Give an example for a square matrix.
4. Find out the determinant of :

$$A = \begin{vmatrix} a & d \\ -b & c \end{vmatrix}$$

5. State Hawkin – Simons conditions.
6. If $y = e^{2x^2}$ find $\frac{dy}{dx}$.
7. If $z = 4x^2y^3$ find first and second order partial derivatives.
8. Given the demand function $P = \log\left(\frac{Q}{Q+1}\right)$. Find out the marginal revenue.
9. Find the price elasticity of demand at $P = 20$, when the demand function $12Q + 7P = 216$.
10. Distinguish between increasing and decreasing function.
11. State the conditions for $y = f(x_1, x_2)$ maximum or minimum.
12. If $z = 4x^2 + 8xy + 8y^2$ find out the degree of homogeneity.

SECTION – B**ANSWER ANY FIVE QUESTIONS. EACH ANSWER NOT TO EXCEED 400 WORDS.****(5 X 8 = 40)**

13. Suppose the demand function of a firm is given by $Q + P - 200 = 0$ and the cost function is $TC = 12 + 3Q$ where P is the price of the good and Q is the Quantity is produced. Find the largest quantity the firm can produce consistent with:

- i) breaking even
- ii) making profit of 9232
- iii) making a loss of 245.

14. Derive the relationship among AR, MR and price elasticity of demand. Demonstrate this by the demand function $P = 420 - 4Q - 12Q^2$.

15. Find the Inverse of the matrix:

$$A = \begin{pmatrix} 3 & 3 & 4 \\ -2 & 4 & -2 \\ 4 & -2 & 3 \end{pmatrix}$$

16. Explain the structure of an open Input – Output model.

17. If $y = ae^{mx} + be^{-mx}$. Prove that $\frac{d^2y}{dx^2} - m^2y = 0$.

18. Find the maximum and the minimum values of the function:

$$y = x^3 - 6x^2 + 9x - 5$$

19. The cost function of a company is given by $TC = 100x - 8x^2 + \frac{1}{3}x^3$ where x denotes the output. Find the level of output at which:

- i) marginal cost is minimum
- ii) average cost is minimum.

20. Using Cobb-Douglas production function prove Euler's theorem.

SECTION – C**ANSWER ANY TWO QUESTIONS. EACH ANSWER NOT TO EXCEED 1000 WORDS****(2 X 20 =40)**

21. Solve the following system of equation using Crammer's rule:

$$\begin{aligned} 3x + 3y - z &= 11 \\ 2x - y + 2z &= 9 \\ 4x + 3y + 2z &= 25 \end{aligned}$$

22. If the Total Cost for a company $c = 26 + 18x$ and the demand function is $P = 40 - x$ where x is the output find the maximum profit.

23. A monopolist sells two products x and y for which the demand function is:

$$x = 25 - 0.5 P_x$$

$$y = 30 - P_y$$

and the combined cost function is

$$c = x^2 + 2xy + y^2 + 20$$

Find (a) the profit maximizing level of output for each product

(b) the profit maximizing price for each product and

(c) the maximum profit.

24. Describe the application of mathematical techniques in economic analysis.
