

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086
(For candidates admitted from the academic year 2019-2020 & thereafter)

SUBJECT CODE : 19EC/AC/MM25

B.A. DEGREE EXAMINATION – APRIL 2022

BRANCH IV – ECONOMICS

SECOND SEMESTER

COURSE : ALLIED CORE

PAPER : MATHEMATICAL METHODS FOR ECONOMICS

TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A

(10 X 2 = 20)

ANSWER ANY TEN QUESTIONS.

1. Plot a point (3,4) and find the distance from the origin.
2. Write the equation to a straight line of gradient $\frac{2}{3}$ and which makes a negative intercept of 4 units on the y axis.
3. What is an idempotent matrix?
4. Find a and b if
$$\begin{pmatrix} a+b & a-b \\ 1 & 2 \end{pmatrix} = \begin{pmatrix} 7 & 3 \\ 1 & 2 \end{pmatrix}$$
5. Find the value of x for which the function $f(x) = \frac{(x^2-9)}{(x-3)}$, is not defined.
6. Check whether the function is odd or even.
 $4x^4+3x^2+5$
7. If the demand function is given by $q = \frac{20}{(p+1)}$, find the elasticity of demand with respect to price at the point when $p=3$.
8. Find the AP_L and MP_K for the production function $Q=2L^2K +3LK^3 +6L+9K$.
9. Distinguish between increasing and decreasing function.
10. Find the homogeneity and degree of the function $f(x,y) = x^3 - 2x^2y + 4xy^2 - y^3$
11. Estimate Aggregate demand given $C=85+0.75Y$ and $I_0=30$.
12. If $f(x)=x^2+x-1$; simplify $f(x+1) - 3f(x)+2f(x-1)$.

SECTION – B

(5 x 8 = 40)

ANSWER ANY FIVE QUESTIONS.

13. Find the focus, directrix, axis, vertex of the parabola.
 $Y^2+2y+4x+5=0$
14. Find the equation of a line passing through the point of intersection of $x-y = 1$ and $2x-3y+1=0$ and parallel to $3x+4y=14$
15. Examine the properties of the Determinants using suitable examples.

16. Find the inverse of $A = \begin{pmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 6 & -6 & 4 \end{pmatrix}$

17. Find the maximum or minimum and inflexion point of the function $y=x^3-6x^2+9x$.
18. Evaluate $\lim_{x \rightarrow 2} (x^2-4)/((\sqrt{x+2} - \sqrt{3x-2}))$
19. Differentiate
- The implicit function $x^2-2x^2y+3xy^2-9$
 - $Y=\log((1+x^2)/(1-x^2))$
 - $e^x(6x^2+6x+7)$
20. . If $xy = ae^x + be^{-x}$. Prove that $x.(d^2y/dx^2)+2 (dy/dx) - xy =0$

SECTION – C

(2 X 20 = 40)

ANSWER ANY 2 OUT OF 4 QUESTIONS.

21. Given the co-efficient matrix, find out the final output goals of each industry assuming that consumer output targets are Rs. 80 million in steel, Rs. 300 million in coal and Rs. 50 million in railway transport. What would be the labour requirement for the three industries?

	Steel	Coal	Railway transport
Steel	0.3	0.2	0.2
Coal	0.2	0.1	0.5
Railway transport	0.2	0.4	0.2
Labour	0.3	0.3	0.1

22. For a firm under perfect competition, it is given that $p=19$, $c=1/3q^3-5q^2+28q+27$, where p stands for price per unit, q units of output and c for total cost. Find
- Quantity produced at which profit will be maximum and the amount of maximum profit
 - What happens to equilibrium output and maximum profit when $p=12$
 - If the total cost function of a firm is $c=1/3q^3-5q^2+30q+10$ and if the price is given by 6, for what value of x , the profit will be maximized. Examine both the first and second order condition.
- 23.
- Derive the relationship between AR, MR and Elasticity of demand
 - The Demand and cost function of a firm is given as $P=12-4x$ and $C=8-x^2$. Estimate the level of output, which maximizes the profit.
24. The demand function of two commodities x_1 and x_2 are given by $x_1=2p_1^{-3}p_2^2$ and $x_2=4p_2^{-2}p_1^2$ where p_1 and p_2 are the price of x_1 and x_2 . Examine the nature of the commodity. Find the first, second order partial and cross partial derivative. Estimate the demand elasticity and cross price elasticity.
