QP Code: U25C051

Reg. No : .....

Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

III SEMESTER (FYUGP) DEGREE EXAMINATIONS, OCTOBER 2025

B. A. Economics

ECO3CJ201 : ANALYTICAL TOOLS FOR ECONOMICS I

2024 Admission Onwards

(Credits: 4)

Time: 2 Hours **Maximum Marks: 70**

Section A

*Answer **all**. Each question carries **3** Marks.* ***(Ceiling: 24 Marks)***

1. Define the terms (a) finite set (b) infinite set.
2. Define polynomial function of degree n.
3. Find $lim_{x \to 1} \frac{x^2-1}{x+1}$
4. Find the marginal cost at $x = 100$ from the total cost function $T = 20 + x + \frac{100}{x}$
5. Find the slope of the curve $y = x^2 - 2x + 3$ at $x = 2$
6. Evaluate the integral $\int \frac{1}{x^2}\, dx$
7. Obtain total cost function from the marginal cost function $MC = 3Q - 4$, when total fixed cost is 100
8. Find the value of the determinant $\begin{vmatrix} 2 & 4 \\ 8 & 2 \end{vmatrix}$
9. Define the terms (a) square matrix (b) diagonal matrix
10. Define norm of a matrix.

Section B

*Answer **all**. Each question carries **6** Marks* ***(Ceiling: 36 Marks)***

11. If $A = \{1, 3, 5, 7\}, B = \{5, 9, 13, 17\}$ and $C = \{1, 3, 9, 13\}$ find (a) $A \cap C$ (b) $A \cup B$ (c) $A - C$ (d) $(A - B) - C$
12. Draw the graph of $3x + 4y = 7$
13. Examine the continuity of $y = \frac{x^2-1}{x-1}$ at $x = 1$
14. For the Cobb-Douglas production function given by $q = 25L^{\frac{2}{5}}K^{\frac{3}{5}}$, find MRTS.

Turn Over

15. Evaluate $\int_2^4 (x^2+1)2x\,dx$.

16. Obtain the consumer's surplus of the demand function $Q = 50 - 2P$, when the price is P =20.

17. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 6 & 2 \\ 1 & 3 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 8 & 7 \\ 0 & -3 & 2 \\ 1 & 0 & 4 \end{bmatrix}$, show that $(A+B)' = A' + B'$

18. If $A = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$, verify that $(AB)^{-1} = B^{-1}A^{-1}$

Section C

*Answer **any one**. Each question carries **10** Marks* ***(1x10=10marks)***

19. Examine the function $y = f(x) = 2x^3 + 3x^2 - 36x + 10$ for maxima and minima.

20. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 2 \\ 2 & 3 & 4 \end{bmatrix}$ and verify that $AA^{-1} = I$

****