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T – 2363

Reg. No. :

Name :



Fourth Semester B.A. Degree Examination, July 2024

First Degree Programme under CBCSS

Economics

Core Course IV

EC 1441 : MATHEMATICAL METHODS FOR ECONOMICS

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in **one** or **two** sentences. Attempt **all** questions. Each question carries **1** mark.

1. Polynomial function
2. Simultaneous equation
3. Demand function
4. Inverse of a matrix
5. Profit maximization
6. Adjoint matrix
7. Cost function
8. Consumer's surplus

P.T.O.

9. Inflection point
10. Indefinite integral

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions not exceeding **one** paragraph. Each question carries **2** marks.

11. Distinguish between Linear function and Non-linear function.
12. Check if the following matrix can be added and find the resultant matrix.
$$A = \begin{bmatrix} 2 & 1 \\ 2 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 1 \\ 2 & 4 \end{bmatrix}$$
13. Determine the maxima and minima values of $4x^3 + 9x^2 - 12x + 13$.
14. Prove that Marginal cost must equal marginal revenue at the profit maximizing level of output.
15. If the Marginal revenue is 25 and the elasticity of demand with respect to price is 2. Find average revenue.
16. $Z = 2x^2 - 3xy + 4y^2$ find $\frac{\partial Z}{\partial x}$ and $\frac{\partial Z}{\partial y}$.
17. Briefly explain the various applications of derivatives in Economics.
18. Find $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x - 3}$.
19. Define Marginal cost.
20. Find the definite integral $\int_1^{10} 3x^2 dx$.

21. If $2x^2 - 3xy + y^2 = 0$ find the value of $\frac{dy}{dx}$ using the product rule.

22. Distinguish between discrete variable and continuous variable.

(8 × 2 = 16 Marks)

SECTION – III

Answer any **six** questions not exceeding **120** words. Each question carries **4** marks.

23. Discuss the role of mathematics in economic theory and point out its applications.

24. Find the inverse of the matrix $\begin{bmatrix} 8 & 4 & 2 \\ 2 & 8 & 4 \\ 1 & 2 & 8 \end{bmatrix}$.

25. Find the maxima and minima values of $Z = f(x, y) = 8x^3 + 2xy - 3x^2 + y^2 + 1$.

26. Distinguish between Single equations and Simultaneous equations.

27. Solve the following system of linear equations.

$$4x + 3y = 4; 3x + 4y = 10$$

28. Briefly explain the various economic functions using in Mathematical economic analysis.

29. Write a short note on cost, revenue, and profit function.

30. Explain the properties of Matrix addition.

31. Given the supply function $P = (Q + 3)^2$, find the producer's surplus PS at $P_0 = 81$ and $Q_0 = 6$.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any **two** questions, not exceeding **4** pages. **Each** question carries **15** marks.

32. Solve the following equations by Cramer's Rule

$$3x + 2y + z = 6, 2x - 3y + 3z = 2 \text{ and } x + y + z = 3$$

33. What do you mean by quadratic equations? Solve the following equations Using Quadratic equation method.

$$x - y = 2$$

$$2x^2 + 5y^2$$

34. Briefly explain the uses of derivatives in Economics.

35. Optimize the function $Z = 4x^2 + 3xy + 6y^2$ subject to the constraint $x + y = 56$.

(2 × 15 = 30 Marks)
