

(Pages : 4)

R – 2206

Reg. No. :

Name :



Fourth Semester B.A. Degree Examination, July 2023

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. Quadratic function
2. Rank of a matrix
3. Constrained optimization
4. Producer's surplus
5. Marginal cost
6. Identity matrix
7. Utility function
8. Implicit differentiation
9. Elasticity of demand
10. Definite integral

(10 × 1 = 10 Marks)

P.T.O

SECTION – II

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

11. Given $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 0 & -1 \\ 6 & 7 \end{bmatrix}$ prove that $AB \neq BA$.
12. Discuss the various marginal concepts using in mathematical economics.
13. Find the adjoint of a matrix $A = \begin{bmatrix} 13 & -2 & 8 \\ -9 & 6 & -4 \\ -3 & 2 & -1 \end{bmatrix}$.
14. Explain the concept of Constrained Optimization.
15. If $f(x) = 4x^3 + 9x^2 - 12x + 22$, find $f'(x)$ and $f''(x)$.
16. Integrate $(2x^6 - 3x^4)dx$.
17. What are the properties of a determinant?
18. Explain the concepts of convex and concave functions.
19. Find $\frac{dy}{dx}$ if $y = (x^4 + x^3)(x^2 + x)$.
20. Describe the important rules of partial differentiation.
21. Determine the following integrals.
- (a) $\int x^5 dx$
- (b) $\int 4x^2 dx$.
22. Write a note on quadratic and logarithmic functions.

(8 × 2 = 16 Marks)

SECTION – III

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

23. Find the first, second and cross partial derivatives for $z = 7x^3 + 9xy + 2y^5$.

24. Briefly explain the application of derivatives in Economics.

25. Find the Rank of the matrix $\begin{bmatrix} 1 & 0 & 2 & 3 \\ 2 & 1 & 0 & 1 \\ 4 & 1 & 4 & 7 \end{bmatrix}$.

26. Explain different types of Matrices.

27. Solve the following quadratic equation: $2q^2 - 85q + 200 = 0$.

28. The demand for a commodity is $D = 35 - 7P$. The Supply function is $S = 2P - 5$. Find the equilibrium price.

29. Evaluate $\int_0^4 \left(\frac{1}{1+x} + 2x \right) dx$.

30. Briefly explain different types of elasticity of demand and point out its relative advantages.

31. Solve the equations using Cramer's rule.

$$2x - 3y + z = 7$$

$$2x + y - z = 1$$

$$4y + 3z = -11$$

(6 × 4 = 24 Marks)

SECTION – IV

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

32. Discuss the role of mathematics in economics analysis and highlight its contemporary relevance.
33. Solve the following system of equations by matrix inversion.
 $2x + y + 3z = 15$
 $x - 2y + 5z = 13$
 $4x + 3y - z = 11$
34. Maximise $y = x_1x_2 + 2x_1$ subject to $x_1 + 2x_2 = 20$. Solve the equations with Lagrange multiplier method.
35. Briefly explain the various economic applications using differential calculus and integral calculus approach.

(2 × 15 = 30 Marks)