D 131132 **(Pages : 4)** **Name.....**

Reg. No.....

FIRST SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2025

(CBCSS)

Econometrics

ECM 1C 01—MATHEMATICAL METHODS FOR ECONOMIC ANALYSIS

(2020 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A (Multiple Choice Questions)

Answer all **fifteen** *questions.*
Each question carries 1/5 *weightage.*

1. Any non zero number or variable raised to the zero power is :

   a) Equal to 0. b) Equal to infinity.

   c) Undefined. d) Equal to 1.

2. In multiplication, exponents of the same variable are :

   a) Subtracted. b) Added.

   c) Kept as constant. d) None of the above.

3. The y intercept is the point where the graph crosses the y axis : it occurs when :

   a) $x = 1$. b) $x = y$.

   c) $x = 0$. d) None of the above.

4. $y = x^2$ is a function. If $x = -5$, y is equal to :

   a) – 25. b) 25.

   c) – 5. d) – 25 or 25.

5. The total cost $TC = Q^3 - 5Q^2 + 60\,Q$, find the average cost AC function :

   a) $Q^3 - 5Q + 60$. b) $3Q - 10Q$.

   c) $Q^2 - 5Q + 60$. d) None of the above.

Turn over

6. To measure the effect of a change in a single independent variable (x or y) on the dependent variable (z) in a multivariable function, _____ is needed.

   a) Total derivative.
   b) Partial derivative.
   c) Elasticity of demand.
   d) None of the above.

7. Inverse function rule indicates that :

   a) Relationship between dependent variable and a lagged independent variable which changes at continuous intervals of time.
   b) The derivative of the inverse function is the reciprocal of the derivative of the original function.
   c) Relationship between dependent variable and a lagged independent variable which changes constantly.
   d) The derivative of the inverse function is the derivative of the original function.

8. The derivative of a constant term 'k' is :

   a) 0.
   b) K.
   c) 1.
   d) Undefined.

9. Which revenue function's derivative gives rise to the marginal revenue ?

   a) Total revenue.
   b) Average revenue.
   c) Variable revenue.
   d) None of the above.

10. Simple interest is ;

   a) It is the method of calculating the interest amount for a particular principal amount of money at some rate of interest.
   b) Calculated on the interest accumulated over the previous period.
   c) Calculated on the principal and the interest accumulated over the previous period.
   d) Both a) and b).

11. Which among the following is true for a Matrix ?

   a) An arrangement of numbers in a box.
   b) A rectangular array of numbers, parameters or variables which has a carefully ordered place within the matrix.
   c) Will not permits expression of a complicated system.
   d) None of the above.

12. Elasticity of demand can be found out by taking ————————.

a) First derivative. b) Second derivative.

c) Third derivative. d) Fourth derivative.

13. When every diagonal element in a square matrix equals one and every other member equals zero, the matrix is referred to as :

a) Null matrix. b) Symmetric matrix.

c) Triangular matrix. d) Identity matrix.

14. For the inverse matrix to exist, the determinant's value cannot be ————————.

a) One. b) Zero.

c) Positive. d) Negative.

15. Find the slope of the equation Y = 5X – 6 :

a) 8. b) 6

c) 5. d) X

(15 × 1/5 = 3 weightage)

Part B (Very Short Answer Questions)

Answer any **five** *questions out of eight questions.*
Each question carries 1 *weightage.*

16. Define Vector.

17. What is constant multiple rule ?

18. What do you mean by area under curve ?

19. Define continuous compounding.

20. What is a diagonal matrix ?

21. What do you mean by a nonlinear function ?

22. Write an equation of a line whose slope is 11 and y-intercept is $(0, -10)$.

23. Multiply the matrix $\begin{bmatrix} 4 & 0 \\ 1 & -9 \end{bmatrix}$ by 2.

(5 × 1 = 5 weightage)

Turn over

Part C (Short Answer Questions)

Answer any **seven** *questions out of ten questions.*
Each question carries 2 *weightage.*

24. Briefly discuss the commutative, associative, and distributive laws in matrix algebra.

25. Write a brief note on application of functions in economics.

26. What do you mean by second order partial derivatives ?

27. Briefly discuss the rules of integration.

28. Write a short note on significance of the Lagrange Multiplier.

29. Briefly discuss the stability conditions for first order linear difference equations.

30. Find the minor of the matrix $A\begin{bmatrix} 2 & 4 \\ -3 & 5 \end{bmatrix}$.

31. Find the inverse of the matrix $B\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$.

32. Given Q = 400 – 8P + 0.05Y, where P = 15 and Y = 12,000. Find (a) income elasticity of demand, ; and (b) the growth potential of the product, if income is expanding by 5 percent a year.

33. Find the demand function Q = f (P) if point elasticity is – 1 for all P > 0.

(7 × 2 = 14 weightage)

Part D (Essay Questions)

Answer any **two** *questions out of four questions.*
Each question carries 4 *weightage.*

34. What is Matrix ? Briefly discuss types and unique properties of matrices.

35. Define Differentiation. Discuss the rules of differentiation.

36. Specify the order and degree of the following differential equation.

    a) $\frac{dy}{dx} = 3x^2$; b) $\frac{dy}{dt} = 2x + 6$.

37. a) Solve the difference equation given below ;

    b) check the answer using t = 0 and t = 1 ; and

    c) Comment on the future path.

(2 × 4 = 8 weightage)