

AQ-354

M.A. (Part—I) Examination

ECONOMICS

(Group—B)

Paper—IX

Quantitative Methods—II

(Econometrics—I)

Time : Three Hours]

[Maximum Marks : 100

N.B. :— (1) Attempt all five questions.

(2) All questions carry equal marks.

1. Define Econometrics. Discuss the scope and importance of Econometrics.

OR

What do you understand by Econometric model ?
Discuss the basic concepts of estimation.

2. (a) If $x = \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$, $y = \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$

Find the value of $\frac{x^2 + xy + y^2}{x^2 - xy + y^2}$.

- (b) Find the sum of the first 14 terms of G.P.
(Geometric Progression) :

G.P. = 3, 9, 27, 81

- (c) Define set. What are the various forms of sets ?
 (d) If X-intercept is -7 and Y-intercept is 4 , find the equation of the straight line.

OR

- (e) If $A = (1, 2, 3)$, $B = (1, 3, 4, 5)$ and $C = (2, 4, 5, 6)$ verify $(A \cup B) \cup C = A \cup (B \cup C)$.
 (f) Expand : $(X + 4)^8$.
 (g) Find the slope and intercept on Y axis of the equation $y - 2x - 3 = 0$.
 (h) If $x = 2 - \sqrt{3}$ show that $\frac{3x - x^3}{1 - 3x^2} = 1$

3. (a) Find MC and AC if $TC = 35 + 5Q - 2Q^2 + 2Q^3$.

- (b) Evaluate : $\lim_{x \rightarrow 2} \frac{4x+2}{x+2}$.

- (c) Find $\frac{dy}{dx}$ if $y = x^4 + y^2 = 3x^2y^2$.

- (d) Integrate the following :

$$\int 3x^3 - x + 1 \, dx.$$

OR

- (e) Find the MR functions for each of the following demand functions and evaluate them at $Q = 4$ and $Q = 10$.

Subject to, $5x_1 + 20x_2 \leq 400$
 $10x_1 + 15x_2 \leq 450$
 $x_1, x_2 \geq 0$.

OR

Solve the following game :

$$A = \begin{bmatrix} -2 & 0 & 0 & 5 & 3 \\ 4 & 2 & 1 & 2 & 5 \\ -4 & -3 & 0 & -3 & 6 \\ 5 & 1 & -5 & -2 & -6 \end{bmatrix}$$

(i) $Q = 36 - 2P$.

(ii) $44 - 4P - Q = 0$

(f) Find $\lim_{x \rightarrow 2} \frac{x^5 - 22}{x^2 - 2}$.

(g) Find $\frac{dy}{dx}$ if $y = \frac{5x}{1-3x}$.

(h) Integrate the following :

$$\int_0^4 6x \, dx$$

4. (a) Adding or subtracting any nonzero multiple of one row (or column) from another row (or column) will have no effect on the determinant. Prove.
- (b) Given $a_{21} = 4$, $a_{32} = 5$, $a_{13} = 3$, $a_{23} = 6$, $a_{12} = 10$ and $a_{31} = -5$, use your knowledge of subscripts to the following matrix :

$$A = \begin{bmatrix} 6 & - & - \\ - & 7 & - \\ - & - & 9 \end{bmatrix}$$

(c) Test for consistency in the system :

$$x + 2y + 3z = 0$$

$$2x + y + 4z = 0$$

$$5x - 6y + 2z = 0$$

and solve it if it is consistent.

- (d) What is lagged model ?

OR

- (e) If any two adjacent rows (or columns) of a determinant are interchanged, the value of the determinant changes only in sign. How ?
- (f) Explain the first order difference equation.
- (g) Find the inverse of the matrix :

$$A = \begin{bmatrix} 0 & -1 & 2 \\ 1 & -2 & -3 \\ 3 & 1 & 1 \end{bmatrix}$$

- (h) Solve :

$$2x - 4y + 3z = 3$$

$$4x - 6y + 5z = 2$$

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

5. Solve the following linear programming problem by simplex method :

$$\text{Maximize } Z = 45x_1 + 80x_2$$