

M.A. (Part—I) Examination
ECONOMICS (Group—B)
(Quantitative Methods—II) (Econometrics—I)
Paper—IX

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) Let $A = \{x, y, z, u, v, w, p, q, r\}$

$B = \{u, v, w, a, b, c\}$ and

$C = \{l, m, n, o, p, q, r, x, y\}$

Let X be the universal set of all English alphabets. Verify the following relations for these sets :

$$(A \cup B) \cup C = A \cup (B \cup C).$$

- (b) If $\left(a - \frac{1}{a}\right)^2 = 3$, show that $a^6 + \frac{1}{a^6} = 110$.

- (c) Find the middle term of $\left(\frac{x}{3} - 1\right)^{10}$.

- (d) Show that the points with co-ordinates (2, -1), (5, 3) and (-4, -9) are Collinear.

OR

- (e) Find the equation of the straight line whose slope is $\frac{5}{2}$, passing through the point (1, 4).

- (f) Expand $\left(\frac{x}{2} - 24\right)^6$.

- (g) Find the 5th term of $\left(2x + \frac{1}{2}y\right)^{12}$.

- (h) Find the middle term of the A.P. :

$$\text{A.P.} = 5, 8, 11, \dots, 65$$

3. (a) Find $\lim_{x \rightarrow 3} \frac{x^2 - x - 6}{x - 3}$.

(b) For the following Demand and Supply Functions find the equilibrium price and output :

$$D = 11P - 11 \text{ and } S = 9P + 7$$

(c) If $y = \frac{5x^2 - 9x + 8}{x^2 + 1}$ then find $\frac{dy}{dx}$.

(d) $\int 4x^3 dx$.

OR

(e) $\lim_{x \rightarrow -4} (3x^2 + 7x - 12)$.

(f) If $y = \left(\frac{3x - 1}{2x + 5} \right)^2$ find $\frac{dy}{dx}$.

(g) $\int_0^6 5x dx$.

(h) Find out $\frac{\partial Q}{\partial L}$ and $\frac{\partial Q}{\partial K}$ for the production function $Q = 24KL - 10L^2 - 8K^2$.

4. (a) If the rows and columns of a determinant are interchanged, the value of the determinant does not change. Prove.

(b) Find the Inverse of the matrix :

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

(c) Solve the following set of Linear Simultaneous Equations :

$$2x - 3y + 4z = 5$$

$$x + 2y - 3z = 8$$

$$x - y - z = 1$$

(d) What is lagged model ?

OR

(e) Explain the first order difference equation.

(f) Find the inverse of the matrix $A = \begin{bmatrix} 2 & 4 & 2 \\ 6 & 2 & 1 \\ 1 & 4 & 3 \end{bmatrix}$

(g) If any two adjacent rows (or columns) of a determinant are interchanged the value of the determinant changes only in sign. How ?

(h) Solve the following simultaneous equations :

$$2x_1 + 3x_2 = 7$$

$$3x_2 - 2x_3 = 5$$

$$2x_1 + 7x_2 = 10$$

5. Maximise $\pi = 30x_1 + 24x_2 + 60x_3$

subject to, $6x_1 + 3x_2 + 5x_3 \leq 30$

$$2x_1 + 2x_2 + 10x_3 \leq 50$$

$$x_1, x_2, x_3 \geq 0.$$

OR

Given $A = \begin{bmatrix} 5 & 8 & 6 \\ 12 & 13 & 6 \\ 11 & 10 & 9 \end{bmatrix}$.

(i) Find maximin and minimax.

(ii) Is there a saddle point ?

(iii) What are the optimal strategies for the two players ?

(iv) What is the pay-off to player 1.