2 0 2 3

(CBCS)

(2nd Semester)

ECONOMICS

(Honours)

Paper No. : EC2.CC4

(**Mathematical Methods for Economics—II**)

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

UNIT—I

1. *(a)* If $A = \begin{bmatrix} x & -2 & y \\ 4 & z & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & x & z \\ x & y & 2 \end{bmatrix}$,

   find $A - 2(B)$. 5

   (b) Solve the coefficient matrix for the systems

   $$x - 2y + 3z = 1$$
   $$3x - y + 4z = 3$$
   $$2x + y - 2z = -1$$

   10

(Turn Over)

OR

2. State the properties of determinants with example.

UNIT—II

3. Find the partial derivatives of the following :

4+4+4+3

(a) $U = x^2y + xy^2$

(b) $U = x^2y^2 + x^5 + y^5$

(c) $U = e^{x^2 + y^3}$

(d) $U = 4x^2$

OR

4. What is total differentiation? Discuss briefly the applications of total differentiation in economic analysis.

5+10=1

UNIT—III

5. Write notes on the following :

7+8=1!

(a) Constrained optimization by substitution method

(b) Lagrange multiplication method

L23/**480**

OR

6. A firm has a budget of ₹ 300 to spend on the three inputs x, y, z whose prices per unit are ₹ 4, ₹ 1 and ₹ 6 respectively. What combination of x, y, z should it employ to maximize output if it faces the production function $Q = 24x^{0.3} y^{0.2} z^{0.3}$?   15

UNIT—IV

7. *(a)* A firm faces the total revenue schedule $TR = 600q - 0.5q^2$.

     (i) What is the marginal revenue when $q = 100$?   3

     (ii) What is the total revenue at its maximum?   2

     (iii) What price should the firm charge to achieve this maximum total revenue?   3

   (b) Find the extreme values of the function

$$y = x^3 - 9x^2 + 15x + 20$$ 7

OR

8. What is profit maximization? The total cost function of a firm is given by $TC = aq^2 + bq + c$, where q is the quantity and

demand function is given by $P = \beta - aq^2$, where P is the price. Find out the profit maximizing output of the firm. 5+10=1..

UNIT—V

9. *(a)* Solve : 5+5=10

(i) $y(1-x) - x\dfrac{dy}{dx} = 0$

(ii) $(x - xy^2)dx + (y - x^2y)dy = 0$

(b) Solve the differential equation

$$\dfrac{dy}{dx} + 5y = 10$$

with the initial condition $y(0) = 6$. 5

OR

10. *(a)* Explain the solution of first-order difference equation by iteration method. 7

(b) Solve $y_{t+2} + 2y_{t+1} - 3y_t = 16$ with initial condition, $y_0 = 10$ when $t = 0$ and $y_1 = 6$ when $t = 1$. 8

★ ★ ★