2022

(CBCS)

(1st Semester)

ECONOMICS

(Honours)

Paper Code : ECO-H/C2

(Mathematical Methods for Economics—I)

Full Marks : 75
Pass Marks : 40%

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* Explain the concept and types of sets. 7

(b) There are 1000 students in a college, 800 depend on library books, 920 on Internet facility, 300 on own books. Of these, 450 use both library and own books, 600 use both Internet and own

books, and 250 use both library and Internet facility. How many students use all the three sources? 4

(c) Find the union of the following sets : 4

(i) $A = \{1, 2, 4, 6, 8, 10\}$
$B = \{3, 6, 8, 9, 10\}$

(ii) $A = \{a, e, i, o, u\}$
$B = \{c, f, g, z\}$

2. (a) Explain the different types of functions and its applications. 7

(b) Solve the given system of equations : 8

$$2x - 3y + 4z = 8$$
$$8x + 4y + 5z = -4$$
$$4x - 5y + 6z = -12$$

UNIT—II

3. (a) Explain the axiomatic properties of real number and completeness. 10

(b) If $ac = bc$ and $c \neq b$, prove that $a = b$. 2½

(c) If $ab = 1$ and $a \neq 0$, prove that $b = \frac{1}{a}$. 2½

Or

4. (a) Find x, y if

$$\frac{x-4}{4+i} + \frac{y}{4-i} = i$$ 5

(b) Given the demand schedule $p = 320 - 2q$ and $TC = 15 + 0 \cdot 5q^2$, calculate the selling price to maximize profit. 5

(c) Briefly explain the rules of differentiation. 4

Or

8. (a) Given $f(x) = 3 - 4x + x^2$, find $f(0)$, $f(-3)$, $f(7)$ and $f(-1)$. 4

(b) Prove

$$\lim_{x \to 1} \frac{x^2 - 4x + 3}{x^2 + 2x - 3} = -\frac{1}{2}$$ 3

(c) Differentiate the following functions : 4

(i) $2x^4$

(ii) $\left(\frac{x+1}{x}\right)^2$

(iii) $x^2 - 4x + 3$

(iv) $y = 8x^3$

(d) Differentiate by Quotient rule with respect to x

$$y = \frac{x+1}{\sqrt{x}}$$ 4

UNIT—V

9. *(a)* Explain the basic rules of integration. 9

(b) Find the integrals of the following : 6

(i) $x^2 - 3x + 2$

(ii) $\int (5 - 2x)\,dx$

10. *(a)* Explain the properties of definite integrals. 10

(b) Give the MC function

$$MC = MQ = Q^2 + 4Q + 3$$

Find the level of output (Q) at which the average variable cost (AVC) will be minimum? 5

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