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(Repeaters)

(1st Semester)

ECONOMICS

(Honours)

Paper No. : ECO–102

[Quantitative Technique—I (Mathematics)]

Full Marks : 70

Pass Marks : 45%

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)* What is function? Discuss the algebra of functions. 1+5=6

   (b) Solve : $\log_{10}\left(\dfrac{47\times32}{10\times16}\right)$ 4

   (c) Show that $\log_a b \cdot \log_b a = 1$ for $a,\ b > 0$; $a,\ b \neq 1$. 4

(Turn Over)

(3)

UNIT—III

5. (a) What is differentiation? Discuss average
rate of change. $2+4=6$

(b) If $y = f(x) = x^2$, then $f(x + \Delta x) = (x + \Delta x)^2$. 4

(c) Solve : $y = \dfrac{1}{x\sqrt{x}} = \dfrac{1}{x} \cdot \dfrac{1}{x^{1/2}}$ 4

6. (a) What is differential approximation? 4

(b) Find $\tan^{-1} 0 \cdot 999$. 6

(c) Since $\lim\limits_{h \to 0} \dfrac{f(x+h) - f(x)}{h} = f'(x)$. 4

UNIT—IV

7. (a) What is consumer surplus? 3

(b) Discuss diagrammatically consumer
surplus. 7

(c) Given the demand function $p = 25 - 2x$,
find the equilibrium price p_0 and
equilibrium quantity demanded x_0 with
the help of the supply function
$4p = 10 + x$. 4

8. (a) What is producer surplus? Explain it
with a diagram. $2+2=4$

(b) Find the producer surplus for the
supply function $p^2 - x = 9$ when $x_0 = 7$. 5

L23/228 (Turn Over)

(c) Show that if the demand and supply functions are given by $p = 36 - x^2$ and $4p - 6 = x^2$ the consumer and producer surpluses are $32\sqrt{6}$ and $8\sqrt{6}$.   5

UNIT—V

9. (a) What is determinant? What are the properties of determinant?   2+5=7

(b) Find $\begin{vmatrix} 1 & 3 & 2 \\ 0 & 2 & -1 \\ 4 & 1 & 5 \end{vmatrix}$.   3½

(c) Find $\begin{vmatrix} 2 & 1 & 0 \\ 3 & 2 & 4 \\ 1 & 2 & 3 \end{vmatrix}$.   3½

10. (a) Solve by Cramer's rule :   7

$$x + 6y - z = 10$$
$$2x + 3y + 3z = 17$$
$$3x - 3y - 2z = -9$$

(b) Show that the matrix

$$A = \begin{vmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{vmatrix}$$

satisfies the equation $A^3 - 6A^2 + 9A - 4I = 0$. Hence find A^{-1}.   7

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