BOARD QUESTION PAPER : MARCH 2017

Notes:

i.   All questions are compulsory.

ii. Figures to the right indicate full marks.

iii. Answer to every question must be written on a new page.

iv. L.P.P. problem should be solved on graph paper.

v.   Log table will be provided on request.

vi. Write answers of Section – I and Section – II in one answer book.

Section – I

Q.1. Attempt any SIX of the following: **[12]**

i.   Find x, y, z, w if $\begin{bmatrix} x+y & x-y \\ y+z+w & 2w-z \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ 9 & 5 \end{bmatrix}$ (2)

ii. Express the truth of the following statements with the help of Venn diagrams:

    a.   No circles are polygon

    b.   If a quadrilateral is rhombus, then it is a parallelogram.   (2)

iii. Find the points of discontinuity, if any for the function:

    $f(x) = \dfrac{x^2 - 9}{\sin x - 9}$ (2)

iv. Write negation of the following statements:

    a.   The number 6 is an even number or the number 25 is a perfect square.

    b.   If $x \in A \cap B$, then $x \in A$ and $x \in B$ (2)

v.   Evaluate : $\int \cos^2 x \cdot dx$ (2)

vi. Find $\dfrac{d^2 y}{dx^2}$, if $y = \log x$.   (2)

vii. Evaluate : $\int \dfrac{e^x + 1}{e^x + x} \cdot dx$ (2)

viii. Find $\dfrac{dy}{dx}$, if $x^3 + y^2 + xy = 10$ (2)

Q.2. (A)   Attempt any TWO of the following: **[6][14]**

i.   Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ by adjoint method.   (3)

ii. If $f(x) = \dfrac{e^{2x} - 1}{ax}$,   for $x < 0$, $a \neq 0$

    $= 1$,   for $x = 0$

    $= \dfrac{\log(1 + 7x)}{bx}$, for $x > 0$, $b \neq 0$

    is continuous at $x = 0$, then find a and b.   (3)

iii.   Demand function x, for a certain commodity is given as $x = 200 - 4p$ where p is the unit price.

     Find : a.   elasticity of demand as function of p.

             b.   elasticity of demand when p = 10, interpret your result.   (3)

(B)   Attempt any TWO of the following: **[8]**

i.   Using the truth table verify that

$p \vee (q \wedge r) = (p \vee q) \wedge (p \vee r)$.   (4)

ii.   If the demand function is $D = 150 - p^2 - 3p$, find marginal revenue, average revenue and elasticity of demand for price p = 3.   (4)

iii.   Evaluate: $\displaystyle\int_{0}^{\frac{\pi}{2}} \frac{\sin x \cdot \cos x}{1 + \sin^4 x \cdot} \cdot dx$.   (4)

Q.3.   (A)   Attempt any TWO of the following: **[6][14]**

i.   Solve the following equations by reduction method:

$x + 3y + 3z = 16$

$x + 4y + 4z = 21$

$x + 3y + 4z = 19$ (3)

ii.   If the function

$f(x) = \dfrac{15^x - 3^x - 5^x + 1}{x \tan x}$, $x \neq 0$ is continuous at $x = 0$, then find f(0).   (3)

iii.   Examine the function $f(x) = x + \dfrac{25}{x}$ for maxima and minima   (3)

(B)   Attempt any TWO of the following: **[8]**

i.   Find the volume of a solid obtained by the complete revolution of the ellipse $\dfrac{x^2}{36} + \dfrac{y^2}{25} = 1$ about X – axis.   (4)

ii.   If $x^3 y^5 = (x + y)^8$, then show that $\dfrac{dy}{dx} = \dfrac{y}{x}$ (4)

iii.   Evaluate : $\displaystyle\int \dfrac{(1 + \log x)}{x(2 + \log x)(3 + \log x)} \cdot dx$ (4)