



BOARD QUESTION PAPER : JULY 2017

Notes:

- All questions are compulsory.
- Figures to the right indicate full marks.
- Answer to every question must be written on a new page.
- L.P.P. problem should be solved on graph paper.
- Log table will be provided on request.
- Write answers of Section – I and Section – II in one answer book.

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

- Write the negation of the following statements: (2)
 - Radha likes tea or coffee.
 - $\exists x \in \mathbb{R}$ such that $x + 3 \geq 10$.
- If $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$, find $A^2 - 3A$. (2)
- Discuss the continuity of the function f at $x = 0$
If $f(x) = \frac{2^{3x} - 1}{\tan x}$, for $x \neq 0$
 $= 1$, for $x = 0$ (2)
- Evaluate : $\int \frac{x+1}{x(x+\log x)} dx$ (2)
- Solve the equations $x + y = 4$ and $2x - y = 5$ using the method of reduction. (2)
- If the function f is continuous at $x = 2$, then find $f(2)$
where $f(x) = \frac{x^5 - 32}{x - 2}$, for $x \neq 2$. (2)
- Find the elasticity of demand, if the marginal revenue is 50 and price is ₹ 75. (2)
- Differentiate $\log(1 + x^2)$ w. r. t. $\tan^{-1}(x)$ (2)

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

- If p : It is raining.
 Q : It is humid.
Write the following statements in symbolic form:
 - It is raining or humid.
 - If it is raining then it is humid.
 - It is raining but not humid. (3)
- Using truth table, examine whether the following statement pattern is tautology, contradiction or contingency:
 $p \vee [\sim(p \wedge q)]$ (3)
- Evaluate : $\int \frac{x^2}{x^6 - 4x^3 + 13} dx$ (3)

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

- i. If the function
- f
- is continuous at
- $x = 0$

$$\text{where } f(x) = 2\sqrt{x^3 + 1} + a, \text{ for } x < 0$$

$$= x^3 + a + b, \quad \text{for } x \geq 0$$

and $f(1) = 2$, then find a and b .

(4)

- ii. For manufacturing
- x
- units, labour cost is
- $150 - 54x$
- , processing cost is
- x^2
- and Revenue
- $R = 10800x - 4x^3$
- .

Find the values of x for which

a. Total cost is decreasing.

b. Revenue is increasing.

(4)

- iii. The total cost
- C
- for producing
- x
- units is ₹
- $(x^2 + 60x + 50)$
- and the price is ₹
- $(180 - x)$
- per unit. For how many units the profit is maximum?

(4)

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

- i. If
- $y = \sin^{-1} \left(\frac{8x}{1 + 16x^2} \right)$
- , find
- $\frac{dy}{dx}$

(3)

- ii. If
- $y = 5^x + x^x$
- , find
- $\frac{dy}{dx}$
- .

(3)

- iii. Evaluate :
- $\int \frac{2x + 1}{(x + 1)(x - 2)} dx$

(3)

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

- i. Find the inverse of matrix
- A
- by using adjoint method;

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

(4)

- ii. Find the area of the region bounded by the curve (parabola)
- $y^2 = 4x$
- and the line
- $x = 3$
- .

(4)

- iii. Evaluate :
- $\int_0^1 \frac{x(\sin^{-1} x)^2}{\sqrt{1 - x^2}} dx$

(4)