

BOARD QUESTION PAPER: MARCH 2019

Notes:

- i. All questions are compulsory.
- ii. Figures to the right indicate full marks.
- iii. Graph paper is compulsory for L.P.P
- iv. Logarithm table will be provided on request.
- v. Answers to the question in Section I and Section II should be written in two separate answer books.
- vi. Question from Section I attempted in the answer book of Section II and vice-versa will not be assessed / not be given any credit.
- vii. Answer to every question must be written on a new page.

Section - I

Q.1. Attempt any SIX of the following:

[12]

i. Write converse and inverse of the following statement:

"If a man is a bachelor then he is unhappy."

(2)

ii. Discuss the continuity of f at x = 1

Where
$$f(x) = \frac{3 - \sqrt{2x + 7}}{x - 1}$$
 for $x \ne 1$

$$=\frac{-1}{3}$$
 for $x=1$ (2)

iii. Find the value of 'k' if the function

$$f(x) = \frac{\left(e^x - 1\right)\sin x}{x^2}, \text{ for } x \neq 0$$

$$= k$$
, for $x = 0$

is continuous at
$$x = 0$$
. (2)

iv. Find the marginal revenue if the average revenue is 45 and elasticity of demand is 5. (2)

v. Find
$$\frac{dy}{dx}$$
 if $x^3 + y^2 + xy = 7$ (2)

vi. Find the area bounded by the curve $y = x^4$, X-axis and lines x = 1 and x = 5. (2)

vii. Evaluate:
$$\int_{-2}^{3} \frac{dx}{x+5}$$
 (2)

viii. Evaluate:
$$\int \frac{dx}{16-9x^2}$$
 (2)

Q.2. (A) Attempt any TWO of the following:

(6)[14]

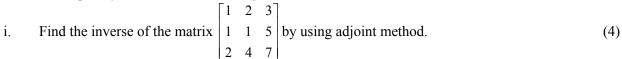
i. Prove that the following statement pattern is a tautology:

$$(q \to p) \lor (p \to q) \tag{3}$$

ii. Find
$$\frac{dy}{dx}$$
 if $y = x^x + 5^x$ (3)

iii. Evaluate:
$$\int x \cos^{-1} x dx$$
 (3)

(B) Attempt any TWO of the following:



- ii. If f is continuous at x = 0 then find f(0) where $f(x) = \frac{5^x + 5^{-x} 2}{x^2}$, $x \ne 0$ (4)
- iii. A manufacturer can sell x items (x > 0) at a price of (280 x) each. The cost of producing x items is $(x^2 + 40x + 35)$. Find the number of items to be sold so that the manufacturer can make maximum profit. (4)

Q.3. (A) Attempt any TWO of the following:

(6)[14]

(8)

(8)

i. If p and q are true statements and r and s are false statements, find the truth value of the following:

$$(p \land \sim r) \land (\sim q \land s) \tag{3}$$

ii. Differentiate
$$e^{4x+5}$$
 w.r.t. e^{3x} (3)

- iii. Evaluate: $\int \frac{e^x(1+x)}{\cos^2(xe^x)} dx$ (3)
- (B) Attempt any TWO of the following:

i. If
$$A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$
, $B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$, find $(AB)^{-1}$ (4)

- ii. For manufacturing x units, labour cost is 150 4x and processing cost is x^2 . Price of each unit is $p = 10,800 4x^2$. Find the values of x for which:
 - (a) Total cost is decreasing.
 - (b) Revenue is increasing (4)
- iii. Evaluate : $\int_{3}^{9} \frac{\sqrt[3]{12-x}}{\sqrt[3]{x} + \sqrt[3]{12-x}} dx$ (4)