

Topics : Fundamentals of Mathematics, Quadratic Equation, Function

Type of Questions

Single choice Objective (no negative marking) Q. 1, 2, 3, 4 (3 marks, 3 min.)

Short Subjective Questions (no negative marking) Q. 5, 6 (3 marks, 3 min.)

Subjective Questions (no negative marking) Q. 7 (4 marks, 5 min.)

Match the Following (no negative marking) Q.8 (8 marks, 8 min.)

M.M., Min.

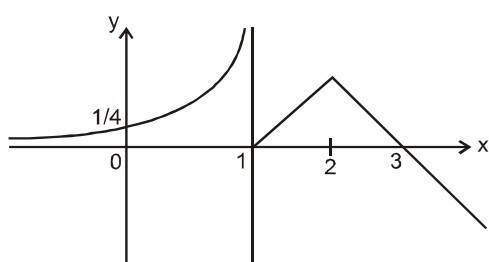
[12, 12]

[6, 6]

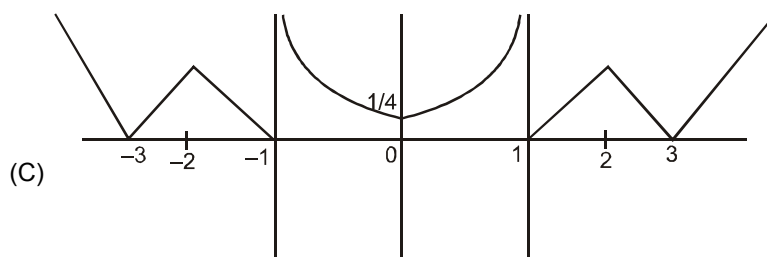
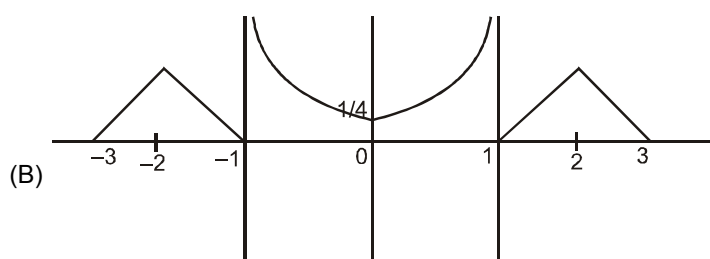
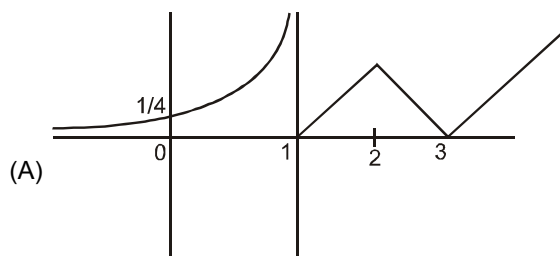
[4, 5]

[8, 8]

1. The graph of  $y = f(x)$  is given below



then the graph of  $y = |f(|x|)|$  is :



(D) none of these

2. If  $(x - a)(x - 5) + 2 = 0$  has only integral roots where  $a \in I$ , then value of 'a' can be :  
 (A) 8 (B) 7 (C) 6 (D) 5
3. If  $x^2 - (a - 3)x + a = 0$  has atleast one positive root then  
 (A)  $a \in (-\infty, 0) \cup [7, 9]$  (B)  $a \in (-\infty, -1) \cup [7, \infty)$   
 (C)  $a \in (-\infty, 0) \cup [9, \infty)$  (D) none of these
4. If  $\log_4(x + 2y) + \log_4(x - 2y) = 1$ , then the minimum value of  $|x| - y$  is  
 (A)  $\sqrt{2}$  (B)  $\sqrt{3}$  (C)  $\sqrt{4}$  (D)  $\sqrt{5}$
5. For what values of a does the equation  $2 \log_3^2 x - |\log_3 x| + a = 0$  possess four solutions ?
6. If  $\sqrt{ab}$  is irrational then prove that  $\sqrt{a} + \sqrt{b}$  irrational. (where  $a > 0, b > 0, a, b \in \mathbb{Q}$ )
7. Prove that ,  $[x] + [5x] + [10x] + [20x] = 36k + 35$  ,  $k \in I$  does not have any real solution .  
 Here  $[.]$  denotes greatest integer function.
8. Match the column

**Column – I**

(A) Number of roots of the equation  $\sin x = \ell n x$

(B) Number of integral solution  
of the inequality  $||x-2|-3| \leq 0$

(C) Number of distinct real roots  
of the equation  $x^3 - 3x + 2 = 0$

(D) Absolute value of the sum of the coefficients of the  
quotient when  $x^5 - 4x^2 + 2x + 1$  is divided by  $(x - 1)$

**Column – II**

(p) 1

(q) 2

(r) 3

(s) 4

## Answers Key

1. (C)      2. (A)      3. (C)      4. (B)
5. for all  $x \in (0, 1/8)$
8.  $(A \rightarrow p), (B \rightarrow q), (C \rightarrow q), (D \rightarrow p)$