EXERCISE – II MULTIPLE CORRECT (OBJECTIVE QUESTIONS)

1. If $C_1 \equiv y = \frac{1}{1+x^2}$ and $C_2 \equiv y = \frac{x^2}{2}$ be two curve lying in XY plane. Then

(A) area bounded by curve C_1 and y = 0 is π

(B) area bounded by C_1 and C_2 is $\frac{\pi}{2} - \frac{1}{3}$

(C) area bounded by C_1 and C_2 is $1 - \frac{\pi}{2}$

(D) area bounded by curve C_1 and x-axis is $\frac{\pi}{2}$

2. Area enclosed by the curves y = ℓnx, y = ℓn |x| ; y = |ℓnx| and y = |ℓn| x | | is equal to

(A) 2 (B) 4
(C) 8 (D) cannot be determined

3. y = f(x) is a function which satisfies
(i) f(0) = 0 (ii) f"(x) = f'(x) and (iii) f'(0) = 1
then the area bounded by the graph of y = f(x), the lines x = 0, x – 1 = 0 and y + 1 = 0, is

(A) e (B) e – 2 (C) e – 1 (D) e + 1

4. Let T be the triangle with vertices (0, 0), (0, c^2) and (c, c^2) and let R be the region between y = cx and y = x^2 where c > 0 then

(A) Area (R) = $\frac{c^3}{6}$ (B) Area of R = $\frac{c^3}{3}$

(C) $\lim_{c\to 0^+} \frac{\text{Area(T)}}{\text{Area(R)}} = 3$ (D) $\lim_{c\to 0^+} \frac{\text{Area(T)}}{\text{Area(R)}} = \frac{3}{2}$

5. Suppose g(x) = 2x + 1 and h(x) = $4x^2 + 4x + 5$ and h(x) = (fog)(x). The area enclosed by the graph of the function y = f(x) and the pair of tangents drawn to it from the origin, is

(A) $\frac{8}{3}$ (B) $\frac{16}{3}$ (C) $\frac{32}{3}$ (D) none

6. Let f(x) = $x^2 + 6x + 1$ and R denote the set of points (x, y) in the coordinate plane such that f(x) + f(y) ≤ 0 and f(x) – f(y) ≤ 0. The area of R is equal to

(A) 16π (B) 12π (C) 8π (D) 4π

7. The value of 'a' (a > 0) for which the area bounded by the curves $y = \frac{x}{6} + \frac{1}{x^2}$, y = 0, x = a and x = 2a has the least value, is

(A) 2 (B) $\sqrt{2}$ (C) $2^{1/3}$ (D) 1

8. Consider the following regions in the plane
$R_1 = \{(x, y) : 0 \le x \le 1 \text{ and } 0 \le y \le 1\}$ and
$R_2 = \{(x,y)\} : x^2 + y^2 \le 4/3\}$
The area of the region $R_1 \cap R_2$ can be expressed as $\frac{a\sqrt{3} + b\pi}{9}$, where a and b are integers, then

(A) a = 3 (B) a = 1 (C) b = 1 (D) b = 3

9. The area of the region of the plane bounded by (|x|, |y|) ≤ 1 & xy ≤ $\frac{1}{2}$ is

(A) less than 4ℓn 3 (B) $\frac{15}{4}$

(C) 2 + 2 ℓn 2 (D) 3 + ℓn 2

10. A point P moves inside a triangle formed by A(0, 0), B(2, $2\sqrt{3}$), C(4, 0) such that {min (PA, PB, PC)} = 2, then the area bounded by the curve traced by P is

(A) $3\sqrt{3} - \frac{3\pi}{2}$ (B) $4\sqrt{3} - 2\pi$ (C) $\sqrt{3} - \frac{\pi}{2}$ (D) 2 π

11. Area of the region enclosed between the curves x = y^2 – 1 and x = |y| $\sqrt{1-y^2}$ is

(A) 1 (B) $\frac{4}{3}$ (C) $\frac{2}{3}$ (D) 2

12. If the tangent to the curve y = 1 – x^2 at x = α, where 0 < α < 1, meets the axes at P and Q. Also α varies, the minimum value of the area of the triangle OPQ is k times area bounded by the axes and the part of the curve for which 0 < x < 1, then k is equal to

(A) $\frac{2}{\sqrt{3}}$ (B) $\frac{75}{16}$ (C) $\frac{25}{18}$ (D) $\frac{2}{3}$