

1. The area bounded in the first quadrant by the normal at (1, 2) on the curve  $y^2 = 4x$ , x-axis & the curve is given by:

- (A)  $\frac{10}{3}$  (B)  $\frac{7}{3}$  (C)  $\frac{4}{3}$  (D)  $\frac{9}{2}$

2. Suppose  $y = f(x)$  and  $y = g(x)$  are two functions whose graphs intersect at the three points (0, 4), (2, 2) and (4, 0) with  $f(x) > g(x)$  for  $0 < x < 2$  and  $f(x) < g(x)$  for  $2 < x < 4$ . If  $\int_0^4 [f(x) - g(x)] dx = 10$  and

$\int_2^4 [g(x) - f(x)] dx = 5$ , the area between two curves for  $0 < x < 2$ , is

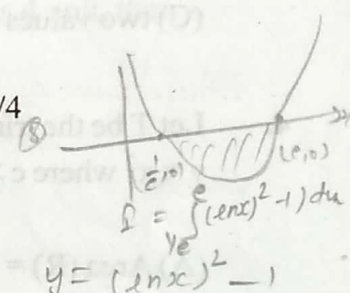
- (A) 5 (B) 10 (C) 15 (D) 20

3. Let 'a' be a positive constant number. Consider two curves  $C_1: y = e^x$ ,  $C_2: y = e^{a-x}$ . Let S be the area of the part surrounding by  $C_1$ ,  $C_2$  and the y-axis, then  $\lim_{a \rightarrow 0} \frac{S}{a^2}$  equals

- (A) 4 (B) 1/2 (C) 0 (D) 1/4

4. The area of the region(s) enclosed by the curves  $y = x^2$  and  $y = \sqrt{|x|}$  is

- (A) 1/3 (B) 2/3 (C) 1/6 (D) 1



5. Area enclosed by the graph of the function  $y = \ln^2 x - 1$  lying in the 4th quadrant is

- (A)  $\frac{2}{e}$  (B)  $\frac{4}{e}$  (C)  $2\left(e + \frac{1}{e}\right)$  (D)  $4\left(e - \frac{1}{e}\right)$

6. The area bounded by the curve  $y = f(x)$  (where  $f(x) \geq 0$ ), the co-ordinate axes & the line  $x = x_1$  is given by  $x_1 \cdot e^{x_1}$ . Therefore  $f(x)$  equals:

- (A)  $e^x$  (B)  $x e^x$  (C)  $x e^x - e^x$  (D)  $x e^x + e^x$

7. The slope of the tangent to a curve  $y = f(x)$  at  $(x, f(x))$  is  $2x + 1$ . If the curve passes through the point (1, 2) then the area of the region bounded by the curve, the x-axis and the line  $x = 1$  is

- (A)  $\frac{5}{6}$  (B)  $\frac{6}{5}$  (C)  $\frac{1}{6}$  (D) 1

8. The area bounded by the curves  $y = x(x - 3)^2$  and  $y = x$  is (in sq. units):

- (A) 28 (B) 32 (C) 4 (D) 8

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

- (A) 1 (B) 4/3 (C) 2/3 (D) 2

10. The curve  $y = ax^2 + bx + c$  passes through the point (1, 2) and its tangent at origin is the line  $y = x$ . The area bounded by the curve, the ordinate of the curve at minima and the tangent line is

- (A)  $\frac{1}{24}$  (B)  $\frac{1}{12}$  (C)  $\frac{1}{8}$  (D)  $\frac{1}{6}$

