1. The area in the first quadrant between $x^2 + y^2 = \pi^2$ and $y = \sin x$ is -

(a) $\frac{(\pi^3 - 8)}{4}$ (b) $\frac{\pi^3}{4}$

(c) $\frac{(\pi^3 - 16)}{4}$ (d) $\frac{(\pi^3 - 8)}{2}$

2. The area of the region bounded by the curves $y = | x - 2 |$ and $y = 4 - | x |$ is -

(a) 2 (b) 4 (c) 5 (d) 6

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

(a) 5/3 units (b) 5/6 units (c) 6/5 units (d) 6 units

4. The area bounded by curves $y = |x| - 1$ and $y = - |x| + 1$ is

(a) 1 (b) 2

(c) $2\sqrt{2}$ (d) 4

5. Lk2If $f(x) = \begin{cases} x & ; \ 0 \le x < 1/2 \\ 1/2 & ; \ x = 1/2 \\ 1 - x & ; \ 1/2 < x \le 1 \end{cases}$ and $g(x) = (x - 1/2)^2$, $x \in R$.

Then the area of the portion bounded between g(x) and f(x) in the interval $[1/2, \sqrt{3}/2]$ is

(a) $\sqrt{3}/4 - 1/3$ (b) $\sqrt{3}/4 + 1/3$ (c) 0 (d) $\sqrt{3}/12$

6. Area of a loop of the curve $r = a \sin 3\theta$ is -

(a) $\frac{\pi a^2}{6}$ (b) $\frac{\pi a^2}{8}$

(c) $\frac{\pi a^2}{12}$ (d) $\frac{\pi a^2}{24}$

7. If $y = mx$ divides the area bounded by lines $x = 0$, $y = 0$, $x = 3/2$ and the curves $y = 1 + 4x - x^2$ in two equal parts, then m is equal to -

(a) 13/8 (b) 13/4 (c) 13/6 (d) None of these

8. The area of the plane region bounded by the curves $x + 2y^2 = 0$ and $x + 3y^2 = 1$ is equal to-

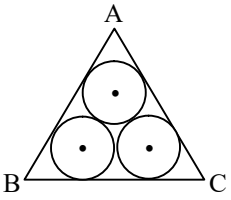
(a) 1/3 (b) 2/3 (c) 4/3 (d) 5/3

9. The area of the region bounded by $y = e^x$, $y = e^{-x}$, $x = 0$ and $x = 1$ is-

(a) $e + \frac{1}{e}$ (b) log (4/e)

(c) 4 log (4/e) (d) $e + \frac{1}{e} - 2$

10. The area of the equilateral triangle, in which three coins of radius 1 cm are placed as shown in the figure, is



(a) $6 + 4\sqrt{3}$ (b) $4\sqrt{3} - 6$

(c) $7 + 4\sqrt{3}$ (d) $4\sqrt{3}$

11. The area bounded by the curve $y = x | x |$, x-axis and the ordinates $x = - 1$, $x = 1$ is given by

(a) 1/3 (b) 4/3 (c) 2/3 (d) None of these

12. Area of the region bounded by the line $x - y + 2 = 0$ and the curve $x = \sqrt{y}$ is

(a) 9 (b) 9/2 (c) 10/3 (d) 5

13. If A_1 is the area of the parabola $y^2 = 4ax$ lying between vertex and the latus rectum and A_2 is the area between the latus rectum and the double ordinate $x = 2a$, then $\frac{A_1}{A_2} =$

(a) $2\sqrt{2} - 1$ (b) $\frac{1}{7}(2\sqrt{2} + 1)$

(c) $\frac{1}{7}(2\sqrt{2} - 1)$ (d) None

14. Area of the region bounded by the curves $y = 2^x$, $y = 2x - x^2$, $x = 0$ and $x = 2$ is given by

(a) $\frac{3}{\log 2} - \frac{4}{3}$

(b) $\frac{3}{\log 2} + \frac{4}{3}$

(c) $3 \log 2 - \frac{4}{3}$

(d) $\frac{3}{\log 2} - \frac{4}{3}$

15. Area lying between the curves $y = \tan x$, $y = \cot x$ and x-axis, $x \in [0, \pi/2]$ is

(a) log 2 (b) $\frac{1}{2}\log 2$

(c) $2 \log \left(\frac{1}{\sqrt{2}}\right)$ (d) None of these

16. Area bounded by the curves $y = | x - 1 |$, $y = 0$ and $| x | = 2$ is

(a) 4 (b) 5 (c) 9 (d) None of these

17. The ratio of the areas between the curves $y = \cos x$ and $y = \cos 2x$ and x-axis from $x = 0$ to $x = \frac{\pi}{3}$ is

(a) 1 : 3 (b) 2 : 1

(c) $\sqrt{3}$: 1 (d) None of these

18. The area bounded by the curve $y = f(x)$, x-axis and ordinates $x = 1$ and $x = b$ is $(b - 1) \sin (3b + 4)$, then $f(x) =$

(a) $3(x-1) \cos (3x + 4) + \sin (3x + 4)$

(b) $(b - 1) \sin (3x + 4) + 3 \cos (3x + 4)$

(c) $(b - 1) \cos (3x + 4) + 3 \sin (3x + 4)$

(d) None of the above

19. The area between the curve $x = 2y - y^2$ and y-axis is

(a) 9/4 (b) 4/3 (c) 9 (d) None of these

20. Area bounded by the curve $y = 2^x$ and $y = 2x - x^2$, $x = 0$, $x = 2$ is

(a) $\frac{3}{\log 2} - \frac{4}{3}$ (b) $\frac{3}{\log 2} + \frac{4}{3}$

(c) $3 \log 2 + \frac{4}{3}$ (d) $3 \log 2 - \frac{4}{3}$

21. The area enclosed by $|y| - |x| = 1$ and $x^2 + y^2 = 1$ is

(a) 2 units (b) Zero units (c) Infinite units (d) None

22. The area of the region bounded by the curve $y = \frac{16 - x^2}{4}$ and $y = \sec^{-1}[-\sin^2 x]$ (where [.] denotes the greatest integer function) is -

(a) $\frac{1}{3}(4 - \pi)^{3/2}$ (b) $8(4 - \pi)^{3/2}$

(c) $\frac{8}{3}(4 - \pi)^{3/2}$ (d) $\frac{8}{3}(4 - \pi)^{1/2}$

23. Through any point (x, y) of a curve which passes through the origin, lines are drawn parallel to the coordinate axes. The curve, given that it divides the rectangle formed by the two lines and the axes into two areas, one of which is twice the other, represents a family of

(a) Circles (b) Parabolas

(c) Hyperbolas (d) Straight lines

24. The area made by curve $f(x) = [x] + \sqrt{x - [x]}$ and x axis when $0 \le x \le n$ $(n \in N)$ is equal to {where [x] is greatest integer function}

(a) $\frac{2n}{3} + \frac{n(n+1)}{2}$ (b) $\frac{n}{3} + \frac{n(n+1)}{2}$

(c) $\frac{2n}{3} + \frac{n(n-1)}{2}$ (d) $\frac{n}{3} + \frac{n(n-1)}{2}$

25. The area bounded by the curve $y = f(x)$, x-axis and the ordinates $x = 1$ and $x = b$ is $(b - 1) \sin(3b + 4)$, then $f(x)$ equals -

(a) $(x - 1) \cos(3x + 4)$ (b) $\sin(3x + 4)$

(c) $\sin(3x + 4) + 3(x - 1) \cos(3x + 4)$ (d) None of these