CUET (UG) – MATHEMATICS

Chapter Test - Unit III: Calculus - Applications of Integrals

1. The area of the region bounded by the curve $y^2 = 9x$, $x = 2$, $x = 4$ and the x-axis in the first quadrant is:
   (A) $8\sqrt{2} - 4\sqrt{2}$ sq. units
   (B) $16 - 4\sqrt{2}$ sq. units
   (C) $4(4 - \sqrt{2})$ sq. units
   (D) $12\sqrt{2}$ sq. units

2. The area of the region bounded by the circle $x^2 + y^2 = 1$ and the line $x + y = 1$ in the first quadrant is:
   (A) $\frac{\pi}{4} - \frac{1}{2}$ sq. units
   (B) $\frac{\pi}{4} - 1$ sq. units
   (C) $\pi - \frac{1}{2}$ sq. units
   (D) $\frac{\pi}{2} - \frac{1}{4}$ sq. units

3. Area of the region bounded by the parabola $y = x^2$ and the line $y = |x|$ is:
   (A) $1/6$ sq. unit
   (B) $1/3$ sq. unit
   (C) $2/3$ sq. unit
   (D) 1 sq. unit

4. The area of the region bounded by $y^2 = 4x$ and $y = 2x$ is:
   (A) $2/3$ sq. unit
   (B) $1/3$ sq. unit
   (C) $1/4$ sq. unit
   (D) $3/4$ sq. unit

5. The area of the region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ in the first quadrant is:
   (A) πab sq. units
   (B) $\frac{\pi ab}{2}$ sq. units
   (C) $\frac{\pi ab}{4}$ sq. units
   (D) $\frac{\pi ab}{8}$ sq. units

6. The area of the region bounded by $y = \sqrt{3}x$, the x-axis and the circle $x^2 + y^2 = 4$ in the first quadrant is:
   (A) $\pi/3$ sq. units
   (B) $\pi/6$ sq. units
   (C) $\pi/2$ sq. units
   (D) $\pi/4$ sq. units

7. Area of the region bounded by the curve $y = x^3$, the line $y = 8$ and the y-axis is:
   (A) 12 sq. units
   (B) 10 sq. units
   (C) 14 sq. units
   (D) 16 sq. units

8. The area of the region bounded by $y^2 = 4x$ and the line $x = 3$ is:
   (A) $8\sqrt{3}$ sq. units
   (B) $4\sqrt{3}$ sq. units
   (C) $12\sqrt{3}$ sq. units
   (D) $16\sqrt{3}$ sq. units

9. The area of the region bounded by the curve $x = 2y - y^2$ and the y-axis is:
   (A) $2/3$ sq. unit
   (B) $4/3$ sq. units

(C) 1/3 sq. unit

(D) 5/3 sq. units

10. Area of the region bounded by the curves $y = e^x$, $y = e^{-x}$ and the line $x = 1$ is:

(A) $e + \frac{1}{e} - 2$ sq. units

(B) $e - \frac{1}{e}$ sq. units

(C) $e + \frac{1}{e}$ sq. units

(D) $e - \frac{1}{e} - 2$ sq. units

11. The area of the region bounded by $y^2 = x$ and $x^2 = y$ is:

(A) 1/3 sq. unit

(B) 1 sq. unit

(C) 1/2 sq. unit

(D) 2/3 sq. unit

12. Area of the region bounded by the curve $y = \sin 2x$ from $x = 0$ to $x = \pi/4$ is:

(A) 1/2 sq. unit

(B) 1 sq. unit

(C) 2 sq. units

(D) 1/4 sq. unit

13. The area of the region bounded by the parabola $y^2 = 8x$ and its latus rectum is:

(A) 16/3 sq. units

(B) 32/3 sq. units

(C) 8/3 sq. units

(D) 64/3 sq. units

14. The area of the region bounded by $x^2 = 4y$, $y = 2$, $y = 4$ and the y-axis in the first quadrant is:

(A) $\frac{8}{3}(2\sqrt{2} - 1)$ sq. units

(B) $\frac{4}{3}(8 - 2\sqrt{2})$ sq. units

(C) $8\sqrt{2}$ sq. units

(D) $4\sqrt{2}$ sq. units

15. Area of the region bounded by $y = |x - 1|$ and $y = 1$ is:

(A) 1 sq. unit

(B) 2 sq. units

(C) 1/2 sq. unit

(D) 3/2 sq. units

16. The area of the region bounded by $x^2 + y^2 = 16$ and $y^2 = 6x$ in the first quadrant is:

(A) $\frac{4\pi}{3} + \sqrt{3}$ sq. units

(B) $\frac{4\pi}{3} + \frac{4\sqrt{3}}{3}$ sq. units

(C) $\frac{8\pi}{3} + \frac{4\sqrt{3}}{3}$ sq. units

(D) $2\pi + \sqrt{3}$ sq. units

17. The area of the region bounded by $y = x^2 + 2$, $y = x$, $x = 0$ and $x = 3$ is:

(A) 21/2 sq. units

(B) 15/2 sq. units

(C) 27/2 sq. units

(D) 9/2 sq. units

18. Area of the region bounded by the curve $y = \sqrt{a^2 - x^2}$ and the x-axis is:

(A) πa^2 sq. units

(B) $\frac{\pi a^2}{2}$ sq. units

(C) $\frac{\pi a^2}{4}$ sq. units

(D) $2\pi a^2$ sq. units

19. The area of the region bounded by the curve $y = \tan x$, x-axis and the line $x = \pi/4$ is:
    (A) $\log \sqrt{2}$ sq. units
    (B) $\log 2$ sq. units
    (C) $1/2 \log 2$ sq. units
    (D) Both (A) and (C)

20. Area of the region bounded by the parabola $y^2 = 4x$ and the line $y = x$ is:
    (A) 8/3 sq. units
    (B) 4/3 sq. units
    (C) 2/3 sq. units
    (D) 16/3 sq. units

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