Online Chapter Tests

8. APPLICATION OF INTEGRALS

Time : 3 Hr.   **MM : 50**

General Instructions

1. This test consists of 26 questions, grouped according to their type and consists a total of 50 marks.
2. Marks related to each question are mention clearly.
3. Time allotted to complete this test is 3 hrs.
4. It is advisible that you should attempt this test in a single slot of time and without the help of books and teacher.
5. To assess your chapterwise understood, once you complete this test compare your solutions with our solution given with each test and score yourself.

Multiple Choice Questions   **[1 Mark each]**

1. The area (in sq units) of the region $\{(x, y) : y^2 \geq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \geq 0\}$, is

   (a) $\pi - 4/3$ (b) $\pi - 8/3$ (c) $\pi - \dfrac{4\sqrt{2}}{3}$ (d) $\dfrac{\pi}{2} - \dfrac{2\sqrt{2}}{3}$

2. The area (in sq units) of the quadrilateral formed by the tangents at the end points of the latusrectum to the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{5} = 1$, is

   (a) 18   (b) $\dfrac{27}{2}$ (c) 27   (d) $\dfrac{27}{4}$

3. Area of the smaller portion of the circle $x^2 + y^2 = 4$ cut off by the line $x = 1$, is

   (a) $\left(\dfrac{4\pi + 3\sqrt{3}}{3}\right)$ sq units   (b) $\left(\dfrac{4\pi - 3\sqrt{3}}{3}\right)$ sq units

   (c) $\left(\dfrac{2\pi - 3\sqrt{3}}{3}\right)$ sq units   (d) $\left(\dfrac{4\pi - \sqrt{3}}{3}\right)$ sq units

4. Area bounded by the curve $y = x^2 - 1$. On Y-axis, $y = 1$ and $y = 3$, when $x > 0$, is

   (a) $\dfrac{14}{3}$ sq units   (b) $\dfrac{16}{3}$ sq units   (c) $\dfrac{17}{3}$ sq units   (d) None of these

5. Let $g(x) = \cos x^2$, $f(x) = \sqrt{x}$ and $\alpha, \beta \, (\alpha < \beta)$ be the roots of the quadratic equation $18x^2 - 9\pi x + \pi^2 = 0$.

   Then the area (in sq units) bounded by the curve $y = (gof)(x)$ and the lines $x = \alpha, x = \beta$ and $y = 0$, is

   (a) $\dfrac{1}{2}(\sqrt{3} + 1)$ (b) $\dfrac{1}{2}(\sqrt{3} - 2)$ (c) $\dfrac{1}{2}(\sqrt{2} - 1)$ (d) $\dfrac{1}{2}(\sqrt{3} - 1)$

Fill in the Blanks [1 Mark each]

6. The area of the region bounded by the curve $y = x^2 + x, X$-axis and the line $x = 2$ and $x = 5$ is equal to ....

7. If the area bounded by the curve $f(x) = x^{1/3}(x-1)$ and X-axis is A, then the value of A is equal to ....

8. If A is the area bounded by the curve $y = \sqrt{1-x^2}$ and $y = x^3 - x$, then the value of $\dfrac{\pi}{A}$ is equal to ....

9. The area bounded by the curve $y = x(x-3)^2$ and $y = x$ is equal to (in sq units) ....

10. The area enclosed by the curve $y = x\sqrt{9-x^2}$ $(x \geq 0)$ and the X-axis is equal to ....

True or False [1 Mark each]

11. Area enclosed by the curve $x = 3\cos\theta, y = 2\sin\theta$ is 6π sq unit.

12. Area bounded by $y = \log_e x, x = 0$ and $y = 0$ is 1 sq unit.

13. Area bounded by $x = 4\sqrt{y}$ and $y = 4$ is $\dfrac{32}{3}$ sq units.

14. Area bounded by $y = \sin^{-1} x, y = \cos^{-1} x$ and the X-axis is $(\sqrt{2}+1)$ sq units.

15. The area between the curves $y^2 = -x$ and $y = |x|$ is the same as the area between $y^2 = -x$ and $y = -x$.

Match the Columns [2 Marks each]

16. Match the terms of column I with the terms of column II and choose the correct options from the codes given below.

	Column I		Column II
A.	The area enclosed between the curves $y^2 = x$ and $y = |x|$ is	I.	$\dfrac{2}{3}$ sq units
B.	The area of region bounded by the curve $y^2 = x$ and the line $y = 4$ and Y-axis is	II.	$\dfrac{1}{6}$ sq units
C.	The area of region lying between the line $x - y + 2 = 0, x = 0$ and the curve $x = \sqrt{y}$	III.	$\dfrac{10}{3}$ sq units
D.	The area bounded by the curve $y = x|x|, X$-axis and the ordinates $x = 1, x = -1$	IV.	$\dfrac{64}{3}$ sq units

Codes

	A	B	C	D
(a)	II	IV	III	I
(c)	III	IV	I	II

	A	B	C	D
(b)	IV	III	II	I
(d)	III	IV	II	I

17. Match the terms of column I with the terms of column II and choose the correct options from the codes given below.

	Column I		Column II
A.	The area of region in the first quadrant enclosed by X-axis, the line $y=\sqrt{3}x$ and the circle $x^2+y^2=16$ is equal to	I.	$\dfrac{1}{6}$ sq units
B.	Area of the regions $\{(x,y): x^2+y^2\leq 4, x+y\geq 2\}$ is equal to	II.	$\dfrac{8\pi}{3}$ sq units
C.	Area of the region bounded by the parabola $y^2=x$ and the line $x+y=2$ is equal to	III.	$\dfrac{7}{6}$ sq units
D.	The area of the region bounded by $y=\sqrt{x}$ and $y=x$ is equal to	IV.	$(\pi-2)$ sq units

Codes

	A	B	C	D			A	B	C	D
(a)	II	IV	III	I		(b)	IV	III	II	I
(c)	III	IV	I	II		(d)	III	IV	II	I

Very Short Answer Type Questions [1 Mark each]

18. Find the area of region bounded by the parabola $y^2=8x$ and the line $x=2$.

19. Find the area of the region included between $y^2=9x$ and $y=x$.

20. Find the area of region bounded by line $2y=5x+7$, X-axis and the lines $x=2$ and $x=8$

Short Answer Type Questions [4 Marks each]

21. Find the area of region included between the parabola $4y=3x^2$ and the line $3x-2y+12=0$.

22. Find the area bounded by the line $y=4x+5$, $y=5-x$ and $4y=x+5$.

23. Draw a rough sketch of the given curve $y=1+|x+1|$, $x=-3$, $x=3$, $y=0$ and find the area of region bounded by them, using integration.

24. Find the area bounded by the curve $y=\sin x$ between $x=0$ and $x=2\pi$.

Long Answer Type Questions [6 Marks each]

25. Find the area of region between the circle $x^2+y^2=4$ and $(x-2)^2+y^2=4$.

26. Find the area bounded by the parabolas $y=6x-x^2$ and $y=x^2-2x$.