CHAPTER-8

APPLICATION OF INTEGRALS

01 MARK TYPE QUESTIONS

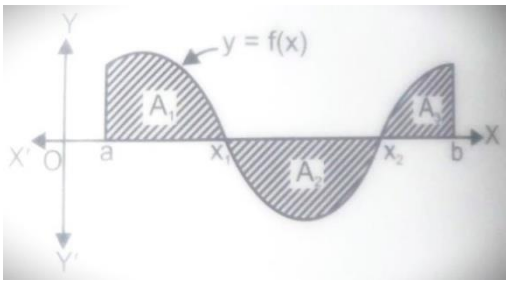
Q. NO	QUESTION	MARK
1.	The area of the region bounded by y = cos x between x=0 and x= π is a) 2sq unit b) 4sq unit c) 6sq unit d) 1sq unit	1
2.	The area of the region bounded by the parabola $y^2 = x$ and the straight line y = x/2 is a) 1/3 sq unit b) 2/3 sq unit c) 3/3 sq unit d) 4/3 sq unit	1
3.	The area bounded by the curve $y^2 = 4ax$ and axis between y= -a and y=a is a) A^2 b) $6a^2$ c) $A^2/6$ d) $A^2/2$	1
4.	The area of the region bounded by the curve x=2y+3 and the line y= 1and y= -1is a) 2 sq unit b) 4 sq unit c) 6 sq unit d) 8 sq unit	1
5.	The area bounded by the curve $y= x^2 -1$ and the straight line x + y=3 a) $\frac{\sqrt{17}}{7}$ sq unit b) $\frac{7\sqrt{17}}{6}$ sq unit c) $\frac{17\sqrt{17}}{6}$ sq unit d) 4 sq unit	1
6.	The area of the region bounded by y = |x-2| , x=1 and x=3 and x-axis is a) 4sq unit b) 3sq unit c) 2sq unit d) 1 sq unit	1
7.	Area of the triangle whose vertices formed from the x-axis and the line 3-|x| is a) $\frac{9}{2}$sq. unit b) $\frac{3}{2}$sq. unit c) $9sq.unit$	1

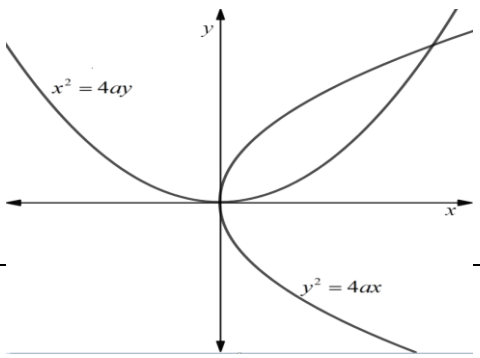
	d) 3 sq unit	
8.	Find the area of the region $\{(x,y): x^2 \le y \le x\}$. a) $\frac{1}{3}$sq. unit b) $\frac{1}{2}$sq. unit c) $\frac{1}{6}$sq. unit d) $\frac{1}{9}$sq. unit	1
9.	If y= 2 sin x + sin 2x for $0 \le x \le 2\pi$ then area enclosed by the curve and the x-axis is a) $\frac{9}{2}$sq. unit b) 8sq. unit c) 12sq. unit d) 4sq. unit	1
10.	The area of the region bounded by the curves y=x, x=e and y=$\frac{1}{x}$ and all the positive x-axis is a) $\frac{1}{2}$sq. unit b) $\frac{3}{2}$ sq. unit c) 1sq. unit d) $\frac{5}{2}$sq. unit	1
11.	The area of the region bounded by the circle $x^2 + y^2 = 1$ is (a) 2π sq. units (b) π sq. units (c) 3π sq. units (d) 4π sq. units	1
12.	The area of the region bounded by the curve $y = x + 1$ and the lines $x = 2$ and $x = 3$ is (a) $\frac{7}{2}$ sq. units (b) $\frac{9}{2}$ sq. units (c) $\frac{11}{2}$ sq. units (d) $\frac{13}{2}$ sq. units	1
13.	The area of the region bounded by the curve $y^2 = 4x$, y-axis and the line $y = 3$ is (a) 2 (b) $\frac{9}{4}$ (c) $\frac{9}{3}$ (d) $\frac{9}{2}$	1
14.	The area bounded by $y = 2 - x^2$ and $x + y = 0$ is (a) $\frac{7}{2}$ (b) $\frac{9}{2}$ (c)9 (d) none of these	1
15.	The area bounded by the parabola $x = 4 - y^2$ and y-axis, in square units, is (a) $\frac{3}{32}$ (b) $\frac{32}{3}$ (c) $\frac{33}{2}$ (d) $\frac{16}{3}$	1
16.	Area lying between the curve $y^2 = 4x$ and $y = 2x$ is (a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$	1

17.	The area bounded by the parabola $y^2 = 4ax$, latus rectum and x-axis is (a) 0 (b) $\frac{4}{3}a^2$ (c) $\frac{2}{3}a^2$ (d) $\frac{a^2}{3}$	1
18.	The area of the region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (a) πab (b) $\pi a^2 b^2$ (c) $2\pi ab$ (d) ab	1
19.	The area of the region bounded by the circle $x^2 + y^2 = a^2$ (a) $2\pi a$ (b) πa^2 (c) $2\pi a^2$ (d) None of these	1
20.	The area of the region bounded by the curve $\frac{x^2}{4} + \frac{y^2}{9} = 1$ (a) 6π (b) 36π (c) 18π (d) None of these	1
21.	The area enclosed between the curve $y=x^2$ and $y=\sqrt{x}$ is A) ⅙ sq. unit B) ½ sq. unit C) 4 sq. unit D) 1/3 sq. unit	1
22.	The area enclosed among the curves 2x-3y=0, X axis, X=3 and X= 5 is A) 16 sq. units B) 8 sq. units C) 4 sd. units D) 16/3 sq. units	1
23.	Area bounded by the lines y=2+x, y= 2-x and x=2 is A) 3 sq. units B) 4 sq. units C) 8 sq. units D) 16sq. units	1
24.	Area lying in the first quadrant and bounded by the circle $x^2+y^2=4$, and the lines x=0 and x=2 is A) π B) π/4 C) π/3 D) π/2	1
25.	The area of the region bounded by the curve $y^2=4x$, Y axis and the line y=3 is A) 2 B)9/4 C)9/3 D) 9/2	1
26.	The area bounded by the curves $y^2=4ax$ and its latus rectum is A) 4/3 a^2 sq. Units B) 8/3 a^2 sq. Units C) 16/3a^2 sq. Units D)None of these	1
27.	Area bounded by the curve y= sinx between the ordinates x=0 and x=π is A) 2sq. Units B) 4 sq. Units C) 3 sq. Units D) 1 sq. Units	1
28.	Assertion (A): The area bounded by the circle $x^2+y^2= 16$ is 16π sq. Units. Reason (R): We have $x^2+y^2= 16$, which is circle having center at (0,0) and radius 4 units. (A) Both A and R are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A.	1

	(C) A is true but R is false. (D) A is false but R is true.	
29.	Assertion (A): The area bounded by $y^2=8x$ and $x^2=8y$ is 64/3 sq. units. Reason (B): The area bounded by $y^2=4ax$ and $x^2=4by$ is 16ab/3 sq. units. The correct answer is (A) Both A and R are true and R is the correct explanation of A. (B) Both A and R are true but R is not the correct explanation of A. (C) A is true but R is false. (D) A is false but R is true.	1
30.	The area of the circle $x^2 + y^2=16$ exterior to the parabola $y^2=6x$ is A) $4/3(4\pi-\sqrt{3})$ B) $4/3(4\pi+\sqrt{3})$ C) $4/3(8\pi-\sqrt{3})$ D)$4/3(8\pi+\sqrt{3})$	1
31.	Area (in square unit) lying in the first quadrant and bounded by the circle $x^2 + y^2 = 4$ and the line x=0, x=2 is (a) π (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{4}$	1
32.	Area of the region bounded by the curve $y^2 = 4x$, y-axis and the line y=3 is (in sq unit) (a) 2 (b) 9/4 (c) 9/5 (d) 9/2	1
33.	Area of the region bounded by the curve $y^2 = 4x$ and y = 2x is (a) 2/3 (b) 1/3 (c) 1/4 (d) 3/4	1
34.	The area enclosed between the curve $y^2 = x$ and $y = \|x\|$ is (a) 1/6 (b) 1/3 (c) 2/3 (d) 1	1
35.	The area enclosed between the curve $y = x\ and$ $y = 2x - x^2$ (in square units) is (a) 1/2 (b) 1/6 (c) 1/3 (d) 1/4	1
36.	The area enclosed between the curve $y = ax^2$and $x = ay^2, (a > 0)$ is 1 square unit then the value of a is (a) $\frac{1}{\sqrt{3}}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{1}{3}$	1
37.	The area (in square units) bounded by the curves $y = \sqrt{x}$, $2y - x + 3 = 0$, x- axis and lying in the first quadrant is	1

	(a) 9 (b) 36 (c) 18 (d) 27/4	
38.	The area enclosed between the parabolas $y^2 = 4x$ and $x^2 = 4y$ is (in Square units) (a) 4/3 (b) 1/3 (c) 16/3 (d) 8/3	1
39.	Smaller area enclosed by the circle $x^2 + y^2 = 4$ and the line $x + y = 2$ is (a) $2(\pi - 2)$ (b) $\pi - 2$ (c) $2\pi - 1$ (d) $(d)2(\pi + 2)$	1
40.	The area enclosed by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$is equal to (a) $\pi^2 ab$ (b) πab (c) $\pi a^2 b$ (d) πab^2	1
41.	The area bounded by the parabola $y^2 = 8x$, the x-axis and the latus rectum is (a) 16/3 (b) 23/3 (c) 32/3 (d) $16\sqrt{2}/3$	1
42.	If the area bounded by y-axis and curves y = cos x and y = sinx, $0 \le x \le$ b is $(\sqrt{2} - 1)$ sq. units then the value of b is (a) π (b)$\pi/2$ (c) $\pi/4$ (d) none of these	1
43.	The area bounded by the curve $y^2 = x - 4$ and the lines $y = 0$ and $y = 5$ is (a) 38/3 (b) 76/3 (c) 19/3 (d) 57/3	1
44.	The area bounded by curve $y = \sin 2x$, x-axis and the lines $x = \pi/4$ and $x = 3\pi/4$ is: (a) 1 sq. units (b) 2 sq. units (c) 4 sq. units (d) 3 2sq. units	1
45.	Area under the curve $y = \sqrt{(b^2 - x^2)}$ included between the lines x = 0 and x = b is: (a) $\pi b^2 / 2$ (b) $\pi b / 2$ (c) $\pi b / 4$ (d) $\pi b^2 / 4$	1
46.	The area bounded by the curve $y = \tan^2 x$, x-axis and ordinates x =0 and $x = \pi/4$ is (a)$\pi/4$ (b) $1 + \pi/4$ (c)$1 - \pi/4$ (d) none of these	1
47.	If area bounded by the curve $y(1 + 4x^2) = 1$, x-axis and ordinate x = 0 and x = a is $\pi/8$ sq. units, then the value of a is (a) 1/2 (b) 1 (c) -1/2 (d) none of these	1
48.	The area of the region bounded by the curve x = 2y + 3, y-axis and the line y = - 1 and y = b is 6 sq. units , then the value of b is (a)b= 0 (b) b= 1 (c) b= -1 (d) none of these	1
49.	The area of the region bounded by the curve $y = x^3$, the x-axis and the ordinates x = a, and x = 1 is 17/4 then value of a is	1

	(a) a = -2 (b) a=2 (c) a=1 (d) none of these	
50.	If the curve y = f(x) crosses x-axis into 3 times and areas A1,A2 and A3 are formed, then the area between the curve and the ordinates x = a and x = b is given by  (a) A1 – A2 +A3 (c) A1+A2 –A3 (b) A1 –A2 – A3 (d) A1+A2+A3	1
51.	The area bounded by the curve y = sin x, x = 0 and x= π is (a) 2 sq. unit (b) 4 sq. unit (c) 3 sq. unit (d) 1 sq. unit	1
52.	Area bounded by the curve y = f(x), x-axis and the lines x=a and x = b is: (a) $\int_a^b x\,dy$ (b) $\int_a^b y\,dx$ (c) $\int_a^b x^2\,dy$ (d) $\int_a^b y^2\,dx$	1
53.	The area bounded by the curve $y^2 = 4ax$ and its latus rectum is (a) $\frac{4}{3}$ a^2 sq. units (b) $\frac{8}{3}$ a^2 sq. units (c) $\frac{16}{3}$ a^2 sq. units (d) None of these	1
54.	The area enclosed between y = x, x = 1, x = 3 and x-axis is (a) 2 sq. units (b) 9/2 sq. units (c) 4 sq. units (d) None of these	1
55.	The area between the curve $y = x^2$, x-axis and the lines x = 0 and x = 2 is (a) $\frac{2}{3}$ sq unit (b) $\frac{6}{3}$ sq unit (c) $\frac{8}{3}$ sq unit (d) $\frac{4}{3}$ sq unit	1
56.	The area of the region bounded by the curve $y^2 = x$ and the lines x = 1 and x = 4 is (in sq. units): (a) $\frac{15}{2}$ (b) $\frac{14}{3}$ (c) 7 (d) None of these	1
57.	The area enclosed between x-axis and the curve y = cos x when $0 \le x \le 2\pi$ is (a) 0 sq. unit (b) 2 sq. units (c) 3 sq. units (d) 4 sq. units	1
58.	Find the area of the region bounded by the curve $y = x^2$ and the line y = 16 is (a) $\frac{32}{3}$ (b) $\frac{256}{3}$ (c) $\frac{64}{3}$ (d) $\frac{128}{3}$	1
59.	The area bounded by the curve y = 4 sin x, x-axis from x = 0 to x = π is equal to: (a) 1 sq unit (b) 2 sq unit (c) 4 sq unit (d) 8 sq unit	1
60.	The area bounded by the parabola $y^2 = x$ and the straight line 2y = x is (a) $\frac{4}{3}$ sq. units (b) 1 sq. unit (c) $\frac{2}{3}$ sq. unit (d) $\frac{1}{3}$ sq. unit	1
61.	The area of the region bounded three roads and the equation of roads is given by the curve $y = x + 1$ and the line x=2 and x=3 is (a) $\frac{7}{2}\ sq\ units$ (b) $\frac{9}{2}\ sq\ units$ (c) $\frac{11}{2}\ sq\ units$ (d) $\frac{13}{2}\ sq\ units$	1
62.	Using integration, find the area of cake which is cut in the shape of the quadrant of the circle	1

	of radius 2units and center (0,0). (a) 2π (b) 4π (c) 3π (d) π	
63.	The area of the region bounded by parabola $y^2 = x$ and the straight line $2y = x$ is (a) $\frac{1}{3}\ sq\ unit$ (b) $2\ sq\ unit$ (c) $\frac{4}{3}\ sq\ unit$ (d) $\frac{2}{3}\ sq\ unit$	1
64.	A Cable hangs in the form of parabola with its axis vertical. The cable is 10m high and 5m wide at the base (a) $y^2 = \frac{5}{8}x$ (b) $y^2 = -\frac{5}{8}x$ (c) $x^2 = \frac{5}{8}y$ (d) $x^2 = -\frac{5}{8}y$ 	1
65.	A parking lot in JNU CAMPAS has an area equals to the smaller part of the circle $x^2 + y^2 = a^2$ cut off by the line$x = \frac{a}{\sqrt{2}}$. This area is allotted for car owners who practices car pooling. On the basis of above information, find the area used for car pooling. (a) $\frac{a^2(\pi-2)}{2}\ sq\ units$ (b) $\frac{a^2}{4}\ sq\ units$ (c) $\frac{a^2(\pi-2)}{4}\ sq\ units$ (d) $\frac{a^2(\pi-2)}{5}\ sq\ units$	1
66.	The area bounded by the curve $y = \|x\|$, the x-axis and between $x = -2\ to\ x = 0$ is (a) $4\ sq\ units$ (b) $\frac{3}{2}\ sq\ units$ (c) $1\ sq\ units$ (d) $2\ sq\ units$	1
67.	Ram and Aman both draw parabolas. Ram draw a parabola on positive y-axis whose equation is $y^2 = 4ax$ and Aman draw a parabola onpositive x-axis whose equation is $x^2 = 4ay$ on the same xy-plane, then her teacher told them to find the area bounded by these two parabolas.  	1

	` (a) $\frac{8a^2}{3}$ (b)$\frac{16a^2}{3}$ (c)$\frac{32a^2}{3}$ (d)$\frac{64a^2}{3}$	
68.	Mohit draw three lines and give the equation of lines as $3x - y - 3 = 0, 2x + y - 12$ *and* $x - 2y - 1 = 0$ *and told his brother to find the area bounded by these lines*  $(a)8\ sq.units$ (b) $9\ sq.units$ (c) $10\ sq.units$ (d) $11\ sq.units$	1
69.	The area of region bounded by the line $2x + y = 8$, the Y-axis and the lines y=2 and y=4 is $(a)5\ sq.units$ (b) $6\ sq.units$ (c) $12\ sq.units$ (d) $7\ sq.units$	1
70.	The area bonded by the parabola$y^2 = 16x$ and its latusrectum is (a) $\frac{25}{3}\ sq.units$ (b)$\frac{16}{3}\ sq.units$ (c) $\frac{64}{3}\ sq.units$ (d)$\frac{32}{3}\ sq.units$	1

ANSWERS:

Q. NO	ANSWER	MARKS
1.	a) 2 sq unit	1
2.	e) 4/3 sq unit	1
3.	a) $A^2/6$ sq unit	1
4.	b) 6 sq unit	1
5.	c) $\frac{17\sqrt{17}}{6}$ sq unit	1
6.	d) 1 sq unit	1
7.	b) 9sq. unit	1
8.	c) 9sq. unit	1
9.	c) 12 sq. unit	1
10.	b) $\frac{3}{2}$sq. unit	1
11.	b	1
12.	a	1
13.	b	1
14.	b	1
15.	b	1
16.	b	1
17.	b	1
18.	a	1
19.	b	1
20.	a	1
21.	c	1
22.	d	1
23.	b	1
24.	a	1
25.	b	1
26.	b	1
27.	a	1
28.	a	1
29.	a	1
30.	c	1
31.	a	1
32.	b	1
33.	b	1
34.	b	1
35.	b	1
36.	a	1

37.	a	1
38.	a	1
39.	b	1
40.	b	1
41.	Option – c	1
42.	Option – b	1
43.	Option – b	1
44.	Option – a	1
45.	Option – d	1
46.	Option – c	1
47.	Option – a	1
48.	Option – b	1
49.	Option – a	1
50.	Option – d	1
51.	a	1
52.	c	1
53.	b	1
54.	c	1
55.	c	1
56.	b	1
57.	d	1
58.	b	1
59.	d	1
60.	a	1
61.	(a) $\frac{7}{2}\ sq\ units$	1
62.	(d) π	1
63.	(c)$\frac{4}{3}\ sq\ unit$	1
64.	(c)$x^2 = \frac{5}{8}y$	1
65.	(c) $\frac{a^2(\pi-2)}{4}\ sq\ units$	1
66.	(d) $2\ sq\ units$	1
67.	(b)$\frac{16a^2}{3}$	1
68.	(d) $11\ sq.units$	1
69.	(a) $5\ sq.units$	1
70.	(c)$\frac{64}{3}\ sq.units$	1