

(1) Find the area of the region bounded by the circle  $x^2 + y^2 = r^2$ .

[ Ans:  $\pi r^2$  ]

(2) Find the area of the region bounded by  $y = x^2 - 5x + 4$  and X-axis.

[ Ans:  $\frac{9}{2}$  ]

(3) Find the area of the region enclosed by  $y^2 = 8x$  and  $x + y = 0$ .

[ Ans:  $\frac{32}{3}$  ]

(4) Find the area of the region between the circles,  $x^2 + y^2 = 4$  and  $x^2 + y^2 = 4x$ .

[ Ans:  $\frac{8\pi}{3} - 2\sqrt{3}$  ]

(5) Prove that the area of the region bounded by  $y = 4x - x^2$  and X-axis is  $\frac{32}{3}$ .

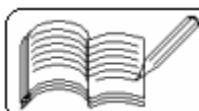
(6) Find the volume of the solid obtained by revolution of portion of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  on right hand semi plane of Y-axis about Y-axis.

[ Ans:  $\frac{4}{3} \pi a^2 b$  ]

(7) If the region bounded by  $y^2 = 8x$  from its vertex to  $x = 2$  is rotated about X-axis, find the volume of the solid generated.

[ Ans:  $16\pi$  ]

(8) Prove that the volume of the solid generated by revolving the region bounded by  $y = x^2 + 1$  and  $y = 2x + 1$  about X-axis is  $\frac{104\pi}{15}$ .



- (9) Find the volume of the right circular cone having semi-vertical angle  $\alpha$  and radius of base equal to  $r$ .

$$\left[ \text{Ans: } \frac{1}{3} \pi r^3 \cot \alpha \right]$$

- (10) Line  $x = c$  divides the area of the region bounded by  $y^2 = 4x$  and  $x = 16$  in two regions having equal areas. Find  $c$ .

$$\left[ \text{Ans: } 2^{\frac{10}{3}} \right]$$

- (11) Find the area of the region bounded by  $y = x^2$  and the line  $y = x + 2$ .

$$\left[ \text{Ans: } \frac{9}{2} \right]$$

- (12) Find the area of the region bounded by  $y = 5x^2$  and  $2x^2 - y + 9 = 0$ .

$$[ \text{Ans: } 12 \sqrt{3} ]$$

- (13) The region bounded by  $y = 2x^2$ , X-axis and  $x = 5$  is rotated about Y-axis. Find the volume of the solid generated.

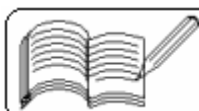
$$[ \text{Ans: } 625 \pi ]$$

- (14) Find the volume of the solid generated when the region bounded by  $y = x^2$  and  $y = 4x - x^2$  is rotated about X-axis.

$$\left[ \text{Ans: } \frac{32 \pi}{3} \right]$$

- (15) If the region bounded by  $x^2 - y^2 = a^2$ ,  $x = a$  and  $x = 2a$  is rotated about Y-axis, find the volume of the solid of revolution.

$$[ \text{Ans: } 4 \sqrt{3} \pi a^3 ]$$



(16) Prove that the area of the region enclosed by the circle  $x^2 + y^2 = 64$  and parabola  $y^2 = 12x$  is  $\frac{16}{3}(4\pi + \sqrt{3})$ .

(17) Prove that the area of the region bounded by  $x = 6 + 4y - y^2$  and  $\overleftrightarrow{AB}$  where A is (4, 3) and B is (-10, -4) is 36.

(18) The region bounded by  $y = 4x - x^2$ ,  $x = 1$ ,  $x = 3$  and X-axis is divided into two parts with equal area by  $x = c$ . Find c.

[ Ans: 2 ]

(19) Obtain the area of the minor segment bounded by the circle  $x^2 + y^2 = a^2$  and the line  $x = \frac{a}{\sqrt{2}}$ .

[ Ans:  $\frac{a^2}{4}(\pi - 2)$  ]

(20) Find the area of the region bounded by  $y = x^2$  and  $y = 2 - x$ .

[ Ans:  $\frac{9}{2}$  ]

(21) Obtain the area of the region bounded by the line through A(3, 2) and B(1, 1) and the curve  $x = y^2 + y - 1$ .

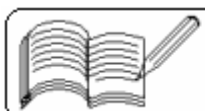
[ Ans:  $\frac{1}{6}$  ]

(22) Obtain the area of the region bounded by the curve  $y = x^2 + 1$  and the line passing through (0, 1) and (2, 5).

[ Ans:  $\frac{4}{3}$  ]

(23) Obtain the area of the region bounded by the curves  $y^2 = 4x$  and  $x^2 = 4y$ .

[ Ans:  $\frac{16}{3}$  ]



- (24) Obtain the area of the region bounded between the circle  $x^2 + y^2 = 4$  and the parabola  $y^2 = 3x$ .

$$\left[ \text{Ans: } \frac{1}{3} (4\pi + \sqrt{3}) \right]$$

- (25) Obtain the area of the region enclosed between the parabolas  $y = 6x - x^2$  and  $y = x^2 - 2x$ .

$$\left[ \text{Ans: } \frac{64}{3} \right]$$

- (26) Obtain the volume of the solid surface generated on rotating the region bounded by the parabola  $y = x^2$  and  $y = 4x - x^2$ , about the X-axis.

$$\left[ \text{Ans: } \frac{32\pi}{3} \right]$$

- (27) Show that the volume of the segment of a sphere with radius  $a$  between two parallel planes on one side of the centre at a distance  $r_1$  and  $r_2$  from the centre ( $r_1 < r_2$ ) is  $\frac{\pi}{3} (r_2 - r_1) [3a^2 - (r_1^2 + r_1 r_2 + r_2^2)]$ .

- (28) Obtain the area of the region enclosed between  $y^2 = 4x - 4$  and  $y^2 = -4x + 4$ .

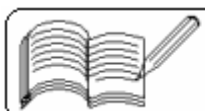
$$\left[ \text{Ans: } \frac{16}{3} \right]$$

- (29) Obtain area of the region enclosed between the parabola  $y^2 = 4(x - 2)$ , the line  $y = x - 1$  and the X-axis.

$$\left[ \text{Ans: } \frac{2}{3} \right]$$

- (30) Find the volume of the solid generated on rotating the region bounded by the curve  $y = x^2 + 1$  and the line  $y = 2x + 4$ , about the X-axis.

$$\left[ \text{Ans: } \frac{1408\pi}{15} \right]$$



(31) Find the volume of the solid generated on rotating the region bounded by  $y^2 = x^3$ ,  $x = 2$  and the X-axis about the X-axis.

[ Ans:  $4\pi$  ]

(32) Find the volume of the solid generated on rotating the region bounded by the curve  $y = a \left( \sin x + \frac{\sin 3x}{3} \right)$ , the X-axis and the lines  $x = 0$  and  $x = \pi$  about the X-axis.

[ Ans:  $\frac{5\pi^2 a^2}{9}$  ]

(33) Find the common area enclosed between the ellipses  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  and  $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$  ( $a > b$ ).

[ Ans:  $2ab \left( \pi - 2 \sin^{-1} \frac{a}{\sqrt{a^2 + b^2}} \right)$  ]

