

Ques 1 (ii)
Ans: (ii)

Section-3

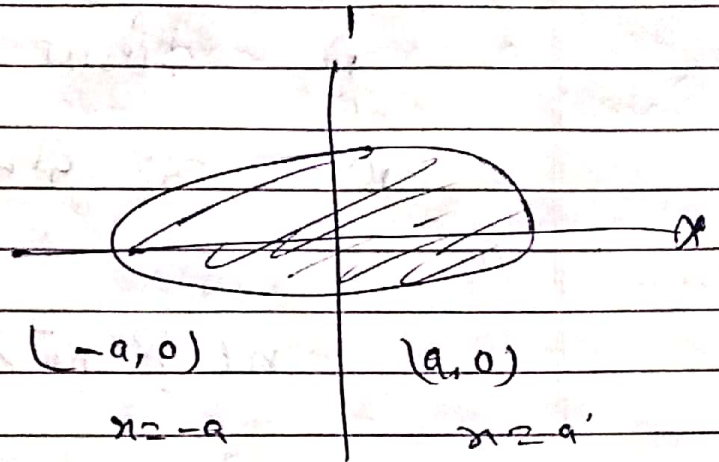
The area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

(a) πab

(b) $\frac{\pi}{4}(a^2 + b^2)$

(c) $\pi(a+b)$

(d) $\pi a^2 - b^2$



Area of ellipse $\int_{x_1}^{x_2} y \, dx$
 $= 2 \int_{x_1}^{x_2} y \, dx$

x_1, x_2

Area $\Rightarrow 2 \int_{-a}^a \frac{b}{a} \sqrt{a^2 - x^2} \, dx$

$\frac{2b}{a} \int_{-a}^a \sqrt{a^2 - x^2} \, dx$

$\Rightarrow \frac{2b}{a} \left[\frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} \right]_{-a}^a$

$$\frac{2b}{a} \left[0 + \frac{a^2}{2} \sin^{-1} \frac{a}{a} - \frac{a^2}{2} \sin^{-1} \left(-\frac{a}{a} \right) \right]$$

$$\frac{2b}{a} \times \frac{a^2}{2} \left[\sin^{-1} 1 + \sin^{-1} 1 \right]$$

$$ab \left[\frac{\pi}{2} + \frac{\pi}{2} \right]$$

$(ab\pi)$ sq units