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DATE :- 28th Oct 2019

i) $y = 3e^{2x}$

$y = 3e^{-x}$, $x = 1$

$x = 2$

$$\text{Area} = \int_a^b y_k \, dx - \int_a^b y_b \, dx$$

$y_a = 3e^{2x}$

$$\int_1^2 3e^{2x} = {}^2\left[\frac{3e^{2x}}{2}\right]$$

$$\Longrightarrow \frac{3e^4}{2} - \frac{3e^2}{2} = 70.81 \text{ square units}$$

$y_b = 3e^{-x}$

$$\int_1^2 3e^{-x} \longrightarrow {}^2\left[\frac{3e^{-x}}{-1}\right]$$

$$= -3e^{-2} - (-3e^{-1})$$

$$\Longrightarrow 0.698 \text{ square units}$$

Area bounded by the curves.

$= 70.81 - 068 = 70.112$ square units

2) $y = 2\sin \pi/10 t$

$x = 2 + 2t - 2\cos \pi/10 t$

$\text{Area} = \int_a^b y \, dx \quad b = 10$

$a = 0$

$dx = 2t^{\pi/5} \sin \pi/10 t \, dt$

$$\therefore \text{Area} = \int_0^{10} 2\sin \pi/10 \, t \left[2 + \pi/5 \sin \pi/10 \, t\right]$$

$$\int_0^{10} \left[4\sin \pi/10 t + 2\pi \sin \frac{\left(\frac{\pi t}{10}\right)^2}{5}\right]$$

$$\Rightarrow \int_0^{10} 1 \sin\frac{\pi}{10} + \int_0^{10} 2\pi \sin\left(\frac{\pi t}{10}\right)$$

$$\Rightarrow 1\int_{10}^{10} \sin\frac{\pi}{10} t + \frac{2\pi}{5}\int_0^{10} \sin\left(\frac{\pi t}{10}\right)^2$$

$$\Rightarrow {}^{10}_{0}\left[\frac{-10\cos\left(\frac{\pi t}{10}\right)}{\pi} + \left(\frac{2\pi}{5} \times \pi t - 5\sin\left(\frac{\pi t}{10}\right)^2\right)\right]$$

$$\Rightarrow {}^{10}_{0}\left[\frac{-10\cos\left(\frac{\pi t}{10}\right)}{\pi} + \pi(10) - 5\sin\left(\pi\frac{10}{5}\right)\right]$$

$$= \left[-10\cos\left(6\times\frac{\pi}{10}\right) + \pi(10) - 5\sin\left(\frac{6}{5}\right)\right]$$

$$\Rightarrow \left[\frac{10}{\pi} + 2\pi\right] - \left[\frac{-10}{\pi} + 0\right]$$

$$\Rightarrow \frac{10}{\pi} + 2\pi + \frac{10}{\pi}$$

$$= \frac{20}{\pi} + 2\pi$$

$$= 31.71 \text{ square units}$$