Section-10

On comparing this eqn. $y'' + Py' + Qy = R$

$y'' + Py' + ey = R$

$P = 3\sin x + \cot x \quad Q = 2\sin^2 x$ and $R = e^{-\cos x}\sin^2 x$

chose z such that $\left(\frac{dz}{dx}\right)^2 = \sin^2 x \Rightarrow \frac{dz}{dx} = \sin x \quad -①$

Integrating $z = -\cos x \quad -②$.

$$\frac{d^2z}{dx^2} = \cos x$$

$$P_1 = \frac{\cos x + (3\sin x - \cot x)\sin x}{\sin^2 x}$$

$P_1 = 3$

$Q_1 = \frac{2\sin^2 x}{\sin^2 x} = 2$

$R_1 = e^z$

$$\frac{d^2y}{dz^2} + \frac{3dy}{dz} + 2y = e^z$$

A.E. $m = -1, -2$

$C.F = C_1 e^{-z} + C_2 e^{-2z}$

$P.I = \frac{e^z}{6}$ $\qquad y = C.F + P.I$

$y = C_1 e^{\cos x} + C_2 e^{2\cos x} + e^{\frac{-\cos x}{6}}$ Ans