

ANSWERS

1. (a) $y = C_1 \sin x + C_2 \cos x$
(b) $y = C_1 e^x + C_2 e^{-6x}$
(c) $y = C_1 e^{2x} + C_2 x e^{2x}$
(d) $y = \frac{1}{2} \sin 2x$
(e) $y = C_1 e^{-x/2} \sin \frac{\sqrt{3}}{2} x + C_2 e^{-x/2} \cos \frac{\sqrt{3}}{2} x$
(f) $y = y_h + y_p$, $y_h = C_1 e^{2x} + C_2 e^{-3x}$, $y_p = -\frac{1}{3} x^2 - \frac{1}{9} x - \frac{7}{54}$
(g) $y = y_h + y_p$, $y_h = C_1 + C_2 e^{-4x}$, $y_p = -\frac{1}{17} \cos x + \frac{4}{17} \sin x$
2. $x(t) = C_1 \sin \omega t + C_2 \cos \omega t$, initial conditions $\implies C_1 = 1/\omega$, $C_2 = 0$
3. $\theta(t) = C_1 \sin \omega t + C_2 \cos \omega t$, initial conditions $\implies C_1 = 0$, $C_2 = \pi/16$
4. $E(x) = C_1 \sin k_0 x + C_2 \cos k_0 x$, initial conditions $\implies C_1 = 1/k_0$, $C_2 = 0$