

## ANSWERS

1. (a)  $y = e^{-x} \left( 1 - \frac{1}{x} \right)$

(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)  $y = C_1 e^{-x/2} \sin \sqrt{3}x + C_2 e^{-x/2} \cos \sqrt{3}x$

(f)  $y = y_h + y_p, \quad y_h = C_1 e^{2x} + C_2 e^{-3x}, \quad y_p = -\frac{1}{3}x^2 - \frac{1}{9}x - \frac{7}{54}$

(g)  $y = y_h + y_p, \quad y_h = C_1 + C_2 e^{-4x}, \quad y_p = -\frac{1}{17} \cos x + \frac{4}{17} \sin x$

2.  $E(x) = C_1 \sin k_0 x + C_2 \cos k_0 x, \quad \text{initial conditions} \implies C_1 = 1/k_0, \quad C_2 = 0$

3.  $\theta(t) = C_1 \sin \omega t + C_2 \cos \omega t, \quad \text{initial conditions} \implies C_1 = 0, \quad C_2 = \pi/16$