

1.

(i) $\lambda = -3$ or $\lambda = -2$

(ii) $y(t) = 4e^{-2t} - 3e^{-3t}$

(iii) $y(t) = (v_0 + 3y_0)e^{-2t} + (-2y_0 - v_0)3e^{-3t}$

3.

$$y(t) = \frac{(2 - v_0)}{4}e^{-2t} + \frac{(v_0 + 2)}{4}e^{2t}$$

$$v_0 = -2$$

5.

(i) (proof)

(ii) $y(t) = \frac{e^{-3t} \sin 2t}{2}$ ($= e^{-3t} \cos t \sin t$)

(iii) 0