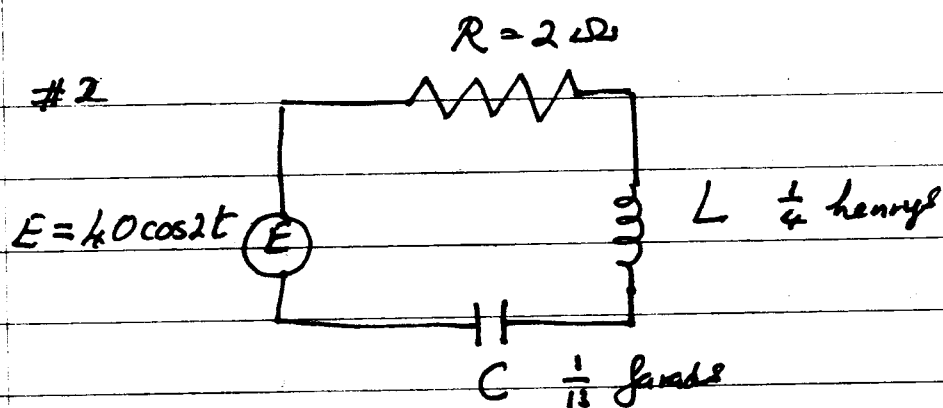


#2

(2)



$$I(0) = 0$$

$q(0) = 3.5$ coulombs. Determine the charge on capacitor at time t . Let $I = I(t)$ current (ampere at time t).

Let $q = q(t)$ charge on the capacitor (at time t).

$$L \frac{dI}{dt} + RI + \frac{1}{C} q = E(t)$$

$$\frac{1}{4} I'(0) + 2 I(0) + 13 q(0) = E(0) = 40$$

$$\frac{1}{4} I'(0) = 40 - 2 I(0) - 13 q(0) = 40 - 13(3.5)$$

$$I'(0) = 160 - 13 \cdot 14 = -22$$

$$L \frac{d^2 I}{dt^2} + R \frac{dI}{dt} + \frac{1}{C} I = E'(t)$$

$$\frac{1}{4} I'' + 2 I' + 13 I = -80 \sin 2t$$

$$I'' + 8 I' + 52 I = -320 \sin 2t$$

A.E. $r^2 + 8r + 52 = 0$

$$(r+4)^2 = r^2 + 8r + 16$$

A.E. $(r+4)^2 = -52 + 16 = -36$

$$r+4 = \pm 6i$$

$$r = -4 \pm 6i$$

$$I_h(t) = e^{-4t} (c_1 \cos 6t + c_2 \sin 6t)$$

$$I_p(t) = A \cos 2t + B \sin 2t$$