حل التمرين الخامس:

1. $u_L(t) + u_c(t) = 0$

$L\ di/dt + u_c(t) = 0$

$$L\frac{d^2q}{dt^2} + \frac{q(t)}{C} = 0$$

$$\frac{d^2q}{dt^2} + \frac{1}{L\times C}\,q(t) = 0$$

2. حل المعادلة التفاضلية هو:

$q(t) = Q\cos(w_0 t + \varphi)$

بالمطابقة نجد: $q(t) = a\cos b\,t$

$a = Q = E \times C = 3{,}0 \times 22 \times 10^{-3} = 66 \times 10^{-3}$ C

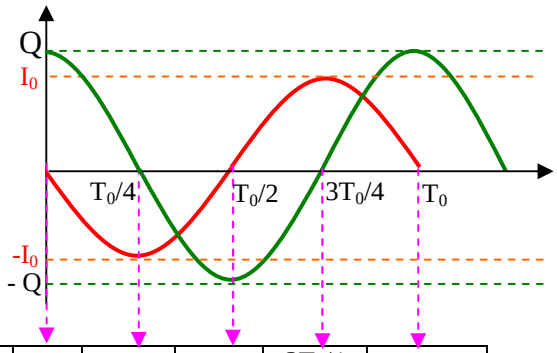
$$b = w_0 = \frac{1}{\sqrt{L\times C}} = \frac{1}{\sqrt{1{,}0\times 22\times 10^{-3}}} = 21{,}3 \text{ rad/s}$$

3. $T_0 = 2\pi\sqrt{L\times C} = 2\pi\sqrt{1{,}0\times 22\times 10^{-3}} = 0{,}3$ s

4. $$i = \frac{dq}{dt} = -w_0 Q \sin w_0 t$$

$I_0 = w_0 Q = 21{,}3 \times 66\times 10^{-3} = 1{,}4$ A

5.



t	0	$T_0/4$	$T_0/2$	$3T_0/4$	T_0
q	Q	0	-Q	0	Q
i	0	$-I_0$	0	I_0	0