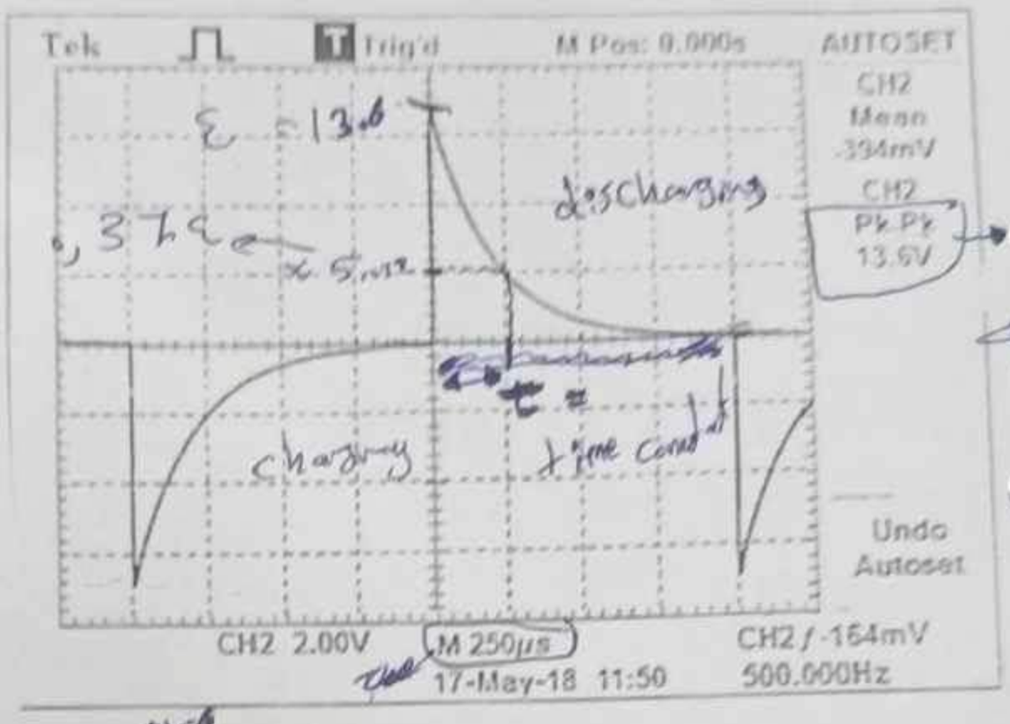
Phys 112

Quiz2

Q1. Consider RC circuit powered using a square wave from the signal generator. The figure below represents the voltage on the resistor (V_R) displayed on the DSO screen.



If the capacitor C=0.3 F. find:

1. The time constant?
2. The value of the resistance?

Q2. For a series RLC circuit with a square input voltage, if L= 10mH,

C = 15 nF, R = 200 ohm.

1. According to the values of L, C, R which kind of system do we have (under damping, over damping, or critical damping), show why?
2. Find the decay constant ?
3. Find the natural frequency?
4. What is the range of resistance that make it over damping?

$R_{critical} = 2\sqrt{\frac{L}{C}} = \sqrt{\frac{(10\times10^{-3})}{(15\times10^{-9})}} = 1632.99\ \Omega$

the system we have under damping

② $\delta = \frac{R}{2L} = \frac{200\ \Omega}{(2)(10\times10^{-3})} = 10\times10^{3}$

③ $\omega = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{(10\times10^{-3})(15\times10^{-9})}} = \frac{1}{\sqrt{150\times10^{-12}}} = 1.2247\times10^{-5} = 0.16\times10^{5}\ Hz$

④ - $R > R_{critical}$

$R > 1632.99$

we have over damping