



Sec 3

PHYSICS 112 Homework 1

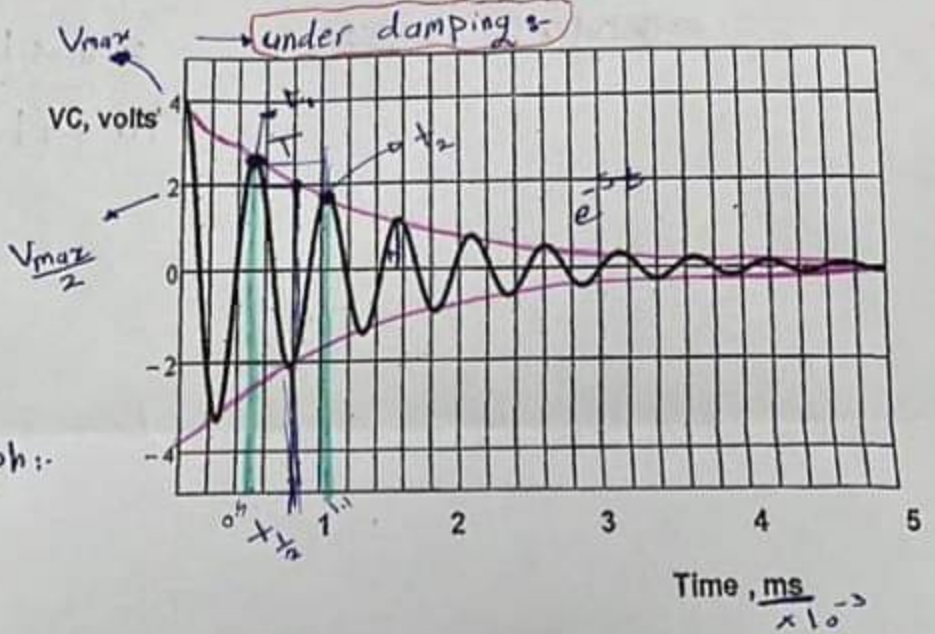
Student name

Student no:1

1. For the following RLC circuit if  $L = 10\text{mH}$  and  $V_C$  is shown in the figure below. Use the information in the  $V_C$  vs. time curve to find the following quantities.

- a. The half-life time  $t_{1/2}$ .
- b. Decay constant  $\delta$ .
- c. The resistance  $R$ .
- d. Angular frequency  $\omega$ .

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a) from the graph:

$$t_{1/2} = 0.8 \text{ ms} = 0.8 \times 10^{-3} \text{ s}$$

b) Decay constant:

$$\delta = \frac{\ln 2}{t_{1/2}} = \frac{\ln 2}{0.8 \times 10^{-3}} = 866.43 \text{ sec}^{-1}$$

$$\delta = 0.866 \text{ K sec}^{-1}$$

OR

$$\delta = \frac{R}{2L}$$

$$= \frac{17.32}{2 \times 10 \times 10^{-3}}$$

$$\delta = 866.4 \text{ sec}^{-1}$$

c) the resistance  $R$

$$\delta = \frac{R}{2L}$$

$$R = 2\delta L$$

$$= 2(866.43)(10 \times 10^{-3})$$

$$R = 17.32 \text{ } \Omega$$

$$\text{OR } R = \frac{2L \ln 2}{t_{1/2}}$$

$$= \frac{2 \times 10 \times 10^{-3} \ln(2)}{0.8 \times 10^{-3}}$$

$$R = 17.32 \text{ } \Omega$$