Quiz 3

Basic Electronics - ECE113

Duration: 30 mins

Marks: 10

Date: 4/07/2022 Time: 4.45 - 5.15 pm

1. A capacitor is charged to 100 V and then discharged through a 50 kΩ resistor. If the time constant of the circuit is 0.8 s, determine: (a) the value of the capacitor, (b) the time for the capacitor voltage to fall to 20 V, (c) the current flowing when the capacitor has been discharging for 0.5 s, and (d) the voltage drop across the resistor when the capacitor has been discharging for one second.

[1+1+1+1 = 4 Marks]

2. In the circuit of Fig. 1, L = 0.5 H, R = 400 ohm and C = 0.5 μF. The capacitor has an initial voltage of V_0 = 30 V, and the switch is closed at t = 0.

(a) Determine the numerical values of v, i_R, i_L and i_C just after the switch is closed, i.e. at t = 0^+.
(b) For this system, write the governing equation in terms of v.
(c) Will the response be under, over or critically damped?

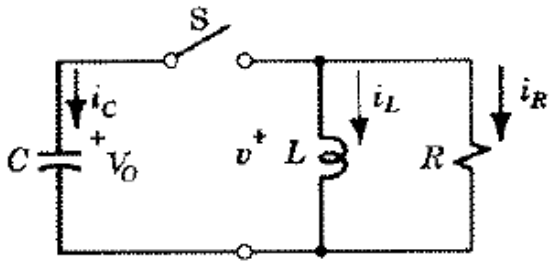

Figure 1

[2+3+1 = 6 Marks]