

CASE WESTERN RESERVE UNIVERSITY
Case School of Engineering
Department of Electrical Engineering and Computer Science

ENGR 210. Introduction to Circuits and Instruments (4)

Quiz No. 10

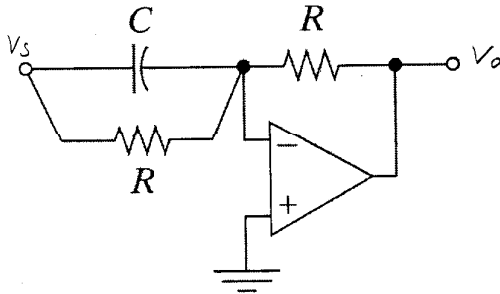
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Name (Section): Solutions

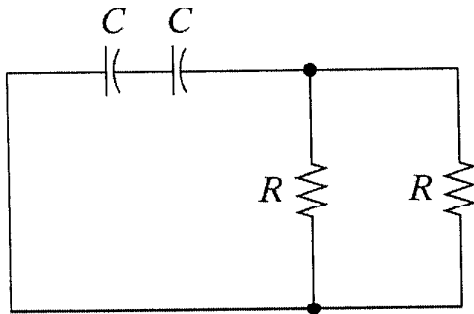
PUT ANSWERS IN THE SPACE PROVIDED AND SHOW YOUR WORK

Problem 1 (10 points)

Find the time constant for each of these circuits.

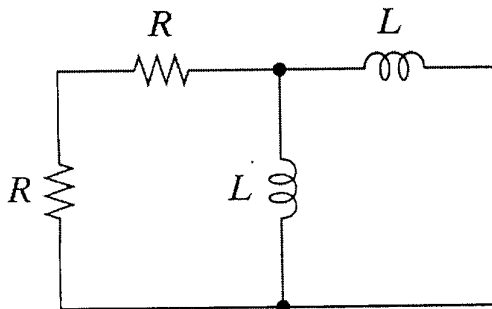


$$T_c = \underline{RC}$$



C3

$$T_c = \underline{\frac{RC}{4}}$$



C4

$$T_c = \underline{\frac{L}{4R}}$$

(over)

Problem 2 (10 points)

A step input of 1 V (Thevenin value) is applied to a circuit having a time constant of 2 msec. The state variable (a capacitor voltage) has an initial value of 4 V. The capacitor value is 5 μ F. Write the expression for the capacitor voltage AND capacitor current for $t > 0$. Use NUMERICAL values.

$$v_c(t) = \underline{1 + 3e^{-500t}}, \quad t > 0.$$

$$i_c(t) = \underline{-7.5 \times 10^{-3} e^{-500t}}, \quad t > 0.$$

(over)