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ECE-205 Quiz 1

1) For a first order RC circuit, the time constant is of the form

a) $\tau = C / R_{th}$ b) $\tau = R_{th} / C$ c) $\tau = R_{th} C$ d) none of these

2) For a first order RL circuit, the time constant is of the form

a) $\tau = R_{th} L$ b) $\tau = L / R_{th}$ c) $\tau = R_{th} / L$ d) none of these

3) The differential equation that relates the current through a capacitor to the voltage across a capacitor is

a) $v_c(t) = C \frac{di_c(t)}{dt}$ b) $i_c(t) = \frac{1}{C} \frac{dv_c(t)}{dt}$ c) $i_c(t) = C \frac{dv_c(t)}{dt}$ d) $v_c(t) = \frac{1}{C} \frac{di_c(t)}{dt}$

4) The differential equation that relates the current though an inductor to the voltage across an inductor is

a) $i_L(t) = L \frac{dv_L(t)}{dt}$ b) $v_L(t) = \frac{1}{L} \frac{di_L(t)}{dt}$ c) $i_L(t) = \frac{1}{L} \frac{dv_L(t)}{dt}$ d) $v_L(t) = L \frac{di_L(t)}{dt}$

5) The standard form for an RC or RL first order circuit, with input $x(t)$ and output $y(t)$, is

a) $\frac{dy(t)}{dt} + \tau\, y(t) = Kx(t)$ b) $\frac{dy(t)}{dt} + \tau y(t) = Kx(t)$ c) $\frac{1}{\tau} \frac{dy(t)}{dt} + y(t) = Kx(t)$

d) $\frac{dy(t)}{dt} + \tau\, y(t) = \frac{1}{K} x(t)$ e) $\tau \frac{dy(t)}{dt} + y(t) = \frac{1}{K} x(t)$ f) $\tau \frac{dy(t)}{dt} + y(t) = Kx(t)$

6) A capacitor is a/an a) short circuit b) open circuit to DC signals.

7) An inductor is a/an a) short circuit b) open circuit to DC signals.

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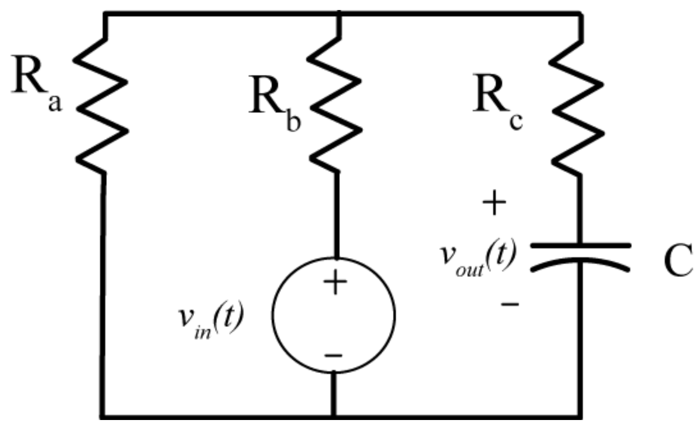
Problems 8 and 9 refer to the following circuit:



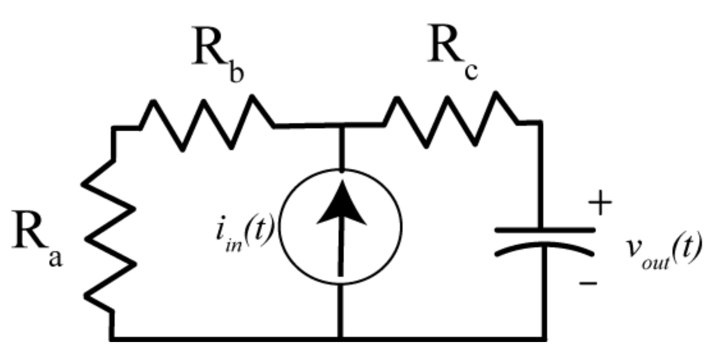
8) The Thevenin resistance seen from the ports of the capacitor is

a) $R_{th} = R_c + R_a \parallel R_b$ b) $R_{th} = R_c$ c) $R_{th} = R_c \parallel (R_a + R_b)$ d) $R_{th} = R_a + R_b + R_c$ e) none of these

9) The static gain for the system is

a) $K = 1$ b) $K = \frac{R_c}{R_a + R_b + R_c}$ c) $K = \frac{R_b}{R_a + R_b}$ d) $K = \frac{R_a}{R_a + R_b}$ e) none of these

Problems 10 and 11 refer to the following circuit



10) The Thevenin resistance seen from the ports of the capacitor is

a) $R_{th} = R_a + R_b$ b) $R_{th} = R_c$ c) $R_{th} = R_c \parallel (R_a + R_b)$ d) $R_{th} = R_a + R_b + R_c$ e) none of these

11) The static gain for the system is

a) $K = 1$ b) $K = R_c$ c) $K = R_a + R_b$ d) $K = R_c \parallel (R_a + R_b)$ e) none of these

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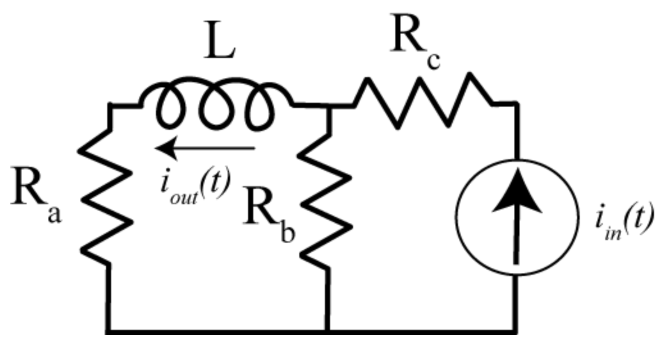
Problems 12 and 13 refer to the following circuit



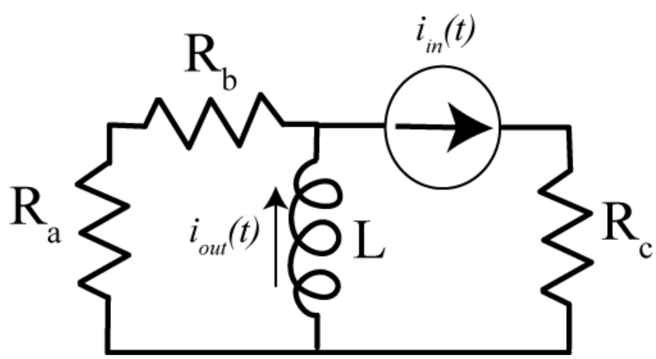
12) The Thevenin resistance seen from the ports of the inductor is

a) $R_{th} = R_a + R_b \,||\, R_c$ b) $R_{th} = R_c + R_a \,||\, R_b$ c) $R_{th} = R_a + R_b$ d) $R_{th} = R_a + R_c$ e) none of these

13) The static gain for the system is

a) $K = 1$ b) $K = \dfrac{R_b}{R_a + R_b}$ c) $K = \dfrac{R_a}{R_a + R_b}$ d) $K = \dfrac{R_b}{R_c + R_b}$ e) none of these

Problems 14 and 15 refer to the following circuit



14) The Thevenin resistance seen from the ports of the inductor is

a) $R_{th} = R_c \,||\, (R_a + R_b)$ b) $R_{th} = R_c$ c) $R_{th} = R_a + R_b$ d) $R_{th} = R_a + R_b + R_c$ e) none of these

15) The static gain for the system is

a) $K = 1$ b) $K = \dfrac{R_a + R_b}{R_a + R_b + R_c}$ c) $K = \dfrac{R_c}{R_a + R_b + R_c}$ d) $K = \dfrac{R_c}{R_a + R_b}$ e) none of these

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16) If $z = \frac{1+j}{1-j}$, then

a) $\angle z = 0^o$ b) $\angle z = 90^o$ c) $\angle z = -90^o$ d) $\angle z = -45^o$ e) $\angle z = 45^o$

17) If $z = \frac{1+j}{3+j}$**,** then

a) $|z| = 0$ b) $|z| = \frac{2}{8}$ c) $|z| = \sqrt{\frac{2}{8}}$ d) $|z| = \sqrt{\frac{2}{10}}$