## ECE-205 Practice Quiz 1

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

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

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

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

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

a) 
$$i_{c}(t) = C \frac{dv_{c}(t)}{dt}$$
 b)  $v_{c}(t) = C \frac{di_{c}(t)}{dt}$  c)  $i_{c}(t) = \frac{1}{C} \frac{dv_{c}(t)}{dt}$  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)  $v_{L}(t) = L \frac{di_{L}(t)}{dt}$  c)  $i_{L}(t) = \frac{1}{L} \frac{dv_{L}(t)}{dt}$  d)  $v_{L}(t) = \frac{1}{L} \frac{di_{L}(t)}{dt}$ 

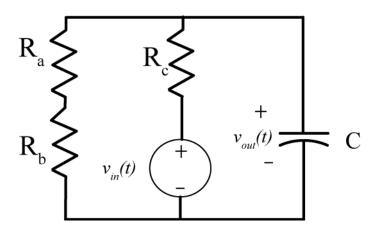
5) The standard form for an RC or RL first order circuit, with input x(t) and output y(t), is

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

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

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

Problems 8 and 9 refer to the following circuit:



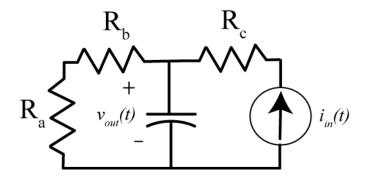
8) The Thevenin resistance seen from the ports of the capacitor is

a)  $R_{th} = R_a + R_b$  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

9) The static gain for the system is

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

Problems 10 and 11 refer to the following circuit



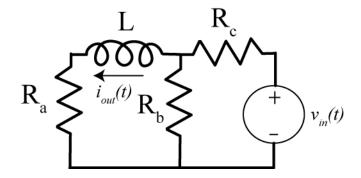
10) The Thevenin resistance seen from the ports of the capacitor is

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)  $K = R_c || (R_a + R_b)$  e) none of these

Problems 12 and 13 refer to the following circuit



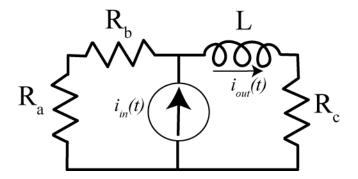
12) The Thevenin resistance seen from the ports of the inductor is

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

Answers: 1-a, 2-c, 3-a, 4-b, 5-b, 6-a, 7-b, 8-c, 9-c, 10-a, 11-c, 12-a, 13-e, 14-d, 15-b