EE 210 **Fall 2018**
Final Exam Review Sheet

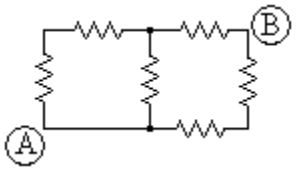
Final exam is Friday, December 7 at 4:30pm

The final exam will be made up of questions that are similar to those on the hour exams. One good way to review is to rework the hour exams.

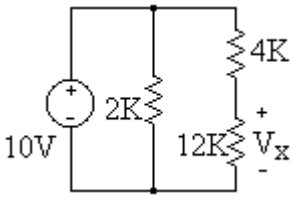
Here are some questions taken from old exams and homework that you should understand.

Hour Exam 1

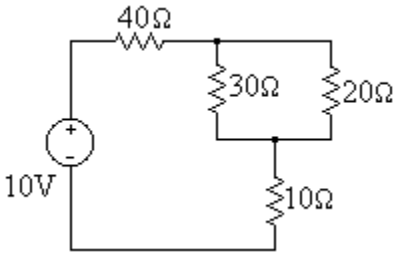
1. All of the resistors in the circuit below have a value of 1Ω. Find the equivalent resistance between node A and node B. Show your work.



2. Use voltage division to find the value of V_x in the circuit below. Show your work.



3. In the circuit below find the power dissipated in the 10Ω resistor. Show your work.



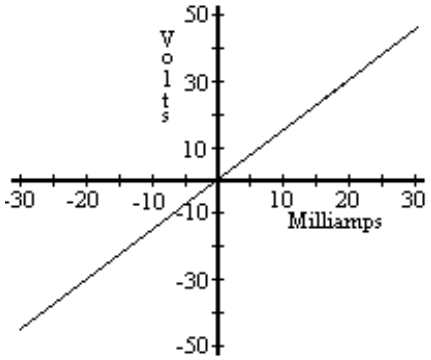
4. In plain English and without equations:

A) What is resistance?

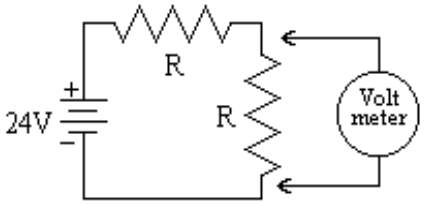
B) What is electrical current?

C) What is voltage?

5. Given below is the voltage/current graph for a resistor. What is the resistance?

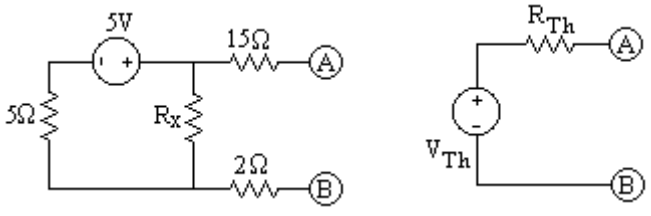


6. Two resistors, a voltmeter, and a 24 volt battery are connected as shown in the circuit below. The voltmeter is known to have a 10MΩ equivalent resistance. If the meter measurement indicates 10 volts, what is the value of the two resistors.



Hour Exam 2

7. The circuit shown below in Figure 2A has a Thevenin equivalent circuit shown in Figure 2B. Find the value of R_x so that $R_{Th} = 20\Omega$. Also find the value of $V_{Th.}$ Show all of your work..



A) **B)**

Figure 2
Circuit for Problem 2

8. Find the Thevenin equivalent circuit for the circuit shown in Figure 3. Show all work.

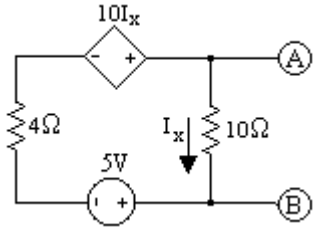


Figure 3
Circuit for Problem 3

9. Find the power dissipated by the 30Ω resistor in the circuit of Figure 5. Show your work.

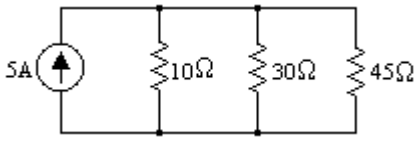
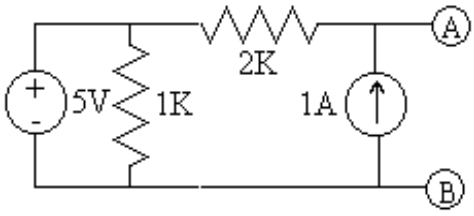


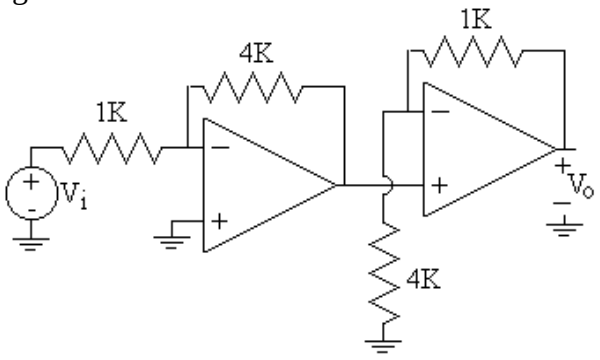
Figure 5
Resistive circuit for Problem

10. With regard to op amps, what is saturation.

11. Sketch the Thevenin equivalent for the circuit below and label R_{Th} and $V_{Th.}$



13. Write the gain equation for the following circuit.



Hour Exam 3

14. Find the current i in Figure P1 below at $t = 0^+$. Show all work.

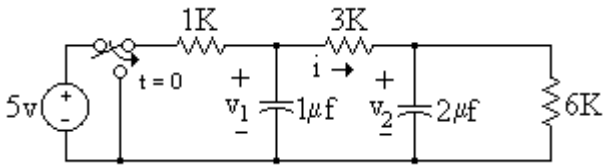


Figure P1
Find the current i at time $t = 0^+$.

15. Answer the following questions about the differential equation below: Show all work.

A) What is the characteristic equation? $2\frac{d^2y}{dt^2} + 8\frac{dy}{dt} + 6y = 24$

B) Find the transient solution

C) Find the steady state solution.

D) Write the complete solution.

16. For the circuit in Figure P4, assume that the capacitor is initially charged to +2 volts. Find the equation for v(t) for $t > 0$. Show all work.

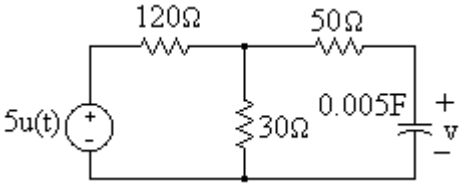
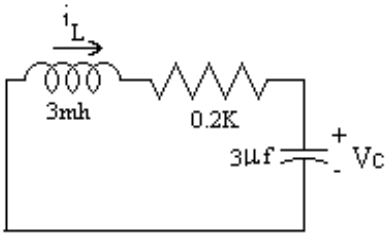


Figure P4
Find the equation for v for $t > 0$.

17. For the circuit below find i(t) for $t > 0$ if $V_c(0^-) = 10$volts and $i_L(0^-) = 0$.



18. Answer the following questions about the circuit below.

A) The capacitor voltage at t = 0+ = _____

B) The inductor current at t = 0+ = _____

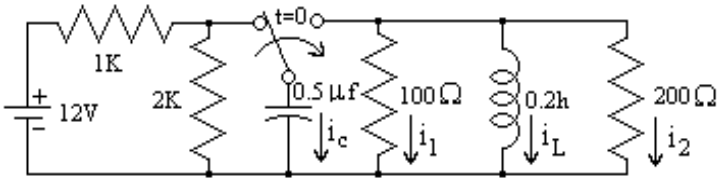
C) The current through the 100Ω resistor at t = 0+ = _____

D) The current through the 200Ω resistor at t = 0+ = _____

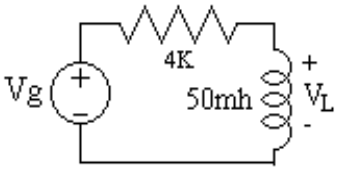
E) The capacitor current at t = 0+ = _____

F) The inductor voltage at t = 0+ = _____

G) Is this circuit overdamped, underdamped, or critically damped?_____

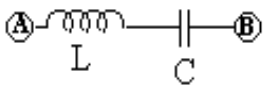


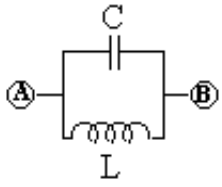
19. Write (but do not solve) the differential equation for V_L for the circuit below. Your equations should contain only V_L and V_g as variables.



Chapter 9

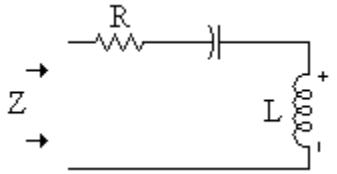
20. The two circuits below L = 10mh and C = 1μf. Find the impedance between nodes A and B for each circuit to a voltage waveform given by 10Cos(10000t - 60^o).





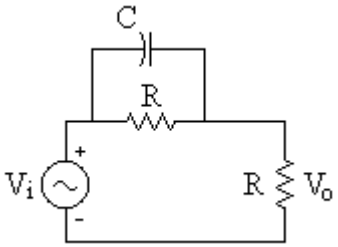
Impedance = _____ Impedance = _____

21. In the circuit below R = 1K, C = 0.25 farad, and L = 0.1 Henrys. Find the frequency where the circuit's total impedance is minimized. Put your result in Hertz. Show your work..



22. In the circuit below we define the gain as V_o/V_i. Answer the following questions about the gain.

A) Will the gain be higher at low frequencies or at higher frequencies? Explain your answer.



B) What is the maximum gain that this circuit could ever have?