

Midterm 1

Principles of Computer Engineering I

NAME:

STUDENT ID:

Given an atom with 30 Protons answer the following:

1. (1 pts) How many electrons orbit the nucleus? _____
2. (2 pts) List the shell number and the number of electrons each shell contains:

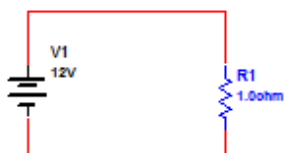
<u>Shell #</u>	<u>Number of Electrons</u>
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3. (2 pts) How many valence electrons are there? _____
4. (1 pts) This atom is a good insulator. T / F

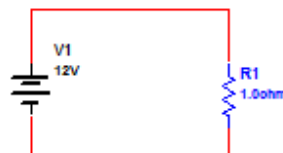
Answer the following (questions 5 – 7) given an electrically balanced electroscope that has a positively charged object next to the exposed conductor at the top.

5. (1 pts) will the foil leaves in the glass jar attract each other or repel? _____
 6. (1 pts) What charge will the two foil leaves have (positive or negative)? _____
 7. (1 pts) Are the electrons at the top of the electroscope or the bottom? _____
8. (1 pts) Please indicate the direction of current for the following two drawings with an arrow and the symbol I.

Conventional Flow



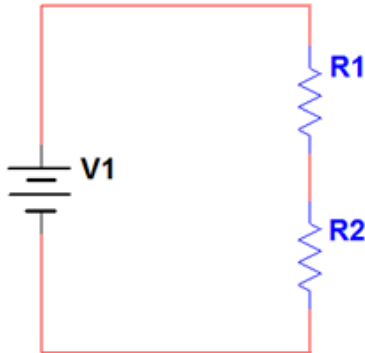
Electron Flow



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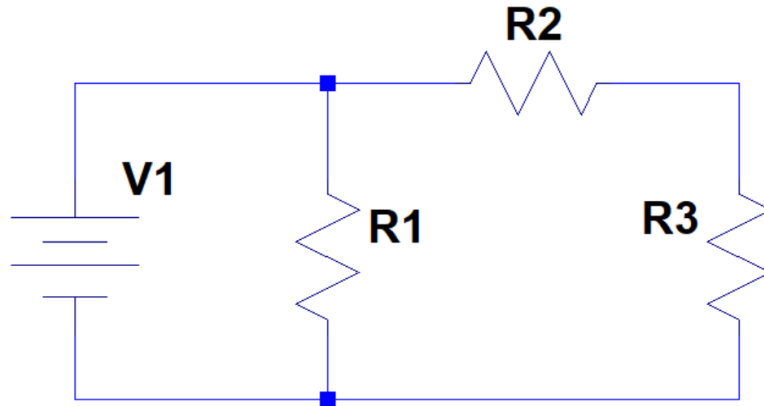
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9. (6 pts) Given the following circuit, solve for each item in the table
 $V_1 = 15\text{V}$, $R_1 = 25\ \Omega$, $R_2 = 50\ \Omega$,



R_T	Equivalent Resistance	
I_T	Total Current	
V_{R1}	Voltage Across R1	
V_{R2}	Voltage Across R2	
P_{R1}	Power Dissipated by R1	
P_{R2}	Power Dissipated by R2	

10. (18 pts) Given the following circuit, solve for each item in the table
 $V_1 = 60\text{V}$, $R_1 = 600\ \Omega$, $R_2 = 100\ \Omega$, $R_3 = 200\ \Omega$

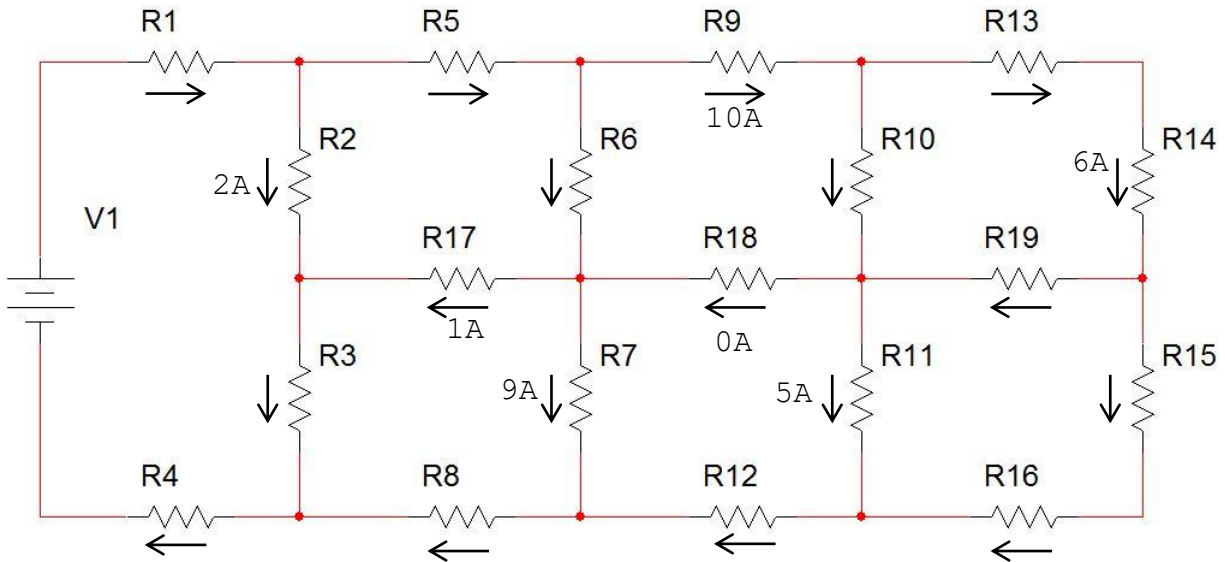


I_{R1}		V_{R3}	
I_{R2}		P_{R1}	
I_{R3}		P_{R2}	
V_{R1}		P_{R3}	
V_{R2}			

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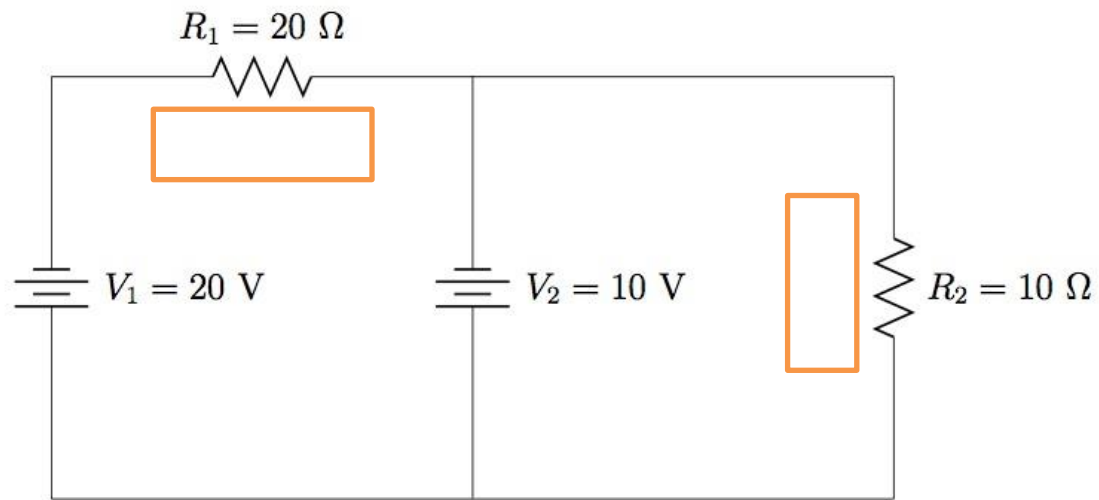
11. (12 pts) Use KCL to figure out all the currents and fill in the table below.



Resistor	Current	Resistor	Current
R1		R11	5A
R2	2A	R12	
R3		R13	
R4		R14	6A
R5		R15	
R6		R16	
R7	9A	R17	1A
R8		R18	0A
R9	10A	R19	
R10			

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12. (20pts - Superposition) For the circuit below use Superposition to determine the Current Magnitude/Direction and Voltage for each component..



(4pt) Use the provided boxes in the circuit to draw an arrow to indicate the direction of conventional current through each component.

(4pt) I_{R1} : _____

(4pt) V_{R1} : _____

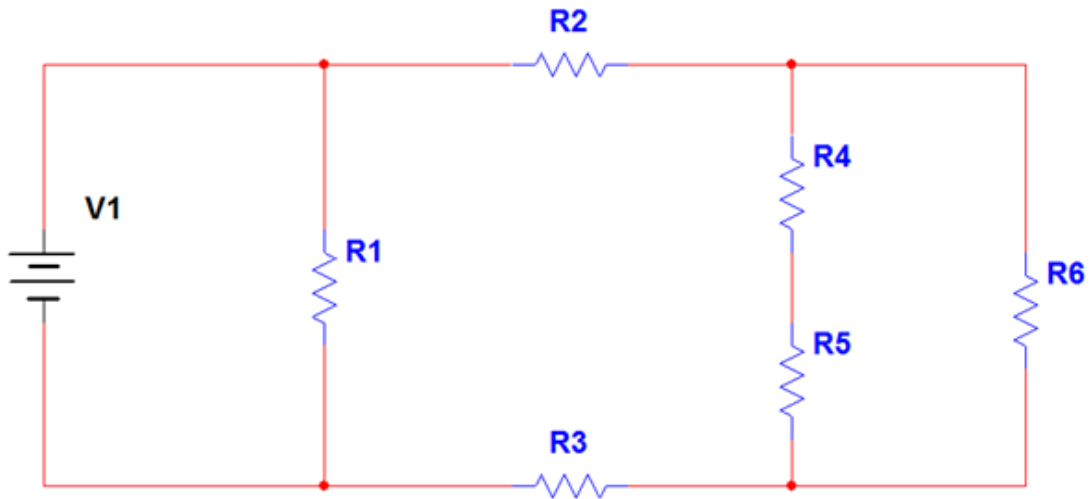
(4pt) I_{R2} : _____

(4pt) V_{R2} : _____

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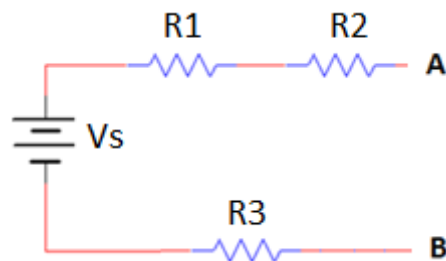
13. (12 pts) $V_1 = 20\text{V}$, $R_1 = 20\Omega$, $R_2 = 40\Omega$, $R_3 = 20\Omega$, $R_4 = 20\Omega$, $R_5 = 20\Omega$ and $R_6 = 40\Omega$.



In the circuit above find the current through and the voltage across each resistor.

I_{R1}		V_{R1}	
I_{R2}		V_{R2}	
I_{R3}		V_{R3}	
I_{R4}		V_{R4}	
I_{R5}		V_{R5}	
I_{R6}		V_{R6}	

14. (4 pts) $V_s = 20\text{V}$, $R_1 = 1\text{k}\Omega$, $R_2 = 2\text{k}\Omega$, $R_3 = 7\text{k}\Omega$

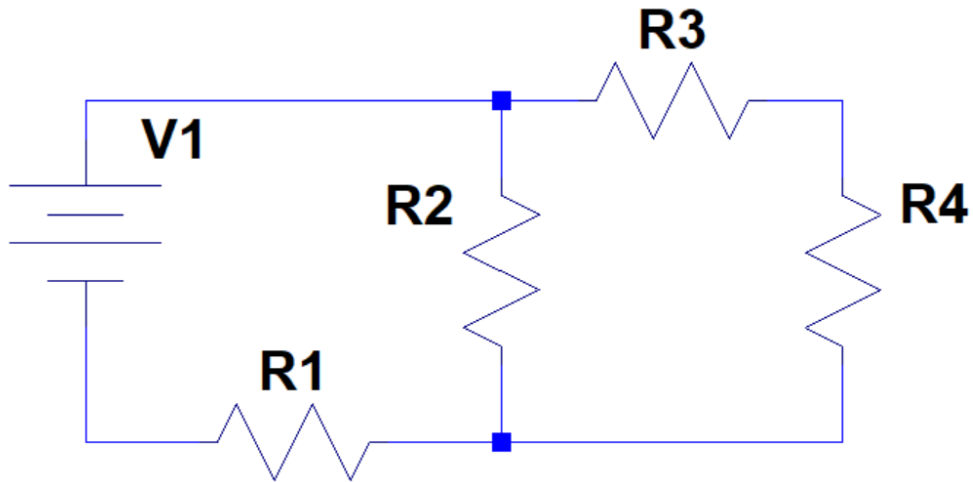


What is the voltage between points A and B? _____

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15. (16 pts) Given the following circuit, solve for each item in the table

$V_1 = 9\text{V}$, $R_1 = 1.5\text{k}\Omega$, $R_2 = 2\text{k}\Omega$, $R_3 = 5\text{k}\Omega$, $R_4 = 1\text{k}\Omega$



I_{R1}		V_{R1}	
I_{R2}		V_{R2}	
I_{R3}		V_{R3}	
I_{R4}		V_{R4}	

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SCRATCH PAPER