Unit 4: Electricity and Magnetism Exam Review

1. What is the potential difference between two points if 2.0 x 103 J of work is required to move 1.0 C of charge between the two points?

2. Along a wire 2.5 C of charge passes by in 6.4 seconds.
a) Determine the current.
b) Determine the total number of electrons that has passed through this wire.

3. If a current of 10.0 A takes 3.0×10^2 s to boil a kettle of water requiring 3.6×10^5 J of energy, what is the potential difference (V) across the kettle?

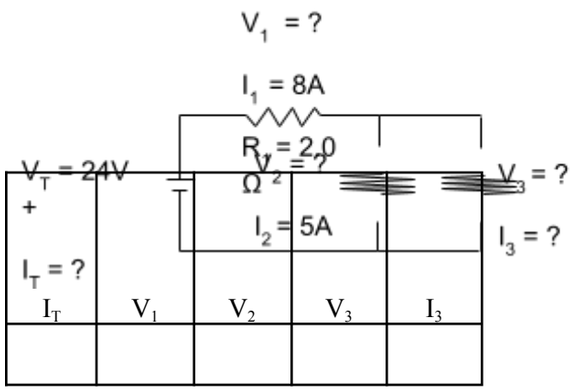
4. Draw a mixed circuit with at least 4 different Electric Loads, 2 switches, three cells (2V each), and 1 Electric Meter.

5. What current is drawn from a vacuum cleaner from a 115 V circuit having a resistance of 28 Ω?

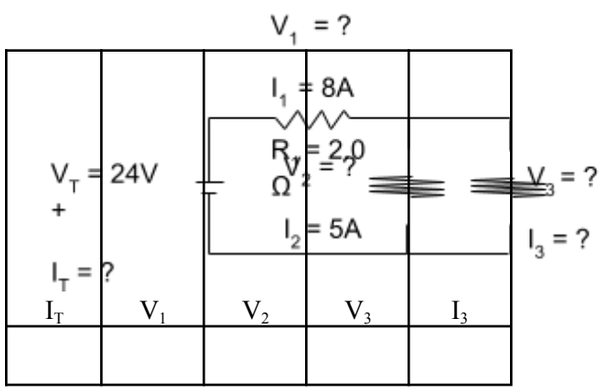
6. What power is dissipated by an electric frying pan that has a resistance of 12 Ω and operates at a potential difference of 120 V?

7. How long does it take for a current of 9.3 mA to transfer a charge of 12 C?

8. Solve the following steady state circuit.



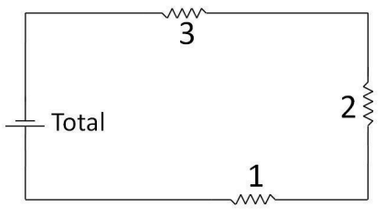
9. Solve the following steady state circuit.



10. How much energy is dissipated over a 4 minute period when a current of 3.0 A runs through a potential difference of 120 V?

11. How many $60\,\Omega$ resistors must be connected in parallel to draw a current of 14.0 A from a 120 V source? If the same number of resistors were connected in series, how much current would they draw?

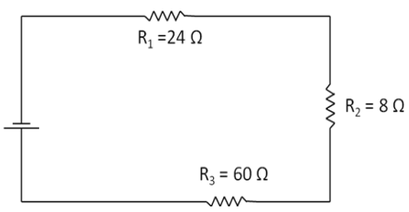
12. Solve the series circuit below.



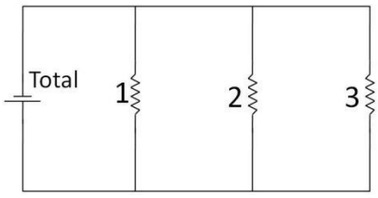
$V_1 = 24$ V	$I_1 =$	$R_1 =$
$V_2 = 36$ V	$I_2 =$	$R_2 = 6\,\Omega$
$V_3 =$	$I_3 =$	$R_3 =$
$V_T =$	$I_T =$	$R_T = 20\,\Omega$

13. Consider the circuit below: Which resistor would have the greatest current passing through it? Explain.

a) Which resistor would have the greatest potential difference across it? Explain.



14. Solve the parallel circuit below.



$V_1 =$	$I_1 = 2$ A	$R_1 =$
$V_2 =$	$I_2 =$	$R_2 = 11\,\Omega$
$V_3 =$	$I_3 =$	$R_3 = 22\,\Omega$
$V_T =$	$I_T =$	$R_T = 6\,\Omega$

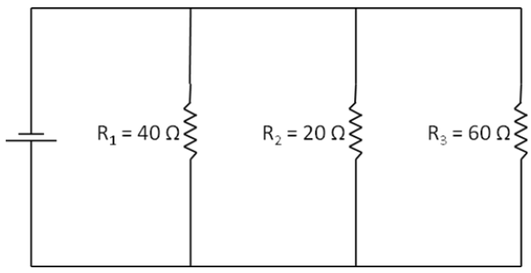
15. A lamp with a resistance of 10 W is connected across a 12 V battery. What resistance must be connected to the lamp to create a current of 0.50 A?

16. A battery sends a 2.25 A current through a circuit for 1.50 min. If a total of 8.10×10^2 J of work was done by the current, what was the potential difference of the battery?

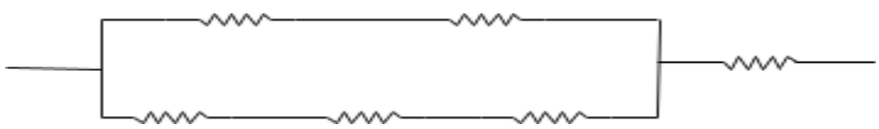
17. Consider the circuit below:

a) Which resistor would have the greatest potential difference across it? Explain.

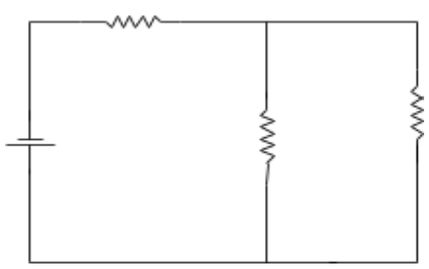
b) Which resistor would have the greatest current passing through it? Explain.



18. Each of the resistors in the diagram below has a resistance of 5 Ω. What is the total resistance of the circuit component shown below?

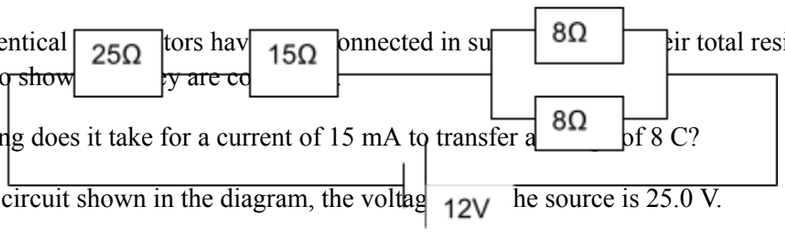


19. Solve the circuit below by finding all of the current, resistance, and potential difference values and entering them into the table.



$V_1 =$	$I_1 =$	$R_1 = 12\,\Omega$
$V_2 =$	$I_2 =$	$R_2 = 6\,\Omega$
$V_3 =$	$I_3 =$	$R_3 = 6\,\Omega$
$V_T = 60$ V	$I_T =$	$R_T =$

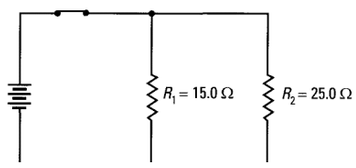
20. A series/parallel circuit is set up as shown below. Find the total resistance, current and the voltage drop across each resistor in the circuit.



21. Four identical [25Ω] tors hav [15Ω] onnected in su [8Ω] [8Ω] ir total resistance is 4Ω. Draw a diagram to show y are co

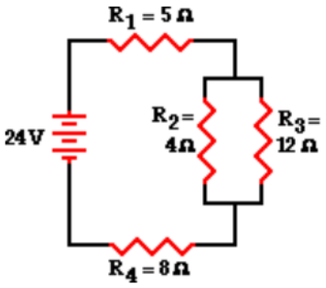
22. How long does it take for a current of 15 mA to transfer a of 8 C?

23. For the circuit shown in the diagram, the voltag he source is 25.0 V. Calculate



a) the equivalent resistance of the circuit
b) the total current
c) the voltage drop across resistor R_3
d) the current through resistor R_1

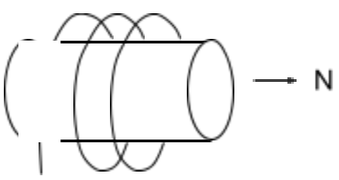
24. For the circuit shown in the diagram, the voltage from the source is 24 V. Calculate

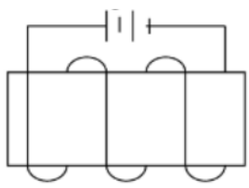


a) the equivalent resistance of the circuit
b) the total current
c) the voltage drop across resistor R_1 and R_4
d) the current through resistor R_2

25. Use the correct right hand rule to answer each of the following.
a) Determine the direction of the magnetic field along a wire.

b) Determine the direction of the current and the **magnetic North** for this solenoid.





c) Determine and draw the **direction of the magnetic force** experienced by the wire placed in the magnetic field