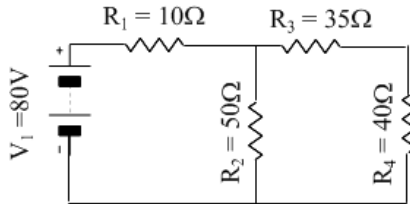


# Physics 12

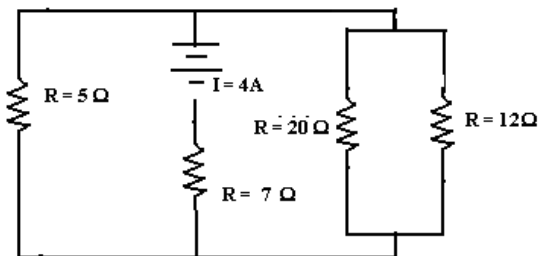
## Assignment #4

1. An 8 gauge copper conductor that is 10 feet long needs to be replaced by a 40 foot cable. Determine the required gauge wire to replace it without increasing the resistance. (You may have to look up the gauge)
2. A series circuit is created with 6 resistors ( $5\Omega$ ,  $10\Omega$ ,  $15\Omega$ , and 3 unknown resistors). The voltage drop across the fourth resistor is  $20V$ , the drop across the fifth is  $25V$  and the sixth is unknown. The battery is  $105V$ . Draw the circuit and solve for all the unknowns if the heat energy created by the fifth resistor is  $1.5kJ$  after it has been on for 1 minute.
3. Solve the following circuits (Include simplified circuits)

a)



b)

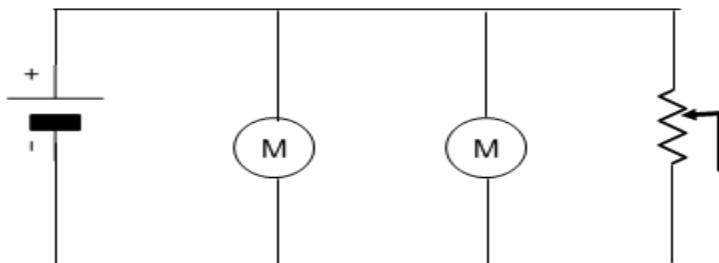


4. What would be the cost of electricity if you were to run the circuit in 3b for 2 days. Use the current cost of electricity in NB. Don't know the cost? (Yes, check the podcast) How much more would it cost to operate the circuit if it were in Nova Scotia?

### Practice Problems

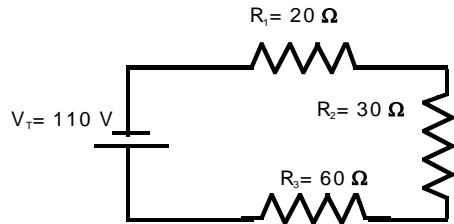
1) The system below has the following known values: Motor 1 is rated at  $2400W$ , Motor 2 is rated at  $1200W$  and the voltage source can supply  $120V$ . What would the third resistor be set at if

- a) the current from the source was  $50A$
- b) the current from the source was  $30A$

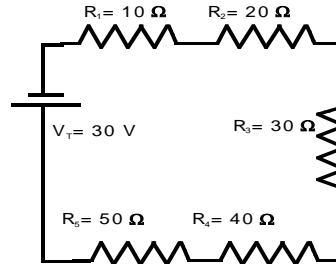


Clearly identify your answers

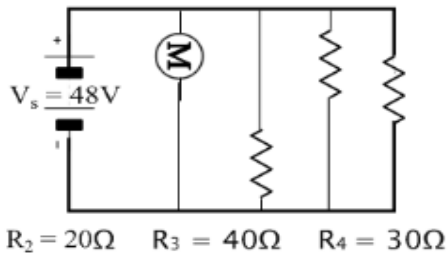
2)



3)

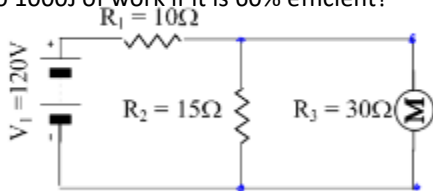


4. The power in the motor is 230.4W. Determine the current in each resistor and the motor.

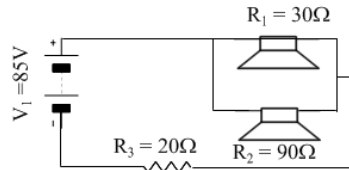


5) Determine how long it takes for the motor below to below.

do 1000J of work if it is 60% efficient?



6) Determine the power in each of the speakers



6. Why was Alessandro Volta's creation so important?
7. How much electrical charge was moved when a 30V battery does 2.5J of work? **(83.3mC)**
8. Your house operates at 120V. A small space heater draws a maximum current load of 10A. If it is operated at 75% capacity for 30minutes how much electrical energy did the heater convert to heat energy? **(1.62MJ)**
9. The battery for a cordless drill draws 4500 C of charge for 45 minutes while recharging. What is the amount of current drawn while recharging? **(1.67A)**
10. A copper wired extension cord has a length of 15m and a resistance of 0.1221Ω. What gauge is the wire? **(14 gauge)**
11. How much current is drawn when you operate a 5000W clothes dryer in your house? Remember dryers use the big plug! **(20.83A)**
12. The filament in a floodlight is rated at 576W. If the resistance of the filament of the in the bulb is 25Ω what continent was the bulb designed for? **(North America)**

