

Physics 12

Assignment #5 - Electrical Circuits

Due Wednesday, April 5th, 2017

- What is the equivalent resistance of the circuit in figure 1?
 - 92Ω
 - 4Ω
 - 95Ω
 - none of the previous

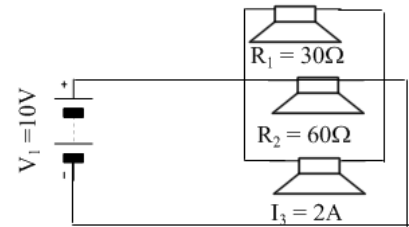


Figure 1

- What is the potential difference across the third resistor in the circuit in figure 2?
 - 8Ω
 - 16Ω
 - $8V$
 - $16V$

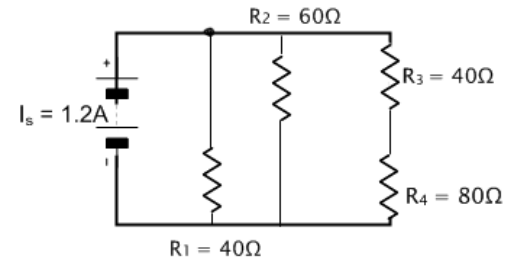


Figure 2

- What would the power of the fourth resistor?
 - $3.2W$
 - $7.2W$
 - $8W$
 - $24W$

- What is the resistance of an ideal ammeter and an ideal voltmeter?

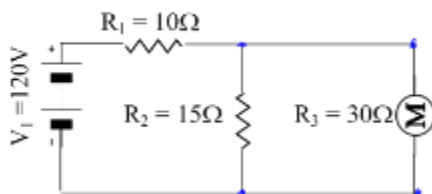
| Ideal Ammeter | Ideal Voltmeter |
|---------------|-----------------|
| a) zero | infinite |
| b) infinite | zero |
| c) zero | zero |
| d) infinite | infinite |
| e) 1Ω | 1Ω |

Solve each of the following for the voltages, currents, unknown resistances and equivalent resistances, unless stated otherwise. (Show your work where necessary and state all constant variables)

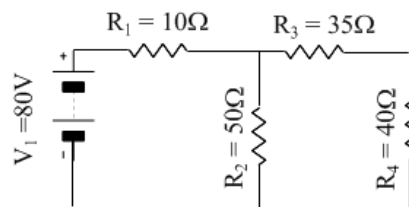
Clearly identify your answers

1) A series circuit is created with 6 resistors (5Ω , 10Ω , 15Ω , 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.

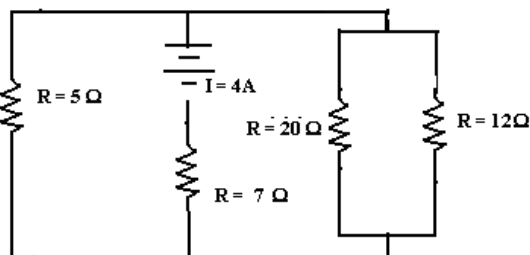
2) Determine how long it takes for the motor below to do $1000J$ of work if it is 50% efficient?



3) Solve the following circuit

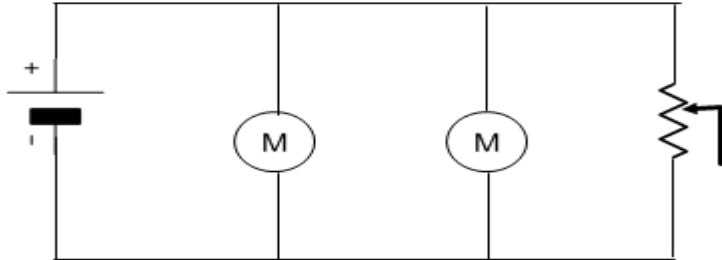


4) Solve for the missing values



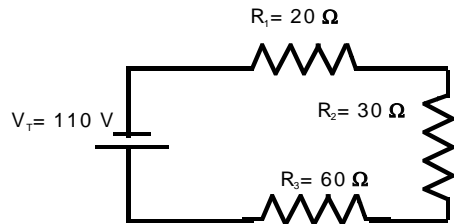
Extra Practice Problems

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

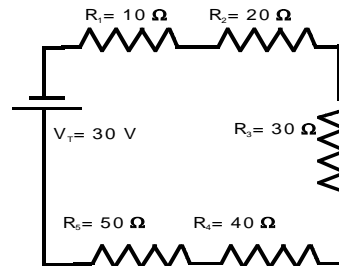


Clearly identify your answers

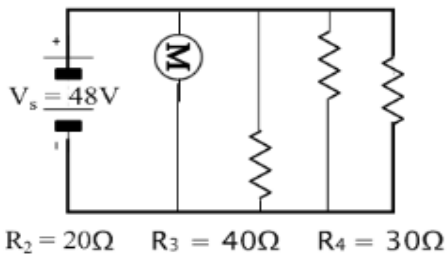
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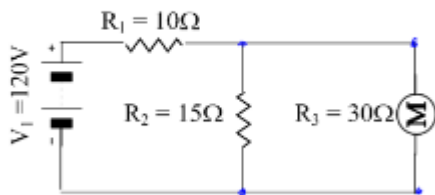
3)



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



- 6) Determine the power in each of the speakers below.

