Unit 4 – Electric Circuits

IPOD Questions

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IPOD # 14

a) A lamp with a resistance of 30 Ω is connected to a voltage source. The current in the circuit is 3.0 A. What is the voltage of the source?

b) The current in a circuit is 2 A. If the voltage is cut in ½ what is the new value of the current?

c) The current in a circuit is 2 A. If the voltage is tripled and the resistance is cut in half, what is the new value of current in the circuit?

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IPOD # 15

A classroom TV, rated at 170 W, was left on overnight and was running for a total of 24 hours that day (in school & out of school).

a) How much energy (in kWh) was consumed?
b) How much did it cost the school? (cost per kWh - $0.10)
c) If this TV were left on every day for a month, how much would it cost?

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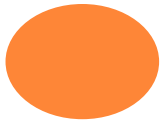
IPOD # 16

- A 2 Ω and a 4 Ω resistor are connected in **series** across a 12-V battery.
  - Draw the circuit
  - What is the equivalent (total) resistance?
  - What is the current?
  - What is the potential drop (voltage) across each resistor?
  - What is the power developed by each resistor?
  - What is the total power developed by the circuit?



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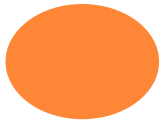
PROMPT # 17

- Two resistors, 40-Ω and 10-Ω, are connected in parallel across a 120-V generator.

  - Draw the circuit
  - What is the equivalent (total) resistance?
  - What is the current through the entire circuit?
  - What is the current through each branch of the circuit?
  - What is the power developed by each resistor?
  - What is the total power developed by the circuit?



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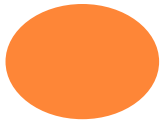
IPOD # 18

- A 2 Ω resistor is connected across a 9-V battery.
  - What is the current in the circuit?
  - How much power is developed by the resistor?
  - The device is on an average of 6 hours per day. How much energy does it use (in kWh) per day? Per 30 days?
  - If it costs $0.12 per kWh, how much does it cost to run for a day? For 30 days?



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IPOD # 19

Comparing Series vs. Parallel Circuits

Fill in the table below to indicate the manner in which series and parallel circuits differ.

		Series Circuit	Parallel Circuit
a.	**Definition:** The pathway by which charge loops around the circuit is characterized by _____ pathway(s).		
b.	**Observation:** If one light bulb goes out, the other light bulbs _____.		
c.	**Observation:** As the number of resistors is increased, the overall current _____.		
d.	**Observation:** As the number of resistors is increased, the overall resistance _____.		
e.	Calculate the equivalent (total) resistance if a 2 Ω and a 4 Ω resistor were connected across a 10-V battery.		

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EXTRA PROMPT

- In this circuit, three resistors receive the same amount of current (4 amps) from a single source. Calculate the amount of voltage "dropped" by each resistor.

- In this circuit, three resistors receive the same amount of voltage (24 volts) from a single source. Calculate the amount of current "drawn" by each resistor.