

**Questions**  
**Chapter 26**  
**Current and Resistance**

- 26-1 What is Physics?
- 26-2 Electric Currents
- 26-3 Current density
- 26-4 Resistance and Resistivity
- 26-5 Ohm's Law
- 26-7 Power in Electric Circuits

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**26-4 Resistance and Resistivity**  
**m2-062**

If a wire is stretched uniformly to  $n$ -times its original length, its resistance changes by a factor of:

- A)  $n^2$
- B)  $n$
- C)  $1/n$
- D)  $2n$
- E) no change

Answer A

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**26-4 Resistance and Resistivity**  
**m2-061**

A heater of unknown resistance is plugged into a 120-V line. The charge passing through it in one hour is 4800 C. What is the resistance of the heater?

- A) 160  $\Omega$
- B) 120  $\Omega$
- C) 90  $\Omega$
- D) 15  $\Omega$
- E) 1.5  $\Omega$

Answer C

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**26-4 Resistance and Resistivity**  
**m2-042**

What diameter must a copper wire have if its resistance is to be the same as that of an equal length of an aluminum wire with 3.26 mm diameter? [Resistivity of aluminum =  $2.75 \times 10^{-8}$  Ohm.m ; Resistivity of copper =  $1.69 \times 10^{-8}$  Ohm.m]

- A) 3.3 mm.
- B) 8.3 mm.
- C) 10 mm.
- D) 4.0 mm.
- E) 2.6 mm.

Answer E

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**26-4 Resistance and Resistivity**  
**m2-041**

The resistivity of nichrome wire is  $1.0 \times 10^{-6}$  Ohm.m. Calculate the length of wire needed for a 1200 watt electric heater that is connected across a 120 V potential difference. [The wire's radius is 0.40 mm]

- A) 4.5 m.
- B) 3.0 m.
- C) 1.5 m.
- D) 6.0 m.
- E) 8.0 m.

Answer D

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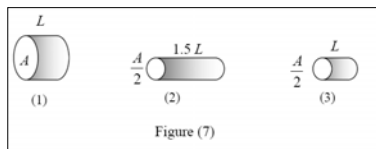
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**26-4 Resistance and Resistivity**  
**m2-041**

Figure 7 shows three cylindrical copper conductors along with their face areas and length. Rank them according to the current through them, greatest first, when the same potential difference  $V$  is placed across their lengths.

- A) 1, 2 and 3.
- B) 1, 3 and 2.
- C) 3, 2 and 1.
- D) 2, 1 and 3.
- E) 1, 3 and 3.



Answer B

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**26-5 Ohm's Law**  
**m2-062**

The potential difference across the ends of a wire is doubled in magnitude. If Ohm's law is obeyed, which one of the following statements concerning the resistance of the wire is true?

- A) The resistance decreases by a factor of four.
- B) The resistance is one half of its original value.
- C) The resistance is twice its original value.
- D) The resistance increases by a factor of four.
- E) The resistance is not changed.

Answer E

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**26-7 Power in Electric Circuits**  
**m2-062**

A 40-W and a 60-W light bulbs are designed for use with the same voltage. What is the ratio of the resistance of the 60-W bulb to the resistance of the 40-W bulb?

- A) 3.0
- B) 2.3
- C) 0.67
- D) 1.5
- E) 0.44

Answer C

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**26-7 Power in Electric Circuits**  
**m2-061**

A 100 W bulb is designed to operate with a line voltage of 120-V. If the line voltage decreases and the bulb consumes only 90 W, find the final voltage in the line. Assuming the resistance of the bulb is constant.

- A) 114 V
- B) 110 V
- C) 100 V
- D) 94 V
- E) 135 V

Answer A

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**26-7 Power in Electric Circuits**  
**m2-042**

A 500 W electric heater is designed to operate from a 120-V power supply. The line voltage decreases and the heater takes only 459 W. Find the voltage drop in the line voltage (Assuming the resistance is constant).

- A) 5 Volts.
- B) 10 Volts.
- C) 15 Volts.
- D) 3 Volts.
- E) 2 Volts.

Answer A

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**26-7 Power in Electric Circuits**  
**m2-041**

A heating coil is immersed in a 0.2 kg of cold water. The coil is connected to a 12 V supply and a current of 5 A flows for 140 seconds. Calculate the temperature increase of the water. [Specific heat of water is 4200 J/(kg.K)]

- A) 15 K.
- B) 30 K.
- C) 5 K.
- D) 12 K.
- E) 10 K.

Answer E

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