Skill 40-Ohm's Law

107. An electric circuit consists of a variable resistor connected to a source of constant potential difference. If the resistance of the resistor is doubled, the current through the resistor is

A) halved B) doubled
C) quartered D) quadrupled

$V=IR$ $I=\frac{V}{R}$ Inverse

108. In a simple electric circuit, a 24-ohm resistor is connected across a 6.0-volt battery. What is the current in the circuit?

A) 1.0 A B) 0.25 A
C) 140 A D) 4.0 A

$R=24\Omega$ $V=6V$ $I=?$ $I=\frac{V}{R}=\frac{6V}{24\Omega}$

109. What is the current in a 100.-ohm resistor connected to a 0.40-volt source of potential difference?

A) 250 mA B) 40. mA
C) 2.5 mA D) 4.0 mA

$I=?$ $R=100\Omega$ $V=.4V$ $I=\frac{V}{R}=\frac{.4V}{100\Omega}=.004A$ $=4mA$

110. A 6.0 ohm resistor that obeys Ohm's Law is connected to a source of variable potential difference. When the applied voltage is decreased from 12 V to 6.0 V, the current passing through the resistor

A) remains the same
B) is doubled
C) is halved
D) is quadrupled

V	I	R
12V	2A	6Ω
6V	1A	6Ω

111. In a flashlight, a battery provides a total of 3.0 volts to a bulb. If the flashlight bulb has an operating resistance of 5.0 ohms, the current through the bulb is

A) 0.30 A B) 0.60 A
C) 1.5 A D) 1.7 A

$I=\frac{V}{R}=\frac{3V}{5\Omega}=.6A$

112. In a simple electric circuit, a 110-volt electric heater draws 2.0 amperes of current. The resistance of the heater is

A) 0.018 Ω B) 28 Ω
C) 55 Ω D) 220 Ω

$V=110V$ $I=2A$ $R=?$ $R=\frac{V}{I}=\frac{110V}{2A}=55\Omega$

113. How much current flows through a 12-ohm flashlight bulb operating at 3.0 volts?

A) 0.25 A B) 0.75 A
C) 3.0 A D) 4.0 A

$I=\frac{V}{R}=\frac{3V}{12\Omega}=.25A$

114. What is the current through a 25 ohm resistor connected to a 5.0 volt power supply?

A) 0.20 A B) 5.0 A
C) 25 A D) 30. A

$I=\frac{V}{R}=\frac{5V}{25\Omega}$

115. What is the potential difference across a 2.0-ohm resistor that draws 2.0 coulombs of charge per second?

A) 1.0 V B) 2.0 V
C) 3.0 V D) 4.0 V

$V=?$ $R=2\Omega$ $q=2C$ $t=1s$ $I=2A$ $V=IR$ $=(2A)(2\Omega)$ $=4V$

116. A 20.-ohm resistor has 40. coulombs passing through it in 5.0 seconds. The potential difference across the resistor is

A) 8.0 V B) 100 V
C) 160 V D) 200 V

$R = 20\Omega$
$q = 40C$, $t = 5s$, $I = 8A$
$V = IR$
$V = (8A)(20\Omega) = 160V$

117. The ratio of the potential difference across a conductor to the current in the conductor is called

A) conductivity B) resistance
C) charge D) power

$\frac{V}{I} = R$

118. If the potential difference across a 12-ohm resistor is 4 volts, the current through the resistor is

A) 1/3 A B) 1/2 A
C) 3 A D) 4 A

$V = 4V$
$R = 12\Omega$
$I = ?$
$I = V/R = \frac{4V}{12\Omega} = .33A$

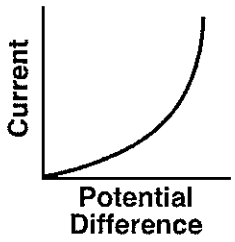
119. A lamp has a current of 2.0 amperes at 6.0 volts. The resistance of the lamp must be

A) 1.5 Ω B) 6.0 Ω
C) 3.0 Ω D) 12 Ω

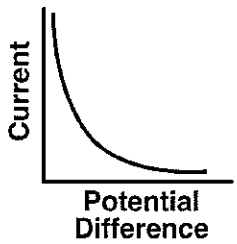
$I = 2A$
$V = 6V$
$R = V/I = \frac{6V}{2A} = 3\Omega$

120. The resistance of a circuit remains constant. Which graph best represents the relationship between the current in the circuit and the potential difference provided by the battery?

A)

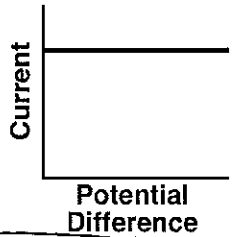


B)

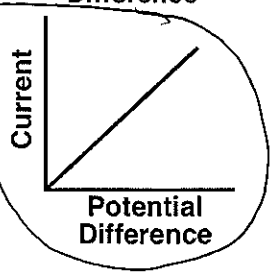


$I = V/R$

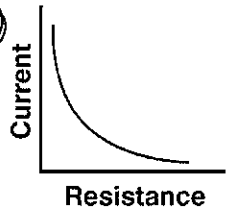
C)

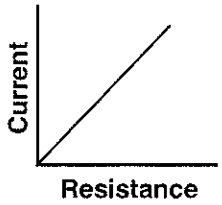


D)

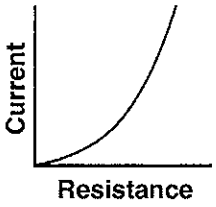


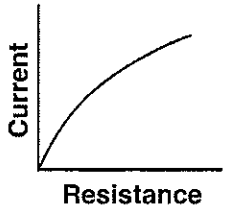
121. A constant potential difference is applied across a variable resistor held at constant temperature. Which graph best represents the relationship between the resistance of the variable resistor and the current through it?

A)


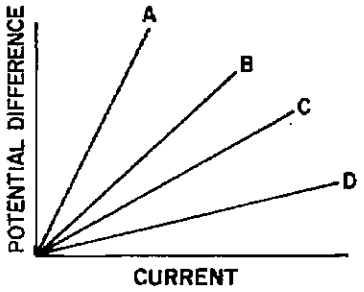
B)


$I = V/R$

C)


D)


122. The graph below shows the relationship between current and potential difference for four resistors *A*, *B*, *C*, and *D*.

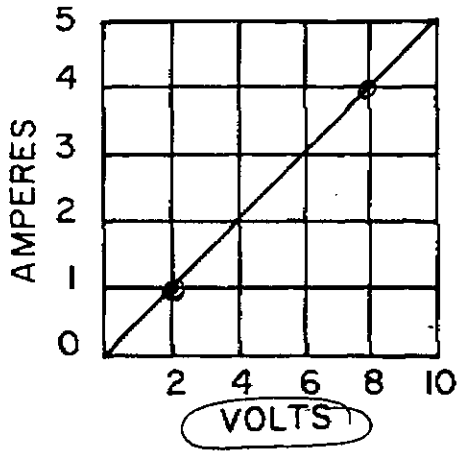


$\frac{V}{I} = R$ Slope

Which resistor has the greatest resistance?

A) *A* B) *B* C) *C* D) *D*

123. Base your answer to the following question on the graph below which represents data obtained by applying different potential differences to a metallic conductor at a constant temperature.



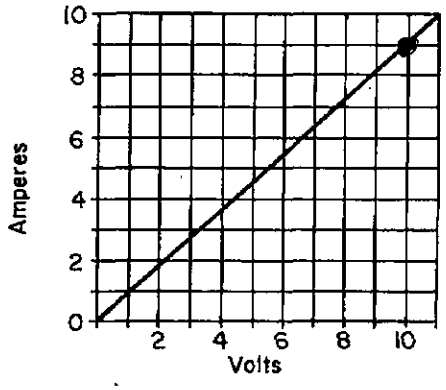
$R = V/I$

The resistance of the conductor is approximately

A) 1.0 Ω B) 2.0 Ω
C) 0.5 Ω D) 4.0 Ω

$\frac{8\text{V} - 2\text{V}}{4\text{A} - 1\text{A}} = \frac{6\text{V}}{3\text{A}} = 2\,\Omega$

124. Base your answer to the following question on the accompanying graph which shows the data collected for a copper wire at a constant temperature.



The resistance of the wire is closest to

A) $1\,\Omega$
B) $2\,\Omega$
C) $0.5\,\Omega$
D) $4\,\Omega$

$R = V/I$