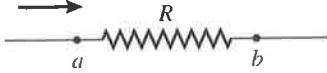
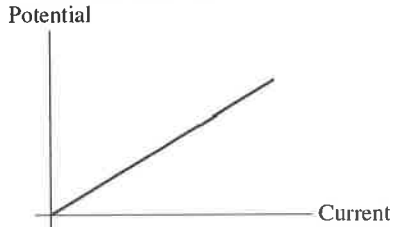


**Chapter 21 Honors Review**

## 21.1 Conceptual Questions

- \_\_\_\_\_ 1) If a quantity you calculated has units of  $A \cdot s$ , what is that quantity?
- A) potential
  - B) resistivity
  - C) resistance
  - D) capacitance
  - E) charge
- \_\_\_\_\_ 2) When a current flows through a metal wire, the moving charges are
- A) only protons.
  - B) only electrons.
  - C) both protons and electrons.
  - D) positive metal ions.
  - E) negative metal ions.
- \_\_\_\_\_ 3) When a current flows through an ionic liquid such as salty water, the moving charges are
- A) only protons.
  - B) only electrons.
  - C) only negative ions.
  - D) only positive ions.
  - E) both positive and negative ions.
- \_\_\_\_\_ 4) The figure shows electrons passing through a resistor. The arrow shows the direction in which the electrons are moving. Which of the following statements are correct? (There could be more than one correct choice.)
- Electrons  
→
- 
- The diagram shows a horizontal wire with a resistor labeled 'R' between two points, 'a' and 'b'. An arrow labeled 'Electrons' points from point 'a' towards point 'b'.
- A) The electrons are moving slower at point  $b$  than at point  $a$ .
  - B) The electric potential is higher at point  $b$  than at point  $a$ .
  - C) The electric potential is lower at point  $b$  than at point  $a$ .
  - D) The electrons are losing electric potential energy as they move through the resistor from  $a$  to  $b$ .
  - E) The speed of the electrons at point  $b$  is the same as it is at point  $a$ .

- \_\_\_\_\_ 5) For the graph shown in the figure, what physical quantity does the slope of the graph represent for ohmic material?



- A) power  
B) resistivity  
C)  $1/(\text{resistivity})$   
D) resistance  
E)  $1/(\text{resistance})$
- \_\_\_\_\_ 6) Which one of the following quantities is equivalent to  $1 \Omega$ ?
- A)  $1 \text{ J/s}$   
B)  $1 \text{ W/A}$   
C)  $1 \text{ V} \cdot \text{A}$   
D)  $1 \text{ V/A}$   
E)  $1 \text{ A} \cdot \text{s}$
- \_\_\_\_\_ 7) Which one of the following quantities is equivalent to  $1 \text{ W}$ ?
- A)  $1 \text{ V/A}$   
B)  $1 \Omega \cdot \text{m}$   
C)  $1 \text{ V} \cdot \text{A}$   
D)  $1 \text{ V}/\Omega$   
E)  $1 \text{ A} \cdot \text{s}$
- \_\_\_\_\_ 8) A kilowatt-hour is equivalent to
- A)  $1000 \text{ W}$ .  
B)  $3600 \text{ J}$ .  
C)  $3,600,000 \text{ J/s}$ .  
D)  $3,600,000 \text{ J}$ .  
E)  $3600 \text{ J/s}$
- \_\_\_\_\_ 9) If the resistance in a constant voltage circuit is doubled, the power dissipated by that circuit will
- A) increase by a factor of two.  
B) increase by a factor of four.  
C) decrease to one-half its original value.  
D) decrease to one-fourth its original value.
- \_\_\_\_\_ 10) Four unequal resistors are connected in series with each other. Which one of the following statements is correct about this combination?
- A) The equivalent resistance is equal to that of any one of the resistors.  
B) The equivalent resistance is equal to average of the four resistances.  
C) The equivalent resistance is less than that of the smallest resistor.  
D) The equivalent resistance is less than that of the largest resistor.  
E) The equivalent resistance is more than the largest resistance.

- \_\_\_\_\_ 11) Four unequal resistors are connected in a parallel with each other. Which one of the following statements is correct about this combination?
- A) The equivalent resistance is less than that of the smallest resistor.
  - B) The equivalent resistance is equal to the average of the four resistances.
  - C) The equivalent resistance is midway between the largest and smallest resistance.
  - D) The equivalent resistance is more than the largest resistance.
  - E) None of the other choices is correct.
- \_\_\_\_\_ 12) When unequal resistors are connected in parallel in a circuit,
- A) the same current always runs through each resistor.
  - B) the potential drop is always the same across each resistor.
  - C) the largest resistance has the largest current through it.
  - D) the power generated in each resistor is the same.
- \_\_\_\_\_ 13) When unequal resistors are connected in series across an ideal battery,
- A) the same power is dissipated in each one.
  - B) the potential difference across each is the same.
  - C) the current flowing in each is the same.
  - D) the equivalent resistance of the circuit is less than that of the smallest resistor.
  - E) the equivalent resistance of the circuit is equal to the average of all the resistances.
- \_\_\_\_\_ 14) As more resistors are added in series to a constant voltage source, the power supplied by the source
- A) increases.
  - B) decreases.
  - C) does not change.
  - D) increases for a time and then starts to decrease.
- \_\_\_\_\_ 15) When different resistors are connected in parallel across an ideal battery, we can be certain that
- A) the same current flows in each one.
  - B) the potential difference across each is the same.
  - C) the power dissipated in each is the same.
  - D) their equivalent resistance is greater than the resistance of any one of the individual resistances.
  - E) their equivalent resistance is equal to the average of the individual resistances.
- \_\_\_\_\_ 16) The lamps in a string of decorative lights are connected in parallel across a constant-voltage power source. What happens if one lamp burns out? (Assume negligible resistance in the wires leading to the lamps.)
- A) The brightness of the lamps will not change appreciably.
  - B) The other lamps get brighter equally.
  - C) The other lamps get brighter, but some get brighter than others.
  - D) The other lamps get dimmer equally.
  - E) The other lamps get dimmer, but some get dimmer than others.

## 21.2 Problems

- \_\_\_\_\_ 17) A charge of 12 C passes through an electroplating apparatus in 2.0 min. What is the average current in the apparatus?
- A) 0.10 A
  - B) 0.60 A
  - C) 1.0 A
  - D) 6.0 A
- \_\_\_\_\_ 18) How much charge must pass by a point in a wire in 10 s for the current in the wire to be 0.50 A?
- A) 20 C
  - B) 2.0 C
  - C) 5.0 C
  - D) 0.050 C
- 19) What potential difference is required across an  $8.0\text{-}\Omega$  resistor to cause 2.0 A to flow through it?
- 20) The current through a piece of lab equipment must be limited to 2.75 A when it is run by a 120-V dc power supply. What must be the resistance of this equipment?