

# PracTest Electricity

ID#

$$k = 9.0 \times 10^9 \text{ N} \cdot \text{m}^2 / \text{C}^2$$

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

$$m_p = 1.67 \times 10^{-27} \text{ kg}$$

$$m_e = 9.11 \times 10^{-31} \text{ kg}$$

Respond to the following statements by indicating that they are true for:

A=insulators only

B=both conductors and insulators

C=conductors only, or

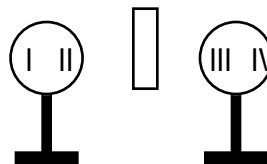
D=neither.

- Electrons can move about freely in this type of material
- Cannot become positively charged
- If charged, a brief touch will not neutralize it
- To give a negative charge to an object,
  - protons must be added to it
  - protons must be removed from it
  - electrons must be added to it
  - electrons must be removed from it
  - neutrons must be added to it
  - neutrons must be removed from it
- Just a reminder: do not write on this test. Consider charged objects A, B, C, D, E and F. If A attracts B and B repels C and C attracts D, and D repels E, and E attracts F, how will A react to F?
  - attraction
  - repulsion
  - no net effect

Consider spheres A, B, and C. A and B are conductors, and C is an insulator. Initially, all spheres are neutral and have equal masses.

- A is given a positive charge, B is given a negative charge. Which object now has more mass?
  - A
  - B
  - Same for both
- B and C are given equal positive charges, then a person touches both B and C. Which object now has more mass?
  - Same for both
  - B
  - C

A charged rod is placed between two conducting spheres as shown.



- If region II is negative, the rod is
  - positive
  - negative
  - could be either pos. or neg.

Consider an electroscope, initially charged positive (pointer needle is deflected).



- If the positive charge were removed and a negatively charged object were brought nearby, which position would the needle move to?

A.



B.



C.



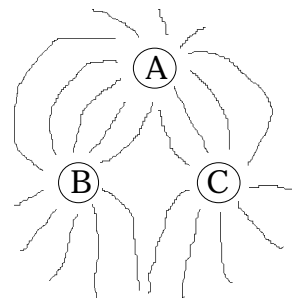
- A strip of acetate is rubbed with silk. When the acetate strip is placed on an electroscope, the needle deflects. The silk is then placed on the acetate so both are on the electroscope. The needle
  - loses its deflection; drops back to vertical
  - remains at the same deflection
  - deflects even farther than with the acetate alone

11. The SI units for electric force are
- |           |              |            |            |           |
|-----------|--------------|------------|------------|-----------|
| A. meters | B. kilograms | C. seconds | D. newtons | E. joules |
| F. watts  | G. coulombs  | H. amps    | J. ohms    | K. volts  |

**Consider two objects with the following initial conditions. The charge on each is +q, the distance between them is R, and the electric force acting between them is F.**

12. If the distance between the objects were halved, the force between them would be  
 A.  $F/16$  B.  $F/8$  C.  $F/4$  D.  $F/2$  E.  $F$  F.  $2F$  G.  $4F$  H.  $8F$  J.  $16F$
13. If the charge on both objects were doubled and the distance between the objects were halved, the force between them would be  
 A.  $F/16$  B.  $F/8$  C.  $F/4$  D.  $F/2$  E.  $F$  F.  $2F$  G.  $4F$  H.  $8F$  J.  $16F$

14. Objects A, B, and C are charged objects immersed in an insulating liquid. Grass seeds or threads float on the surface of the liquid. Suppose charge A is positive. What are the charges on B and C?
- A. B is positive and C is positive.  
 B. B is positive and C is negative.  
 C. B is negative and C is positive.  
 D. B is negative and C is negative.  
 E. This picture is not possible! Three charges cannot produce this pattern.



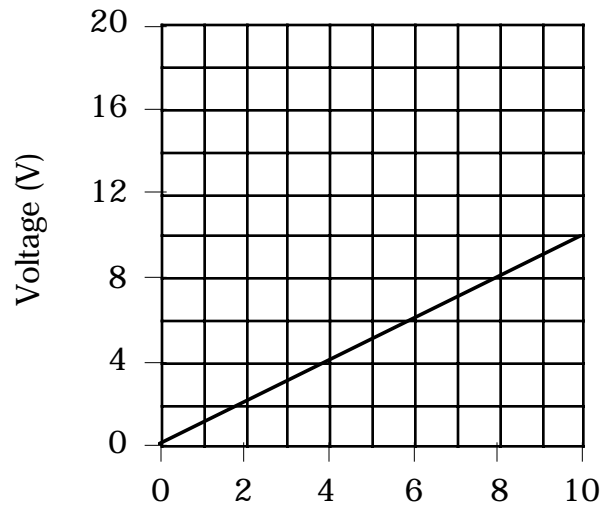
**Two positive spherical positive charges (white) have a length of thread stretched between them as shown. The black bead on the thread is charged and is at equilibrium in the position shown. The spherical charges cannot move; the thread is taut and will not flex. The bead can move only along the thread.**



15. If the bead carries a negative charge, it is in  
 A. stable equilibrium B. unstable equilibrium C. neutral equilibrium
16. James Prescott Joule  
 A. first discovered the relationship  $I=V/R$  B. first discovered the relationship  $P = IV$   
 C. investigated jumping frog legs D. developed the first battery with zinc and silver
17. Seven coulombs of charge pass through a wire in 4s. The meaning of  $7/4$  in this context is  
 A. the current in the wire  
 B. the voltage in the wire  
 C. the number of joules in each coulomb of charge that passes through the wire  
 D. the number of coulombs that pass through the wire in each second  
 E. the number of coulombs required to transfer each joule of energy  
 F. the number of seconds required for each coulomb to pass through the wire
18. In 4s,  $2C$  of charge pass through a circuit connected to a 24V battery. The number of joules delivered each second is best represented by the number  
 A. 0.5 B. 4 C. 8 D. 12 E. 24 F. 48
19. In a simple circuit, current flows from the  $_{-}$  terminal of the battery to the  $_{+}$  terminal of the battery.  
 A. positive; negative B. negative; positive C. positive; positive D. negative; negative
20. The unit of electromotive force (emf) is the  
 A. coulomb B. volt C. ampere D. ohm E. newton F. watt
21. Which of the following is equivalent to an amp-minute?  
 A.  $0.017A/s$  B.  $0.017C/s$  C.  $0.017C$  D.  $60A/s$  E.  $60C/s$  F.  $60C$
22. How long does it take for  $8C$  to pass a point in a wire that carries  $2A$  of current?  
 A. 0.25s B. 0.5s C. 2s D. 4s E. 16s F. 32s

23. Consider two circuits, A and B. Both circuits have the same voltage, but B has more current. The circuit with more resistance is circuit  
 A. A    B. B    C. Same for both
24. How much current passes through a  $24\Omega$  circuit when 12V are applied?  
 A. 21mA      B. 0.5A      C. 2.0A      D. 6.0A      E. 288A      F. 3.5kA
25. Consider two circuits, A and B. Each circuit has the same voltage, but circuit B has more resistance. The circuit that uses the most power is circuit  
 A. A    B. B    C. Same for both
26. Consider two circuits, A and B. Each circuit has the same resistance, but circuit B has more voltage. The circuit that uses the most power is circuit  
 A. A    B. B    C. Same for both
27. What is the voltage across a device that draws 2A and dissipates 12W?  
 A. 167mV      B. 408mV      C. 2.45V      D. 6V      E. 24V      F. 48V
28. What is the resistance of a circuit element that dissipates 12W when drawing 4A of current?  
 A.  $27m\Omega$       B.  $0.33\Omega$       C.  $0.75\Omega$       D.  $1.33\Omega$       E.  $3\Omega$       F.  $36\Omega$

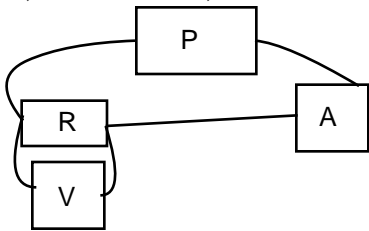
29. A variable power supply was connected to a resistor. The voltage and current were varied, and the results were plotted on the graph shown to the right.



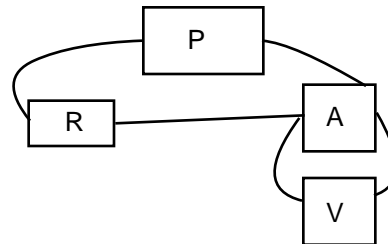
What was the resistance of the resistor?  
 A.  $0.25\Omega$   
 B.  $0.50\Omega$   
 C.  $1.0\Omega$   
 D.  $2.0\Omega$   
 E.  $4.0\Omega$   
 F.  $8.0\Omega$

30. Which of the diagrams shows the wiring in the Ohm, Ohm on the Range lab? P = power supply, R = resistor, A = ammeter, V = voltmeter.

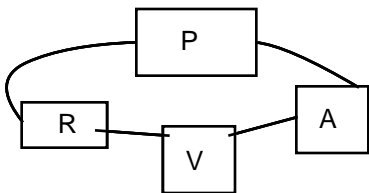
A.



B.



C.



D.

