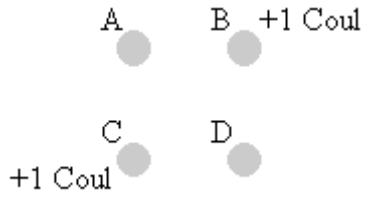
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Electricity Review (Take at Home) Test
Planet Holloway Physics

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Four charges are at the corners of a square, with B and C on oppositecorners. Charges A and D, on the other two corners, have equal charge, while both B and C have a charge of +1.0 C. What is the charge on A so that the force on B is zero?



a. −1.0 C
b. −0.50 C
c. −0.35 C
d. −0.71 C
e. −1.42 C

____ 2. Charge A and charge B are 3.00 m apart, and charge A is +2.00 C and charge B is +3.00 C. Charge C is located between them at a certain point and the force on charge C is zero. How far from charge A is charge C?
a. 0.555 m
b. 0.667 m
c. 1.35 m
d. 1.50 m
e. 1.80 m

____ 3. A 6.0 μC charge is placed at the origin and a second charge is placed on the x-axis at x = 0.30 m. If the resulting force on the second charge is 5.4 N in the positive x-direction, what is the value of its charge?
a. 9.0 μC
b. 9.0 nC
c. -9.0 μC
d. -9.0 nC
e. 90 nC

____ 4. Two point charges each have a value of 30.0 mC and are separated by a distance of 4.00 cm. What is the electric field midway between the two charges? ($k_e = 8.99 \times 10^9$ N·m^2/C^2)
a. 40.5×10^7 N/C
b. 20.3×10^7 N/C
c. 10.1×10^7 N/C
d. 5.1×10^7 N/C
e. zero

____ 5. Two point charges are separated by 10.0 cm and have charges of +2.00 μC and −2.00 μC, respectively. What is the electric field at a point midway between the two charges? ($k_e = 8.99 \times 10^9$ N·m^2/C^2)
   a. 28.8×10^6 N/C
   b. 14.4×10^6 N/C
   c. 7.19×10^6 N/C
   d. 3.59×10^6 N/C
   e. zero

____ 6. An electron (charge -1.6×10^{-19} C) moves on a path perpendicular to the direction of a uniform electric field of strength 3.0 N/C. How much work is done on the electron as it moves 15 cm?
   a. 4.8×10^{-20} J
   b. -4.8×10^{-20} J
   c. 1.6×10^{-20} J
   d. -1.6×10^{-20} J
   e. zero

____ 7. A proton ($+1.6 \times 10^{-19}$ C) moves 10 cm on a path in the direction of a uniform electric field of strength 3.0 N/C. How much work is done on the proton by the electrical field?
   a. 4.8×10^{-20} J
   b. -4.8×10^{-20} J
   c. 1.6×10^{-20} J
   d. -1.6×10^{-20} J
   e. zero

____ 8. A uniform electric field, with a magnitude of 600 N/C, is directed parallel to the positive *x-axis*. If the potential at $x = 3.0$ m is 1 000 V, what is the change in potential energy of a proton as it moves from $x = 3.0$ m to $x = 1.0$ m? ($q_p = 1.6 \times 10^{-19}$ C)
   a. 8.0×10^{-17} J
   b. 1.9×10^{-16} J
   c. 0.80×10^{-21} J
   d. 500 J
   e. 2.2×10^{-15} J

____ 9. In which case does an electric field do positive work on a charged particle?
   a. a negative charge moves opposite to the direction of the electric field.
   b. a positive charge is moved to a point of higher potential energy.
   c. a positive charge completes one circular path around a stationary positive charge.
   d. a positive charge completes one elliptical path around a stationary positive charge.
   e. a negative charge moves in the direction of the electric field.

____ 10. If the distance between two negative point charges is increased by a factor of three, the resultant potential energy is what factor times the initial potential energy?
   a. 3.0
   b. 9.0
   c. 1/3
   d. 1/9
   e. 1

____ 11. Find the electrical potential at 0.15 m from a point charge of 6.0 μC. ($k_e = 8.99 \times 10^9$ N·m^2/C^2)
a. 5.4×10^4 V
b. 3.6×10^5 V
c. 2.4×10^6 V
d. 1.2×10^7 V
e. 1.8×10^7 V

____ 12. Two point charges of values +3.4 and +6.6 μC, respectively, are separated by 0.20 m. What is the potential energy of this 2-charge system? ($k_e = 8.99 \times 10^9$ N·m^2/C^2)
a. +0.34 J
b. −0.75 J
c. +1.0 J
d. −3.4 J
e. +0.75 J

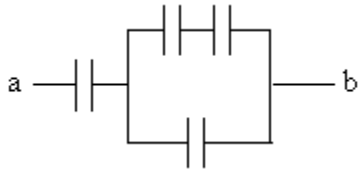
____ 13. Doubling the voltage across a parallel plate capacitor does not double which of the following?
a. the charge
b. the electric field between the plates
c. the energy stored
d. the electric force on the plates
e. both a and b

____ 14. Three capacitors of 1.0, 1.5, and 2.0 μF are connected in series. Find the combined capacitance.
a. 4.5 μF
b. 4.0 μF
c. 2.2 μF
d. 0.46 μF
e. 0.24 μF

____ 15. If three 4.0-μF capacitors are connected in parallel, what is the combined capacitance?
a. 12 μF
b. 0.75 μF
c. 8.0 μF
d. 0.46 μF
e. 5.5 μF

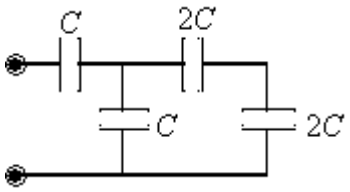
____ 16. Two capacitors with capacitances of 1.5 and 0.25 μF, respectively, are connected in parallel. The system is connected to a 50-V battery. What charge accumulates on the 1.5-μF capacitor?
a. 100 μC
b. 75 μC
c. 50 μC
d. 33 μC
e. 25 μC

____ 17. What is the equivalent capacitance between points a and b? All capacitors are 1.0 μF.



a. 4.0 μF
b. 1.7 μF
c. 0.60 μF
d. 0.25 μF
e. 0.50 μF

____ 18. If C = 36 μF, determine the equivalent capacitance for the combination shown.



a. 36 μF
b. 32 μF
c. 28 μF
d. 24 μF
e. 20 μF

____ 19. The size of the electric current in an electrical conductor is a function of which of the following?
a. velocity of charge carriers
b. conductor cross sectional area
c. density of charge carriers
d. conductor length
e. All of the above choices are valid.

____ 20. You measure a 25.0-V potential difference across a 5.00-Ω resistor. What is the current flowing through it?
a. 125 A
b. 5.00 A
c. 4.00 A
d. 1.00 A
e. 0.125 A

____ 21. A 60-W light bulb is in a socket supplied with 120 V. What is the current in the bulb?
a. 0.50 A
b. 2.0 A
c. 60 A
d. 7 200 A
e. 10 000 A

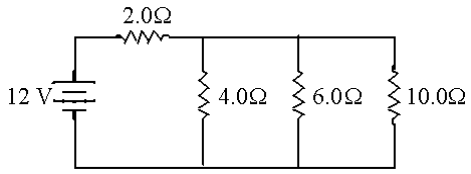
____ 22. If a lamp has resistance of 120 Ω when it operates at 100 W, what is the applied voltage?
a. 110 V
b. 120 V
c. 125 V
d. 220 V
e. 280 V

____ 23. A light bulb has resistance of 240 Ω when operating at 120 V. Find the current in the light bulb.
a. 2.0 A
b. 1.0 A
c. 0.50 A
d. 0.20 A
e. 0.30 A

____ 24. The internal resistances of an ideal voltmeter and an ideal ammeter are respectively (*ideal* meaning the behavior of the system is not changed when using the meter):
a. zero and zero.
b. infinite and infinite.
c. zero and infinite.
d. infinite and zero.
e. Both resistances are finite and non-zero.

____ 25. Three resistors, with values of 2.0, 4.0 and 8.0 Ω, respectively, are connected in series. What is the overall resistance of this combination?
a. 0.58 Ω
b. 1.1 Ω
c. 7.0 Ω
d. 14.0 Ω
e. 19.0 Ω

____ 26. Three resistors connected in parallel have individual values of 4.0, 6.0 and 10.0 Ω, respectively. If this combination is connected in series with a 12-V battery and a 2.0-Ω resistor, what is the current in the 10-Ω resistor?

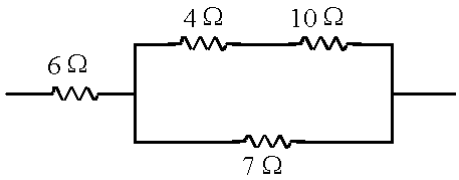


a. 0.59 A
b. 1.0 A
c. 11 A
d. 16 A
e. 23 A

____ 27. Two resistors of values 6.0 and 12.0 Ω are connected in parallel. This combination in turn is hooked in series with a 4.0-Ω resistor. What is the overall resistance of this combination?

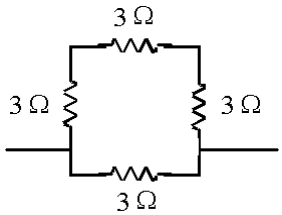
a. 0.50 Ω
b. 2.0 Ω
c. 8.0 Ω
d. 22.0 Ω
e. 34.0 Ω

____ 28. Resistors of values 6.0Ω, 4.0Ω, 10.0Ω and 7.0Ω are combined as shown. What is the equivalent resistance for this combination?



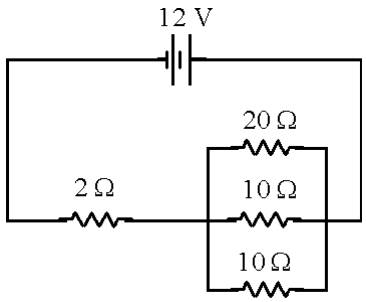
a. 2.3 Ω
b. 3.0 Ω
c. 10.7 Ω
d. 27 Ω
e. 30 Ω

____ 29. What is the equivalent resistance for these 3.00-Ω resistors?



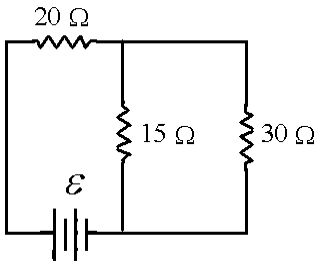
a. 1.33 Ω
b. 2.25 Ω
c. 3.00 Ω
d. 7.50 Ω
e. 9.00 Ω

____ 30. How much current is flowing in one of the 10-Ω resistors?



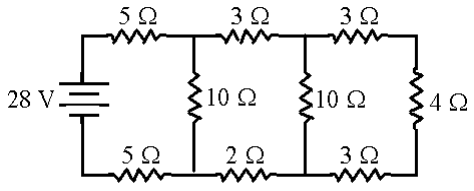
a. 0.8 A
b. 2.0 A
c. 1.6 A
d. 2.4 A
e. 2.8 A

____ 31. If ε = 9.0 V, what is the current in the 15-Ω resistor?



a. 0.20 A
b. 0.30 A
c. 0 10 A
d. 0.26 A
e. 0.15 A

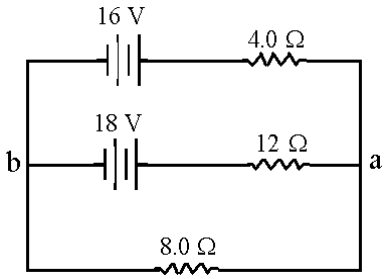
____ 32. Consider the circuit shown in the figure. What power is dissipated by the entire circuit?



a. 14 W
b. 28 W
c. 52 W
d. 112 W
e. 169 W

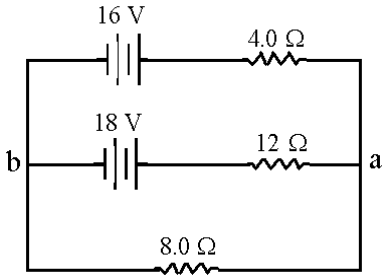
____ 33. Resistors of values 8.0 Ω, 12.0 Ω, and 24.0 Ω are connected in parallel across a fresh battery. Which resistor dissipates the greatest power?
a. the 8.0-Ω resistor
b. the 12.0-Ω resistor
c. the 24.0-Ω resistor
d. All dissipate the same power when in series.
e. The answer depends on the internal resistance of the battery.

____ 34. What is the current through the 8-Ω resistor?



a. 1.0 A
b. 0.50 A
c. 1.5 A
d. 2.0 A
e. 2.5 A

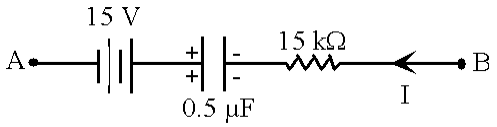
____ 35. What is the potential difference between points a and b?



a. 6 V
b. 8 V
c. 12 V
d. 24 V
e. 27 V

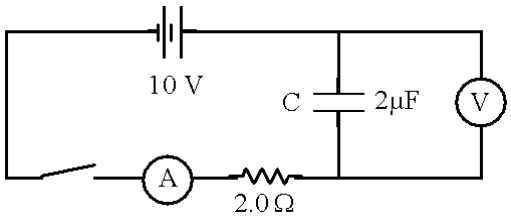
____ 36. In a circuit, a current of 2.0 A is drawn from a battery. The current then divides and passes through two resistors in parallel. One of the resistors has a value of 64 Ω and the current through it is 0.40 A. What is the value of the other resistor?
a. 8.0 Ω
b. 16 Ω
c. 24 Ω
d. 32 Ω
e. 40 Ω

____ 37. In the circuit segment shown if I = 7 mA and Q = 50 μC, what is the potential difference, $V_A - V_B$?



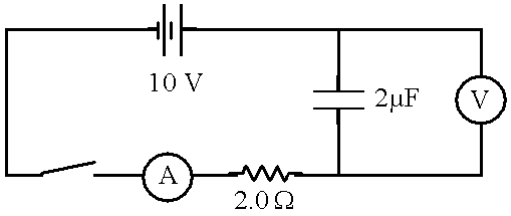
a. −40 V
b. +40 V
c. +20 V
d. −20 V
e. −15 V

____ 38. A 10-V-emf battery is connected in series with the following: a 2-μF capacitor, a 2-Ω resistor, an ammeter, and a switch, initially open; a voltmeter is connected in parallel across the capacitor. At the instant the switch is closed, what are the current and capacitor voltage readings, respectively?



a. zero A, 10 V
b. zero A, zero V
c. 5 A, zero V
d. 5 A, 10 V
e. 20 A, 10 V

____ 39. A 10-V-emf battery is connected in series with the following: a 2-μF capacitor, a 2-Ω resistor, an ammeter, and a switch, initially open; a voltmeter is connected in parallel across the capacitor. After the switch has been closed for a relatively long period (several seconds, say), what are the current and capacitor voltage readings, respectively?



a. zero A, 10 V
b. zero A, zero V
c. 5 A, zero V
d. 5 A, 10 V
e. 20 A, 10 V

____ 40. A hair dryer draws 1 200 W, a curling iron draws 800 W, and an electric light fixture draws 500 W. If all three of these appliances are operating in parallel on a 120-V circuit, what is the total current drawn?

a. 19.4 A
b. 20.8 A
c. 25.4 A
d. 36.7 A
e. 63.8 A