Physics G12- Q3W6-Electric currents-Test

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

____ 1. What is the potential difference across a 5.0 Ω resistor that carries a current of 5.0 A?
a. 10.0 V
b. 1.0 V
c. 1.0×10^{2} V
d. 25 V

____ 2. When compared in a given time interval with other lightbulbs connected to a 120 V circuit, a 60 W lightbulb
a. converts more electrical energy to heat and light than a 100 W lightbulb.
b. converts less electrical energy to heat and light than a 100 W lightbulb.
c. converts the same electrical energy to heat and light as a 40 W lightbulb.
d. converts less electrical energy to heat and light than a 40 W lightbulb.

____ 3. What effect will be produced on a capacitor if the separation between the plates is increased?
a. It will decrease the capacitance.
b. It will decrease the charge.
c. It will increase the capacitance.
d. It will increase the charge.

____ 4. When you flip a switch to turn on a light, the delay time before the light turns on is determined by
a. the drift speed of the electrons in the wire.
b. the resistance of the wire.
c. the speed of the electric field moving in the wire.
d. the number of electron collisions per second in the wire.

____ 5. A flashlight bulb with a potential difference of 4.5 V across it has a resistance of 8.0 Ω. How much current is in the bulb filament?
a. 0.56 A
b. 36 A
c. 9.4 A
d. 1.8 A

____ 6. Which of the following is *not* a characteristic of electrical potential energy?
a. It results from the interaction between charges.
b. It results from a single charge.
c. It is associated with a charge in an electric field.
d. It is a form of mechanical energy.

____ 7. A parallel-plate capacitor has a capacitance of *C* F. If the area of the plates is doubled while the distance between the plates is halved, the new capacitance will be
a. $\frac{C}{2}$.
b. $\frac{C}{4}$.
c. *4C*.
d. *2C*.

____ 8. Which of the following does *not* affect a material's resistance?
a. the temperature of the material
b. the length of the material
c. the type of material
d. Ohm's law

____ 9. If the current through a 5.00×10^{2} W heater is 4.00 A, what is the potential difference across the ends of the heating element?
a. 2.50×10^{1} V
b. 8.00×10^{-3} V
c. 2.00×10^{3} V
d. 1.25×10^{2} V

____ 10. A steam turbine at an electric power plant delivers 4500 kW of power to an electrical generator that converts 95 percent of this mechanical energy into electrical energy. What is the current delivered by the generator if it delivers energy at 3600 V?
a. 1.2×10^{3} A
c. 0.66×10^{3} A

b. 5.9×10^3 A
d. 1.0×10^3 A

____ 11. If a lamp has a resistance of 136 Ω when it operates at a power of 1.00×10^2 W, what is the potential difference across the lamp?
a. 125 V
c. 117 V
b. 136 V
d. 220 V

____ 12. When electrons move through a metal conductor,
a. they move at the speed of light in a vacuum.
b. they move in a straight line through the conductor.
c. they move in zigzag patterns because of repeated collisions with the vibrating metal atoms.
d. the temperature of the conductor decreases.

____ 13. If a 325 W heater has a current of 6.0 A, what is the resistance of the heating element?
a. 54 Ω
c. 88 Ω
b. 9.0 Ω
d. 4.5 Ω

____ 14. A lightbulb has a resistance of 240 Ω when operating at 120 V. What is the current in the lightbulb?
a. 0.50 A
c. 1.0 A
b. 0.20 A
d. 2.0 A

____ 15. When a capacitor discharges,
a. charges move from one plate to the other until equal and opposite charges accumulate on the two plates.
b. it must be attached to a battery.
c. it cannot be connected to a material that conducts.
d. charges move through the circuit from one plate to the other until both plates are uncharged.

____ 16. Which of the following wires would have the *least* resistance, assuming that all of the wires have the same cross-sectional area?
a. an iron wire 5 cm in length
c. a copper wire 10 cm in length
b. an iron wire 10 cm in length
d. a copper wire 5 cm in length

____ 17. A blow dryer draws 11 A when it is connected to 125 V. If electrical energy costs \$0.090/kW•h, what is the cost of using the blow dryer for exactly 15 min?
a. \$0.12
c. \$0.33
b. \$0.064
d. \$0.032

____ 18. Increasing the potential difference between the plates of a capacitor will produce what effect on the capacitor?
a. It will decrease the charge on each plate.
b. It will increase the capacitance.
c. It will increase the charge on each plate.
d. It will decrease the capacitance.

____ 19. When a positive charge moves in the direction of the electric field, what happens to the electrical potential energy associated with the charge?
a. It decreases.
b. It remains the same.
c. It sharply increases, and then decreases.
d. It increases.

____ 20. Tripling the current in a circuit with constant resistance has the effect of changing the power by what factor?
a. 3
c. $\frac{1}{9}$
b. 9
d. $\frac{1}{3}$

____ 21. Which process will double the power dissipated by a resistor?
a. doubling the current and making the resistance half as big
b. doubling the current while making the potential difference half as big
c. doubling the current while doubling the resistance
d. doubling the current and doubling the potential difference

____ 22. A color TV draws about 2.5 A when it is connected to a 120 V outlet. Assuming electrical energy costs \$0.060 per kW•h, what is the cost of running the TV for exactly 8 h?
a. \$0.03
b. \$0.30
c. \$0.014
d. \$0.14

____ 23. A 0.50 μF capacitor is connected to a 12 V battery. Use the expression $PE = \frac{1}{2}C(\Delta V)^2$ to determine how much electrical potential energy is stored in the capacitor.
a. 3.6×10^{-5} J
b. 1.0×10^{-5} J
c. 3.0×10^{-6} J
d. 6.0×10^{-6} J

____ 24. If a 75 W lightbulb operates at a voltage of 120 V, what is the current in the bulb?
a. 1.6 A
b. 1.95×10^{2} A
c. 9.0×10^{3} A
d. 0.62 A

____ 25. When comparing the net charge of a charged capacitor with the net charge of the same capacitor when it is uncharged, the net charge is
a. greater in the charged capacitor.
b. greater or less in the charged capacitor, but never equal.
c. equal in both capacitors.
d. less in the charged capacitor.

____ 26. A 0.25 μF capacitor is connected to a 9.0 V battery. What is the charge on the capacitor?
a. 1.2×10^{-12} C
b. 2.5×10^{-6} C
c. 2.2×10^{-6} C
d. 2.8×10^{-2} C

____ 27. The energy gained by electrons as they are accelerated by an electric field is
a. less than the average loss in energy due to collisions.
b. not affected by the gain in energy due to collisions.
c. greater than the average loss in energy due to collisions.
d. equal to the average loss in energy due to collisions.

____ 28. The amount of charge that moves through the filament of a lightbulb in 2.00 s is 2.67 C. What is the current in the lightbulb?
a. 1.33 A
b. 5.34 A
c. 0.417 A
d. 0.835 A

____ 29. Two positive point charges are initially separated by a distance of 2 cm. If their separation is increased to 6 cm, the resultant electrical potential energy is equal to what factor multiplied by the initial electrical potential energy?
a. 3
b. $\frac{1}{9}$
c. 9
d. $\frac{1}{3}$

____ 30. Which set of information will allow you to calculate the kilowatt•hr usage?
a. the voltage and current in the circuit
b. the voltage and the resistance of the circuit
c. the current and the time the circuit operates
d. the resistance, the current, and the time the circuit operates

____ 31. If the measured resistance of a lamp is 45 Ω when it operates at a power of 80.0 W, what is the current in the lamp?

a. 0.56A
b. 0.75A
c. 1.3 A
d. 1.8 A

____ 32. A microwave draws 5.0 A when it is connected to a 120 V outlet. If electrical energy costs $0.090 per kW•h, what is the cost of running the microwave for exactly 6 h?

a. $2.70
b. $0.32
c. $1.60
d. $0.72

____ 33. The power ratings on lightbulbs are measures of the

a. amount of negative charge passing through them.
b. density of the charge carriers.
c. rate that they give off heat and light.
d. voltage they require.

____ 34. A high-voltage transmission line carries 1000 A at 700 000 V. What is the maximum power carried in the line?

a. 70 MW
b. 100 MW
c. 400 MW
d. 700 MW

____ 35. Charge buildup between the plates of a capacitor stops when

a. there is no net charge on the plates.
b. the potential difference between the plates is equal to the applied potential difference.
c. the charge on both plates is the same.
d. unequal amounts of charge accumulate on the plates.

____ 36. An electric toaster requires 1100 W at 110 V. What is the resistance of the heating coil?

a. 10 Ω
b. 9.0 Ω
c. 11 Ω
d. 3.3 Ω

____ 37. The current in an electron beam in a cathode-ray tube is 7.0×10^{-5} A. How much charge hits the screen in 5.0 s?

a. 5.3×10^{-6} C
b. 2.8×10^{3} C
c. 5.6×10^{-2} C
d. 3.5×10^{-4} C

____ 38. In a conductor that carries a current, the drift speed of an electron is

a. less than the average speed of the electron between collisions.
b. approximately equal to the speed of light.
c. greater than the average speed of the electron between collisions.
d. equal to the average speed of the electron between collisions.

____ 39. How much does it cost to operate a 695 W heater for exactly 30.0 min if electrical energy costs $0.060 per kW•h?

a. $0.02
b. $0.18
c. $0.90
d. $0.36

____ 40. How is current affected if the time interval over which the charge passes through a given area decreases while the amount of charge remains the same?

a. The current increases.
b. The current is not affected.
c. The current decreases.
d. The current initially increases and then is gradually restored.

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