

Name: _____

Grade 9 Academic Science: Unit Test - Electricity Answer Sheet

Part A: Circle the correct answer:

- | | | | | | | | | | |
|-----|---|---|---|---|-----|---|---|---|---|
| 1. | A | B | C | D | 11. | A | B | C | D |
| 2. | A | B | C | D | 12. | A | B | C | D |
| 3. | A | B | C | D | 13. | A | B | C | D |
| 4. | A | B | C | D | 14. | A | B | C | D |
| 5. | A | B | C | D | 15. | A | B | C | D |
| 6. | A | B | C | D | 16. | A | B | C | D |
| 7. | A | B | C | D | 17. | A | B | C | D |
| 8. | A | B | C | D | 18. | A | B | C | D |
| 9. | A | B | C | D | 19. | A | B | C | D |
| 10. | A | B | C | D | 20. | A | B | C | D |

Part A Multiple Choice (Circle the correct answer on the answer sheet)

1. A circuit breaker is connected:
a) in series with the live wire b) in parallel with the live wire
c) in series with the neutral wire d) in parallel with the neutral wire
2. Which of the following is **not** a renewable energy source?
a) solar energy b) wind
c) nuclear energy d) gravitational potential of water
3. The SI unit for **power** is the:
a) watt b) joule c) ampere d) volt
4. The joule is not a practical method for measuring energy in everyday use because it is:
a) too large b) too small c) difficult to measure d) not important
5. The amount of electrical energy used by a circuit depends on the:
a) voltage b) current c) operation time d) a, b and c
6. An atom contains:
a) only positive charges b) only negative charges
c) positive and negative charges d) no charges
7. A positively charged object has:
a) gained protons b) gained electrons c) lost protons d) lost electrons
8. The law of electric charges states:
a) unlike charges repel b) like charges repel
c) like charges attract d) neutral objects repel
9. An ammeter measures:
a) electric current b) power c) resistance d) voltage
10. Two bulbs are connected in a parallel circuit to a dry cell. If one bulb burns out, the brightness of the other bulb will:
a) decrease b) increase c) become zero d) remain the same

11. The load in a circuit converts electrical energy into:
 a) light energy b) heat energy c) mechanical energy d) a, b and c
12. An additional **cell** is connected in series to a simple circuit. The light bulb will:
 a) be brighter b) be dimmer c) glow longer d) glow the same
13. Two bulbs are connected in a parallel circuit to a dry cell. If one bulb burns out, the brightness of the other bulb will:
 a) decrease b) increase c) become zero d) remain the same
14. Five 1.5 volt batteries are connected in series. Their combined voltage is:
 a) 1.5 volts b) 15 volts c) 7.5 volts d) 3 volts
15. Why is a circuit breaker more useful than a fuse
 a) when the weak piece of metal of the circuit breaker melts it can be replaced
 b) the bi-metallic strip of the fuse can bend back into shape
 c) the fuse can only be used once while the circuit breaker can be used repeatedly
 d) all of the above
16. Compared to a light connected to a single cell, a light connected to 3 cells in parallel will:
 a) be brighter b) be dimmer
 c) operate a longer period of time d) operate shorter period of time
17. The amperage (current) in a circuit with 2 lights connected in series is:
 a) higher between the lights compared to the rest of the circuit
 b) lower between the lights compared to the rest of the circuit
 c) the same everywhere in the circuit
 d) higher close to the battery
18. A dry cell :
 a) is rechargeable b) does not have an electrolyte
 c) is not rechargeable d) has a paste for an electrolyte
19. A secondary cell :
 a) has a paste as an electrolyte b) does not have an electrolyte
 c) is rechargeable d) is not portable
20. A car battery is an example of :
 a) a secondary cell b) a primary cell
 c) a single cell d) multiple connected cells in parallel

1. Match the equation on the left with the best description on the right (enter the proper letter in the box provided).

$V = IR$	
$E = V \times I \times \Delta t$	
$P = VI$	
$P = E / \Delta t$	

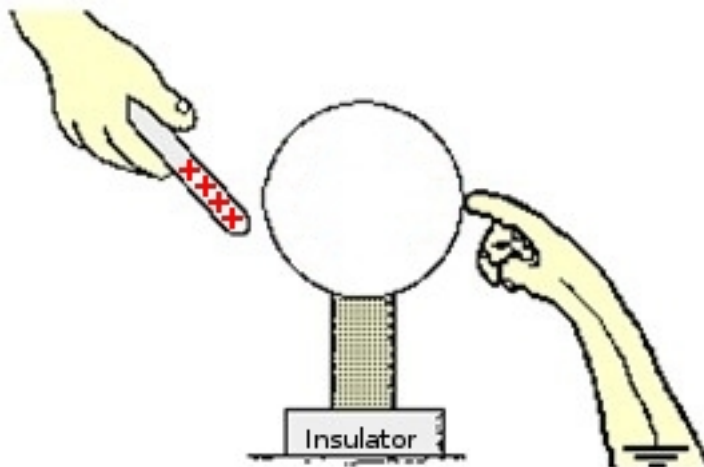
- A) Electrical Energy in Joules or Watt hours
- B) Equation for Power when time interval is in seconds and energy is in joules
- C) Ohm's Law
- D) Equation for power



2. A student noticed a wool sock stuck to his cotton shirt when he was taking the shirt out of the clothes dryer full of wool socks and cotton shirts. Use the electrostatic series to explain exactly how this happened (don't forget to mention charges).

<u>ELECTROSTATIC SERIES</u>	
acetate	
glass	+
wool	
fur or hair	
silk	
aluminum	
cotton	
	-

3. Will the steel ball have a charge on it once the finger touching it is removed and then the charged rod, not in contact with it, is moved away as well? What will the charge be if any and why?



4. Draw a and label a voltaic cell including the electrolyte, electrodes, and circuit with a load:

5. What part of a simple circuit is not necessary for the circuit to operate?

6. Draw one circuit with two batteries connected in parallel and two lights connected in series. Attach a voltmeter to the circuit such that it shows a voltage drop of zero: (remember that a battery is more than one cell)

7. One circuit is operating at 0.3 amps and another circuit is operating at 0.2 amps. Both circuits have similar batteries. Which circuit will operate the longest? Why?

8. Imagine that you are an electrical engineer and you work for a company that wants you to design a flash light. The company only has light bulbs with a resistance of 8 ohms and they must run with a current of 1 amps and the batteries you must use are 24 volts but you can use more than one battery. Draw the circuit you designed:

9. A young woman kept blowing the 15 amp fuse in her fuse box every time she turned her hair dryer on when the microwave oven was operating. She always did her hair while her breakfast was cooking and her schedule could not be changed. One day at the hardware store she noticed 30amp fuses right below the 15 amp fuses and they were the same price. She thought the bigger number might be beneficial so she bought them. Her blow dryer and microwave oven can work at the same time and she can even operate an electric heater now during the winter and everything has been working fine. Do you think the young woman came up with a good solution to her problem? Why?

10. What is the current in a circuit with a source of 24 volts and a load of 8 ohms?

11. How much energy is consumed in a circuit that runs for 90 seconds with a current of 0.90 AMPS and a voltage drop of 24 volts?

12. How many seconds does it take for a 4 watt light to consume 8 Joules of energy?

13. How many volts are required to power a 10 watt light in a circuit with 5 amps of current?