CURRENT ELECTRICITRY PRACTICE PROBLEMS

Use your understanding of the mathematical relationship between work, potential energy, charge and electric potential difference to complete the following statements 1 -7:

$$\Delta V = \Delta PE \; / \; Q \qquad\qquad \Delta PE \; = \Delta V{\cdot}Q \qquad\qquad Q = \Delta PE \; / \; \Delta V$$

1. A 9-volt battery will increase the potential energy of 1 coulomb of charge by ____ joules.
2. A 9-volt battery will increase the potential energy of 2 coulombs of charge by ____ joules.
3. A 9-volt battery will increase the potential energy of 0.5 coulombs of charge by ____ joules.
4. A ___volt battery will increase the potential energy of 3 coulombs of charge by 18 joules.
5. A ___volt battery will increase the potential energy of 2 coulombs of charge by 3 joules.
6. A 1.5 volt battery will increase the potential energy of ____ coulombs of charge by 0.75 joules.
7. A 12 volt battery will increase the potential energy of ____ coulombs of charge by 6 joules.

Use the diagram below to answer question 8 – 13.
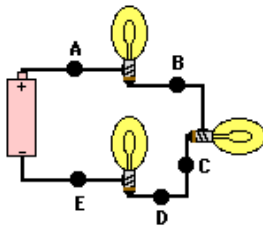
$$I = Q \; / \; t \qquad\qquad Q = I \cdot t \qquad\qquad t = Q \; / \; I$$

8. A current of one ampere is a flow of charge at the rate of _____ coulomb per second.
9. When a charge of 8 C flows past any point along a circuit in 2 seconds, the current is _____ A.
10. If 5 C of charge flow past point A (diagram at right) in 10 seconds, then the current is _____ A.
11. If the current at point D is 2.0 A, then _____ C of charge flow past point D in 10 seconds.
12. If 12 C of charge flow past point A in 3 seconds, then 8 C of charge will flow past point E in _____ seconds.
13. True or False:
    The current at point E is considerably less than the current at point A since charge is being used up in the light bulbs.

$$P = \Delta V \cdot I \qquad\qquad I = P \; / \; \Delta V \qquad\qquad \Delta V = P \; / \; I$$

14. What is the current in a 120-watt bulb plugged into a 120-volt outlet.
15. What is the current in a 60-watt bulb plugged into a 120-volt outlet.
16. What is the power of a saw that draws 12 amps of current when plugged into a 120-volt outlet.
17. What is the power of a toaster that draws 6 amps of current when plugged into a 120-volt outlet.
18. What is the current in a 1000-watt microwave when plugged into a 120-volt outlet.
19. Your 60-watt light bulb is plugged into a 110-volt household outlet and left on for 3 hours. The utility company charges you $0.11 per kiloWatt•hr. Explain how you can calculate the cost of such a mistake.

QUANTITY	SYMBOL	UNIT	SYMBOL
Charge	Q	Coulomb	C
Energy	ΔPE	Joule	J
Potential Difference	ΔV	Volt	V
Current	I	Ampere	A
Power	P	Watt	W
Resistance	R	Ohm	Ω