QUIZ / Current Flow

NAME　　　　　　　　　　　　　　　　　　　　　　DATE　　　　　　　CLASS PERIOD

Put a check ☒ in the ○ next to the correct answer.

1. What is current?

　　○ A movement of volts

　　○ The flow of electric charge

　　○ The splitting of electrons

　　○ The electromotive force (pressure) of electricity

2. What is the voltage of a circuit with a resistance of 1000 ohms and a current of 0.16 amps? Use the formulas at left.

　　○ 6250 V　　　　　　○ 0.00016 V　　　　　○ 160 V

3. What is the resistance of a circuit with a voltage of 1.5 V and a current of 0.16 amps? Use the formulas at left.

　　○ 0.24 ohms　　　　○ 0.106667 ohms　　○ 9.375 ohms
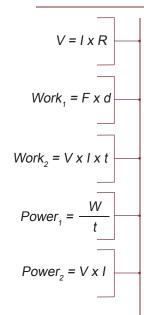
4. A battery produces:

　　○ Alternating current　　○ Direct current

$V = I \times R$

5. You have attached four AA (1.5 V) batteries together in series. If you use your multimeter to measure the voltage of this circuit, what do you expect the reading to be?

　　○ 6 V　　　　　　　○ 1.5 V　　　　　　○ 0.375 V

$Work_1 = F \times d$

6. If your robot does 0.5 J of work for 10 milliseconds, how much power does it produce? Use the formulas at left.

　　○ 5 Watts　　　　　○ 0.005 Watts　　　○ 50 Watts

$Work_2 = V \times I \times t$

7. If your robot is powered by a 7.2 V battery and produces 2.16 W of power, how much current is your robot drawing? Use the formulas at left.

　　○ 3.33 A　　　　　○ 0.3 A　　　　　　○ 15.552 A

$Power_1 = \dfrac{W}{t}$

8. Your robot is powered by two 1.5 V batteries in series. If your robot is drawing 0.1 amps of current for 10 s, how much work does your robot do? Use the formulas at left.

　　○ 3 J　　　　　　　○ 0.03 J　　　　　　○ 1.5 J

$Power_2 = V \times I$

9. What will happen if a 12 volt battery is used on a 6 volt motor?

　　○ Destroy the motor

　　○ Make the motor run very slow

　　○ The motor will not run

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$V = I \times R$

$Work_1 = F \times d$

$Work_2 = V \times I \times t$

$Power_1 = \dfrac{W}{t}$

$Power_2 = V \times I$

10. The amount of work done by your robot in this lab is directly proportional to:
(check all that apply)

> o The friction of the ramp
> o Current draw of the robot
> o The battery voltage of the robot
> o The number of seconds it takes the robot to go up the ramp
> o The total resistance of the robot

11. What will happen to the current draw on the motor if the incline is increased from 5° to 30°?

> o Remain the same   o Decrease   o Increase

12. What symbol setting should the multimeter be on to measure direct current?

> o Ā   o ĩ   o Ã

13. What will happen to the current reading when the drive gear is much larger than the driven gear?

> o Current reading will stay the same
> o Current reading will increase
> o Current reading will decrease

14. List one factor that affects the current drawn in your motor. Explain why this factor affects current.

Quiz Part 2 example problem:

If 25 nano-Coulombs flow through a wire in 5 microseconds, determine I, the current flow.

Solution:

Using Equation 3 from the notes, we have:

$I = q/T = (25 \times 10^{-9})$ Coulombs$/(5 \times 10^{-6})$ seconds $= 5 \times 10^{-3}$ amperes = 5 ma

15. How long does it take for 40 u-Coulombs to flow through a wire if the current flow, I, is 100 u-amps?

Modifying Equation 3, we have:

$T = q/I = (40 \times 10^{-8})/(100 \times 100^{-8})$ amperes = 0.4 seconds = 400 m-sec.

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16. How much charge does it take for 800 ma of current to flow through a wire if the charge flows in 200 u-seconds?

17. An electron has a charge of 1.602 x10^{-19} coulombs. If 200 billion electrons flow through a wire in 50 nano-seconds, determine I, the current flow.

18. An electron has a charge of 1.602 x10^{-19} coulombs. How many electrons will flow through a wire in 100 nano-seconds to generate 250 ma of current?