

Science 10-Electricity & Magnetism

Activity 12

Worksheet on Electrical Energy and Power



20

Name _____

Due Date _____

Show Me Hand In

Correct and Hand In Again By _____

Note: Information for this worksheet can be found on pages 91-92 of the textbook.

1. Write the equation for **electrical energy** using voltage, current and time. (It is just below the middle of page 91 of the text.) Include **units!**

2. Write the same equation for **energy** as in question 1, only this time, use the **letters V, I** and t.

3. A 120 volt light bulb has a current of 0.5 A. running through it for 30 seconds. How much electrical **energy** does it use in this time? (*Include units in your answer!*)

Equation:

Solution:

Answer _____

4. A 120 volt light bulb has a current of 0.833 A. running through it for 30 seconds. How much electrical **energy** does it use in this time? (*Include units in your answer!*)

Equation:

Solution:

Answer _____

5. A 15 A. saw runs for 2 minutes on a voltage of 120 volts. Calculate the amount of **energy** used. (Remember to changes min. to seconds!) (*Include units in your answer!*)

Equation:

Solution:

Answer _____

6. Write the equation for **power** using just current (I) and voltage (V). (This can be found right in the middle of page 92 of the text.) Be sure to state what **units** everything is in!

7. An electric saw draws 15 A. of current while operating on 120 volts.

- a) What is the **power** of the saw? (*Include units in your answer!*)

Equation:

Solution:

Answer _____

- b) If the saw is operated for 3 minutes, calculate the **energy** used. (Remember to change minutes to seconds!) (*Include units in your answer!*)

Equation:

Solution:

Answer _____

8. A “walkman” draws 200 mA. of current while operating on 3 volts.

- a) What is the **power** of the walkman? (Remember to change mA to A!) (*Include units in your answer!*)

Equation:

Solution:

Answer _____

- b) If the walkman is operated for 3 hours, calculate the **energy** used. (There are 3600 seconds in one hour.) (*Include units in your answer!*)

Equation:

Solution:

Answer _____

9. An outdoor floodlight has a power rating of 150 watts.

- a) Calculate the **current** through the bulb if the voltage is 120 volts.

Equation:

Solution:

Answer _____

- b) Calculate the total **energy** used by the bulb if it is left on for 10 hours overnight.
(1 hour = 3600 seconds)

Equation:

Solution:

Answer _____

10. Joules, Kilojoules and kW•h are all units of _____.
11. Calculate the energy used by a 300 W light bulb that is used to light a yard 9 hours per night for 30 days? Express the answer in kW•h.

Answer _____

12. Which has a greater Resistance, a 50 W light bulb or a 100 W light bulb? _____

What would happen to the current if a 50 W light bulb is replaced by a 100 W light bulb?

_____.

13. Calculate the Resistance of an 18 W compact fluorescent light bulb. Assume it is operating at a voltage of 120 V.

Answer _____ Ω

14. A 240 V oven element draws 22 A of current. Calculate the energy the element uses if it is cooking a turkey for 3.0 hours.

Answer _____

15. A light bulb consumes 2400 J of energy in 60 s. It is a _____ W light bulb.

16. A projector has a 500 W bulb in it. How much energy does it use when it runs for a 2 hour science double block? Express your answer in kW•h.

Answer _____

17. A 12 V, 6 A motor takes 180 minutes to do a job. A 120 V, 10 A motor takes 5 minutes to do the same job. Which motor uses the least energy and by how much?

Answer _____

18. A 120 V appliance draws 14 A of current. If electricity costs \$0.065 kW•h, how much does it cost to operate the appliance for 5.5 hours?

Answer _____

19. a) Calculate the current drawn by a 1600 W microwave oven if it is plugged in to a 120 V circuit.

b) Will it trip a 15A breaker? _____. If two microwaves like this are plugged into the same circuit and they are both operating at the same time, would that trip the 15A breaker? _____

20. How many Joules of energy is used by an 800 W coffee maker operating for $\frac{1}{2}$ an hour?

Answer _____ J

21. A 600W fridge is plugged into a 120V circuit. Calculate the Resistance of the fridge.

Answer _____ Ω

22. a) A 340 W television continues to use 6 W even when turned “off” in order to keep its clock and program settings. Calculate the energy saved in 30 days if the TV unplugged for 12 hours per day and plugged in the rest of the time? Express your answer in kW•h.

Answer _____

b) If electricity costs \$0.065 kW•h, how much money would be saved in a month?

Answer _____

23. What is the main advantage of using compact fluorescent light bulbs in a home rather than ordinary incandescent light bulbs? _____

24. a) A 100 W incandescent light bulb lights a porch for 3 hours a day. How much energy can be saved in a month (30 days) if that 100 W incandescent bulb is replaced with an 18 W compact fluorescent bulb which gives a comparable amount of light?

Answer _____

b) If electricity costs \$0.065 kW•h, how much money would be saved in a month?