



Physics 3204

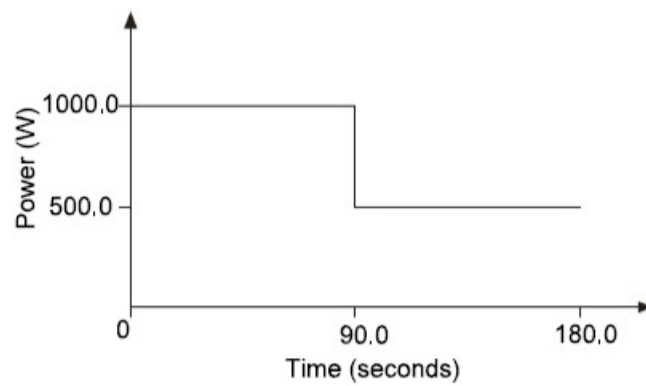
Unit 2: Section 2 -Current Electricity

Worksheet 5: Electric Energy, Electrical Power and the Cost of Electrical Energy

- Which is equivalent to 1 W?
 - 1 V/A
 - 1 · A
 - 1V·A
 - 1V
- What energy is transferred by a 6.0 V battery to run an appliance that draws 2.0 A of current in 1.0 minute?
 - 3.0 J
 - 12 J
 - 180 J
 - 720 J
- What is the power rating of an electric kettle that draws a 12.5 A current in a 120 V circuit?
 - 0.10 W
 - 9.6 W
 - 1200 W
 - 1500 W
- A potential difference of 12 V causes 0.35 C of electric charge to pass through a resistor in 2.6 s. How much power does the resistor dissipate?
 - 1.6 W
 - 4.2 W
 - 11 W
 - 89 W
- If a 1.2×10^3 W hair dryer has a 10.0Ω resistance, how much current will it draw?
 - 0.091 A
 - 11 A
 - 12 A
 - 120 A
- The headlights in a car use 95 W of power and its 12 V battery has 3.4×10^5 C of stored charge. If the lights are left on, how much time does it take for the battery to lose its charge?
 - 2.3×10^{-5} s
 - 3.6×10^3 s
 - 4.3×10^4 s
 - 2.7×10^6 s

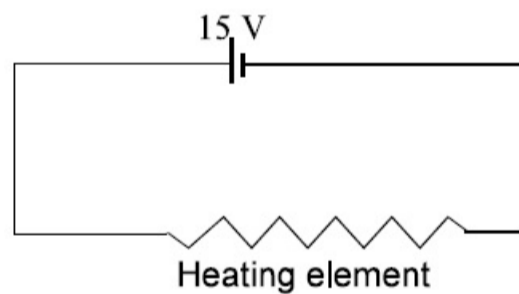
7. An electric clothes dryer uses a 30.0 A current for 12 minutes to dry a load of clothes. This process uses 5184 kJ of energy. What is the potential difference across the dryer?
- (A) 12 V
(B) 14 V
(C) 120 V
(D) 240 V
8. How much electrical energy does a 75 W motor use in 15 minutes?
- (A) 1.1×10^3 J
(B) 1.9×10^3 J
(C) 6.8×10^4 J
(D) 2.7×10^5 J
9. If a 1.50×10^3 W heater is connected to a 1.20×10^2 V line for 2.0 hours, how much heat energy is produced?
- (A) 1.5 kJ
(B) 3.0 kJ
(C) 180 kJ
(D) 11 000 kJ
10. How much current will a 1.2×10^3 W hair dryer draw if it has a 10.0Ω resistance?
- (A) 0.090 A
(B) 1.0 A
(C) 11 A
(D) 12 A
11. If a 2.0 kW heater operates for 10.0 hours, what is the cost of operating the heater if the rate is \$0.11/kWh?
- (A) \$2.20
(B) \$0.22
(C) \$1.10
(D) \$182
12. A 1200 W stereo is operating for 6.0 hours. If charge for electricity is 7.0 ¢/kWh, what is the total cost of energy consumed?
- (A) \$0.05
(B) \$0.50
(C) \$5.00
(D) \$50.00
13. A 1.0×10^3 W bulb burns for 2.0 h. What is the total cost of the electricity used if the rate is eight cents per kilowatt hour?
- (A) \$0.04
(B) \$0.16
(C) \$0.25
(D) \$1.60

14. An electrical appliance runs from a 240 V power supply. A graph of power versus time for this appliance is shown below.



- i) Use the graph to determine the energy dissipated by the appliance in the first 180.0 seconds. [2]
- ii) Determine the resistance of the appliance when its power consumption is 1000.0 W. [2]

15. A power supply is connected to a heating element in the diagram below.



- (i) If a total of 5.0×10^{20} electrons pass any point in the heating element circuit in 40 s, calculate the amount of power dissipated in the circuit. [2]

16. What is the cost of operating a 20.0 A clothes dryer on a 2.20×10^2 V line for two hours if the price of electrical energy is \$0.082/kWh? [2]

17. A soldering iron of resistance 576Ω is connected to a 120 V circuit. Calculate the cost to operate the soldering iron 8.0 hours a day for 21 days, if energy costs \$0.080/kWh. [3]