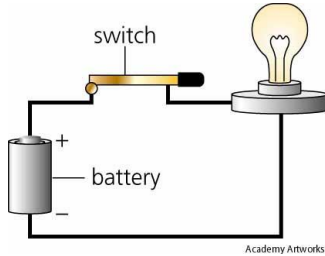
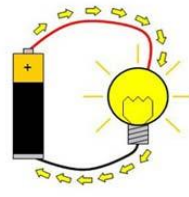


Electricity and circuit formulas

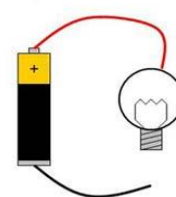
Circuit def: _____



Closed circuit



Open circuit



Variables

	Definition	Symbol	Unit
Current intensity			
Potential Difference			
Resistance			
Power			
Energy			
Time			

Conversions: Must memorize

Minutes to seconds _____

Seconds to minutes _____

Hours to seconds _____

Seconds to hours _____

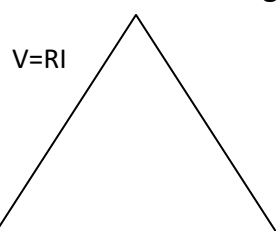
J to kJ _____

J to kWh _____

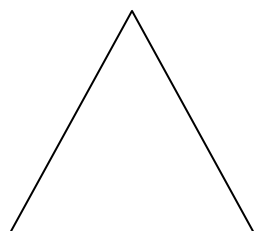
W to kW _____

kW to W _____

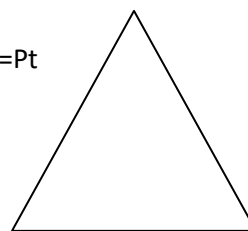
Formulas and triangles used:



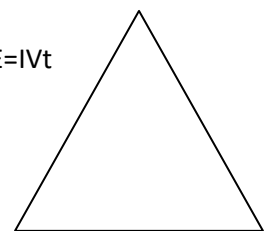
$P=IV$



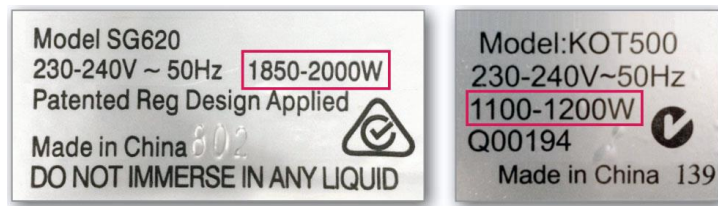
$E=Pt$



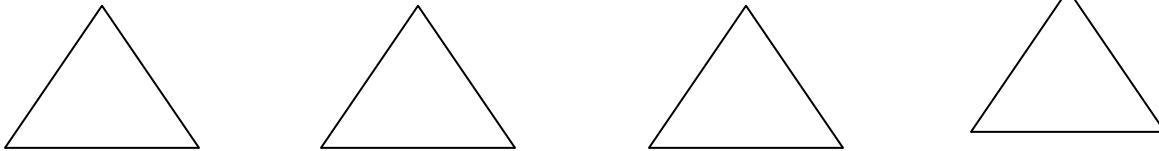
$E=IVt$



Rating plates: Information given on electrical appliances that allows its power and energy to be calculated.



Practice questions



1. What is the resistance of a circuit if the potential difference is 25 V and the current is 3 A?
2. A radio is on for 2 hours and has 700 W of power. How much energy was used in J?
3. A radio is on for 2 hours and has 700 W of power. What is the energy in kJ and kWh?
4. How much power did it take to use a microwave for 90 seconds and consumed 70 000 J of energy?
5. A hairdryer is used for 20 minutes a day. It runs on 190 V and 3 A. How much energy is used in J ?
6. How much energy in kJ does a computer use if it is on for 3 hours and uses 200 V and 2.0 A.
7. If a computer used 950 000 J of energy and 100 W of power. How long did you use the computer for?

8. If a TV used 950 000 J of energy and 90 W of power. How many hours did you watch TV for?
9. How much power did it take when a dishwasher ran for 55 minutes and consumed 50 000 J of energy?
10. A hairdryer uses 220 V and 7 A. If the hairdryer used 525 000 J of energy, how much time did you use it for in minutes?

Past Exam Questions

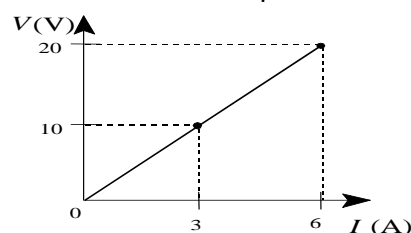
1. Some characteristics of appliances are listed in the table below:

Appliance	Characteristic
1	120 V, 10 A
2	240 V, 6 A
3	120 V, 1500 W
4	240 V, 1.8 kW

If each appliance is used for the same amount of time, which appliance uses the most electric energy?

- A) 1 B) 2 C) 3 D) 4

2. The following graph illustrates the change in the current intensity, I , in a circuit element as a function of the potential difference (voltage), V , across its terminals.



What is the resistance of this circuit element?

- A) 2Ω B) 0.5Ω C) 3.3Ω D) 100Ω

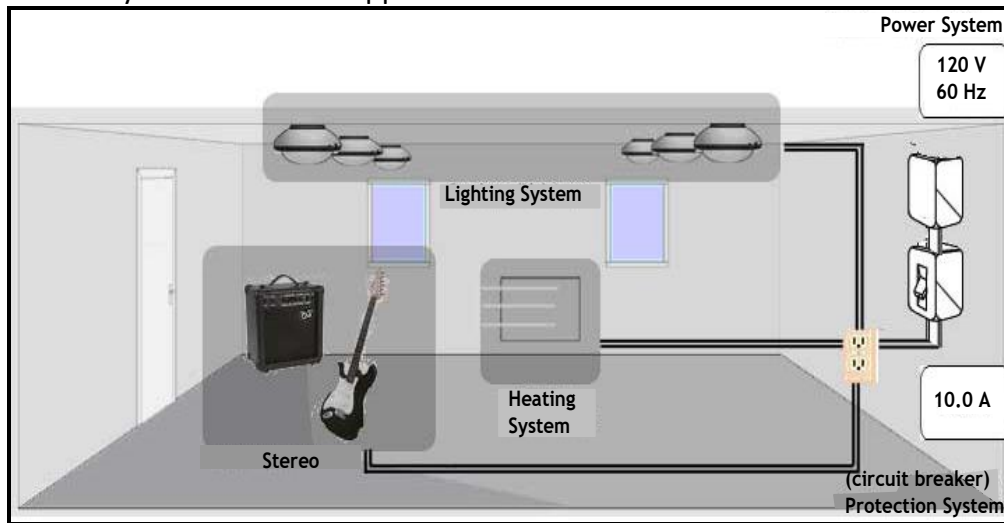
3. A mother has decided to charge her children for leaving appliances on uselessly. Below is a table showing the wasted energy each child accumulates.

	Appliances	Total Powers used	Total Time on
Child 1	TV, computer and radio	4.0 kW	48 hrs
Child 2	Computer and radio	1 400 W	3 500 min

Using the information above determine which child will pay the most money.

4. Eric wants to convert a room in his house into a music studio. Below is the layout of the electric installations and the rating plates on the appliances in the room.

Layout of Electrical Appliances in the Music Studio



Here is the information on the rating plates for the heating system and the stereo system in the room:

Heating system	Stereo
120 V 60 Hz 720 W	120 V 60 Hz 360 W

Here is the information on the rating plates for the two lighting systems available:

Incandescent lighting system	Compact fluorescent lighting system
120 V 60 Hz 480 W	120 V 60 Hz 110 W

- a- Calculate the maximum electrical power that can be attributed to the lighting system.
- b- Which lighting system should be installed in the electrical circuit of the music studio? Justify your choice using mathematical reasoning.