

Paying for electrical energy

Name & set

1 The element of an electric fire is rated at 1200W, 240 V. It is switched on for 8 hours.

(a) How many Units of electrical energy are used?

[2]

(b) How much does it cost to use the fire if 1 Unit of electrical energy costs 6p?

[2]

(c) How much does it cost to use this heater for 8 hours a day for a week?

[2]

2 A kettle takes 2 minutes 30 seconds to boil 1 litre of water. The heating element in the kettle is rated at 2400 W.

(a) How much thermal energy is developed by the heating element in boiling the water?

[2]

(b) How much does it cost to boil 1 litre of water if the cost of electrical energy is 6 p per Unit.

(i) Number of units used to boil water = _____

[2]

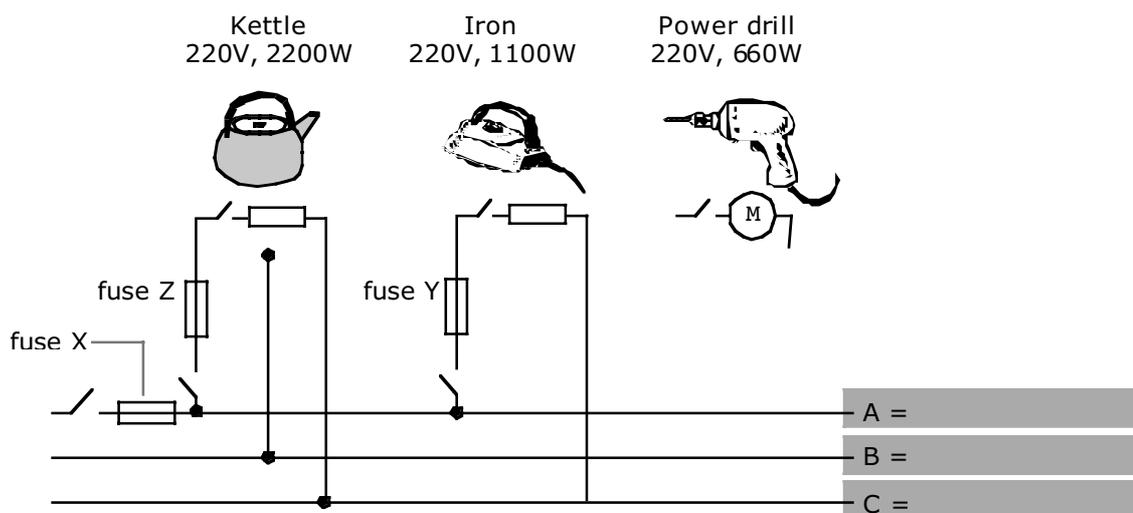
(ii) cost of boiling water = _____

[1]

(c) Utility bills are paid quarterly. How much does it cost to boil 1 litre of water 2 times a day, 7 days a week for 12 weeks?

[2]

- 1 The diagram shows part of a ring main in a house. Three appliances, with their operating voltages and powers, are also represented.



(a) On the diagram,

(i) label the live wire with a letter L, the neutral wire with a letter N and the earth wire with a letter E. [3]

(ii) complete the circuit from the main to the power drill. The power drill is double insulated (i.e. it has a plastic casing). [2]

(b) (i) Write down in words the equation that links electrical power, voltage and current.

_____ [1]

(ii) Calculate the current to the kettle.

_____ [2]

(ii) While the kettle is boiling water, the iron is switched on.

Calculate the current that flows through fuse Y.

_____ [1]

(c) George turns off the main switch and fits a 13 A fuse for fuse X. He switches on the main switch and the kettle. The kettle works. He then switches on the iron as well.

(i) What would you expect to happen to fuse X?

_____ [1]

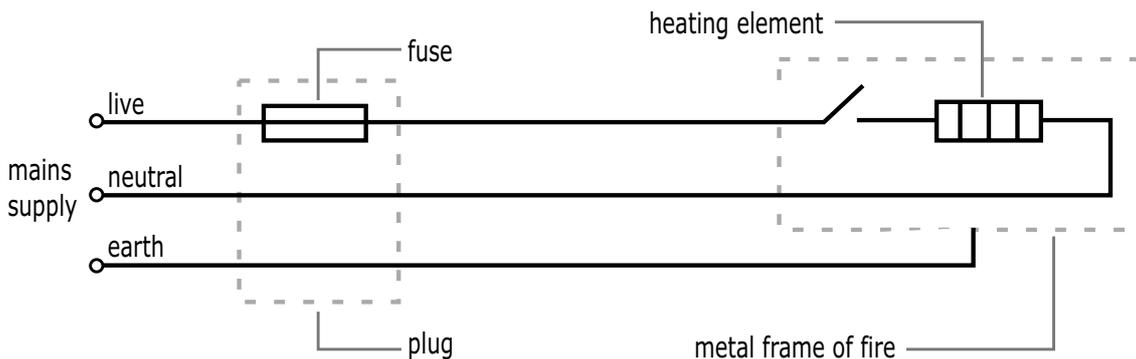
(ii) George replaces the 13 A fuse with a 30 A fuse. Some time later a fault develops so that when George switches the kettle on fuse Z melts. Describe a fault that could cause fuse Z to melt.

_____ [1]

(iii) If fuse Z melts what, if anything, happens to fuse Y?

_____ [1]

3 The diagram shows an electric fire connected to the mains supply.

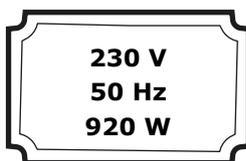


(a) What is the correct colour for the plastic insulation on the live wire?
 _____ [1]

(b) Why would it be unwise to use flex that is thinner than that recommended for a fire?

(c) Explain what will happen if the live wire makes metal-to-metal contact with the frame of the fire.

(d) back of the fire there is a small metal panel containing the following information. [2]



(i) How many Units of electrical energy does the fire use in 5 hours?
 _____ [2]

(ii) How much does it cost to run the fire for 8 hours a day for a week? The cost of 1 Unit of electrical energy is 6 p.

(iii) The following fuses are available to the householder: 3A, 5A, 13A. Which fuse should be used with this fire? (Show how you work out your answer.)
 _____ [2]