

MAINS ELECTRICITY

1. The metal case of an electric heater is earthed. The plug to the heater contains a 5 A fuse. There is a current of 4 A when the heater works normally. The cable to the heater becomes so worn that the live wire makes electrical contact with the case.

What happens? Give a reason for your answer

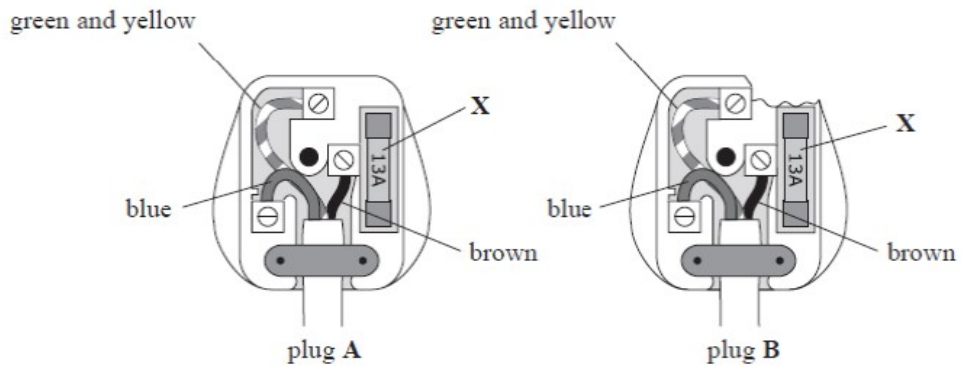
[2m]

2. A lamp with a resistance of 576Ω is connected to a 120-V source.

a. What is the current through the lamp?

b. What is the power rating of the lamp?

3. (a) The covers are removed from two plugs, A and B. The diagram shows the inside of the plugs.



(i) Identify a problem with plug B.

.....

(1)

(ii) Suggest why this makes plug B unsafe.

.....

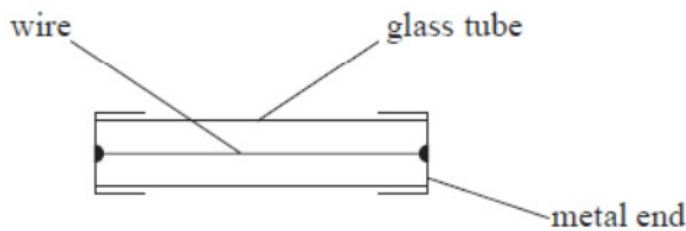
(1)

(iii) Name part X.

.....

(1)

(iv) The diagram below shows the structure of part X.

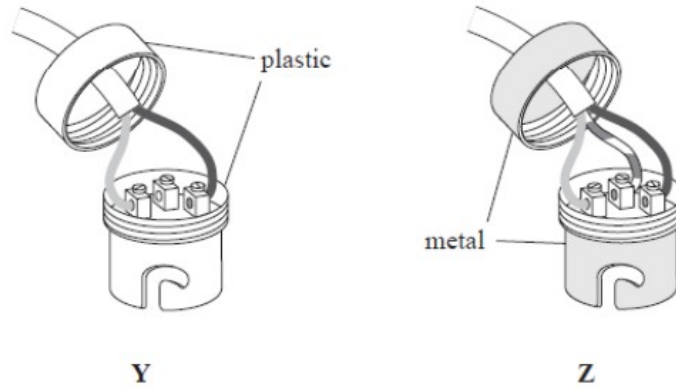


State **one** change which occurs in part X when the current is too large.

.....

(1)

(b) The diagram shows two light fittings, Y and Z.



When the tops are screwed on, each fitting is safe to use.

(i) State why light fitting Y is safe to use.

.....

(ii) Why is light fitting Z safe to use?

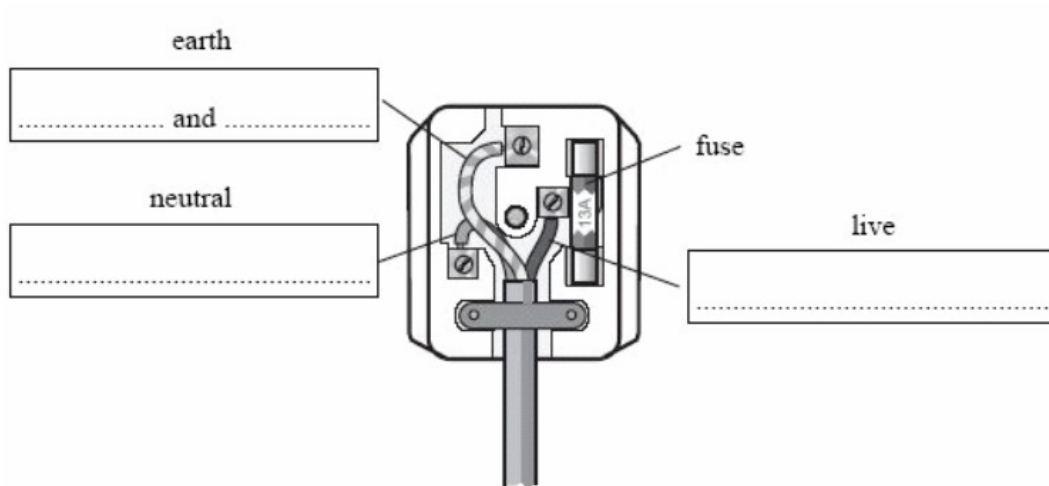
.....

(1)

(1)

4. (a) The diagram shows a correctly wired 3-pin plug.

Label the wires with the correct colours.



(3)

(b) The table shows information about some household electrical appliances.

appliance	power	current
table lamp	100 W	0.40 A
clothes iron	2.2 kW	8.8 A
television set	80 W	0.32 A

(i) The mains cable for the iron is thicker than the mains cables for the other two appliances.

Suggest **two** reasons for this.

1

.....

2

.....

(2)

(ii) The three appliances are switched on for 30 minutes.

Which costs the least to run?

Explain your answer.

.....

.....

.....

(2)

(iii) The iron is switched on for 30 minutes.

Calculate the electrical energy used in kW h.

.....

.....

.....

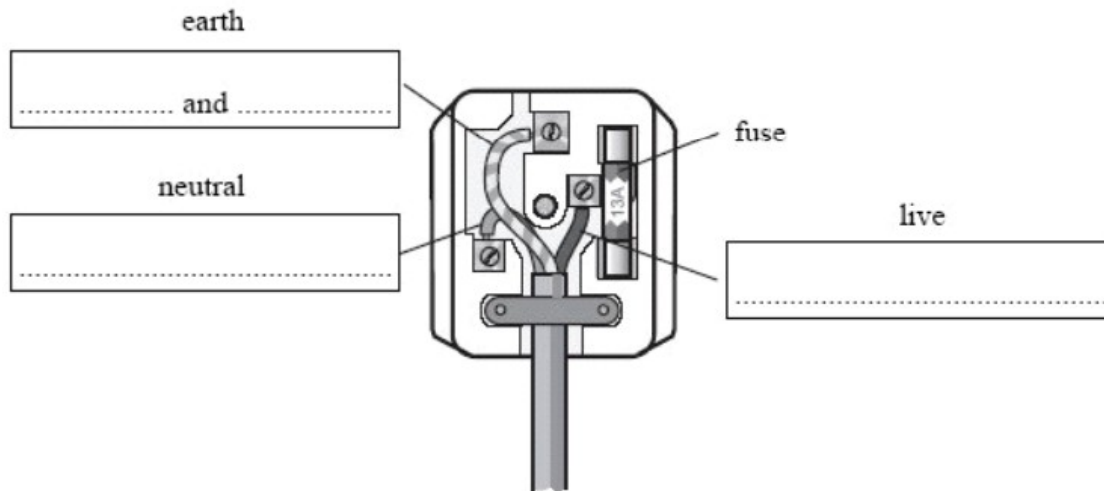
.....kW h

(3)

(Total 10 marks)

5. The diagram shows a correctly wired 3-pin plug.

Label the wires with the correct colours.



(3)

6. The table lamp shown in Fig. 10.2 is made from plastic. It has only two wires in the cable to connect it to the plug.

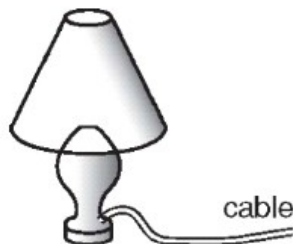


Fig. 10.2

The lamp has a power rating of 100 W and is used with a 230 V supply.

(i) Which wire, earth, live or neutral, is **not** needed in the cable for the lamp?

.....
[1]

(ii) Explain why the lamp is safe to use even though it has only two wires in the cable.

.....
[2]

(iii) Explain what is meant by a *power rating of 100 W*.

.....
[2]

(iv). Calculate the value of the fuse that should be used in the plug for this lamp.

(v) Calculate the electrical energy supplied to the lamp in 30 minutes.