**Name of the Student**:_____
**Max. Marks : 22 Marks** **Time : 22 Minutes**

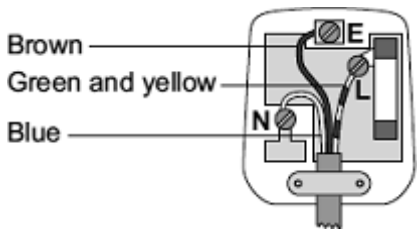
## Q1.

The diagrams show the inside of a 13 amp plug.

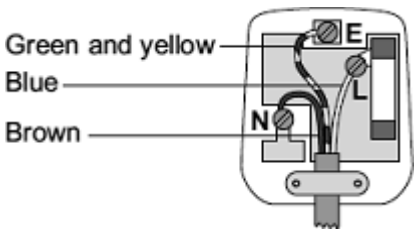
(a) (i) Which **one** of the plugs, **A**, **B**, **C** or **D**, is correctly wired?

Write your answer, **A**, **B**, **C** or **D**, in the box.

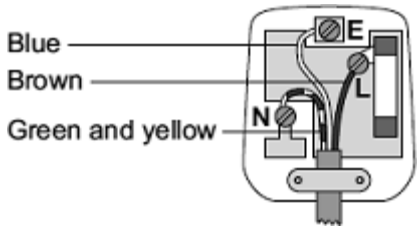
**A**



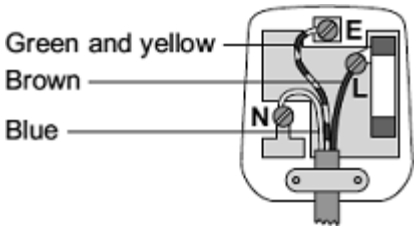

**B**




**C**




**D**




The plug that is correctly wired is ☐

**(1)**

(ii) What material is the outside casing of a plug made from?

_____

**(1)**

(b) An electric drill draws a current of 2 amps from the 230 volt mains electricity supply.

Use the equation in the box to calculate the power of the drill.

| power = current × potential difference |
|---|

Show clearly how you work out your answer.

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_____

_____

Power _____ watts

**(2)**

(c) A householder needs to replace a damaged plug. Most replacement plugs are sold with a 13 amp fuse fitted inside. The householder thinks it would be better for shops to sell the plugs without a fuse. He could then buy either a 3 A, 5 A or 13 A fuse to fit inside the plug.

Explain an advantage of selling plugs without a fuse, rather than with a 13 amp fuse fitted.

_____

_____

_____

_____

**(2)**

**(Total 6 marks)**

## Q2.

The diagram shows four electrical appliances. Each appliance is designed to transform electrical energy into one form of output energy.



Kettle



Toaster



Radio



Hair straighteners

(a) Which **one** of the appliances is designed to give a different form of output energy from the other three appliances?

_____

Give a reason for your answer.

_____

_____

**(2)**

(b) The power of each appliance is given in the table.

| Appliance | Power |
|---|---|
| Kettle | 2.5 kW |
| Toaster | 920 W |

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| | |
|---|---|
| Radio | 15 W |
| Hair straighteners | 75 W |

Each appliance is switched on for 5 minutes.

Which appliance transforms the most energy?

_____

**(1)**

(c) The 75 watt hair straighteners are switched on for a few minutes each day.
In one year, the amount of energy transferred from the mains electricity supply to the hair straighteners is 4 kilowatt-hours.

Electricity costs 15 p per kilowatt-hour.

Use the equation in the box to calculate the yearly cost of using the hair straighteners.

| total cost = number of kilowatt-hours × cost per kilowatt-hour |
|---|

Show clearly how you work out your answer.

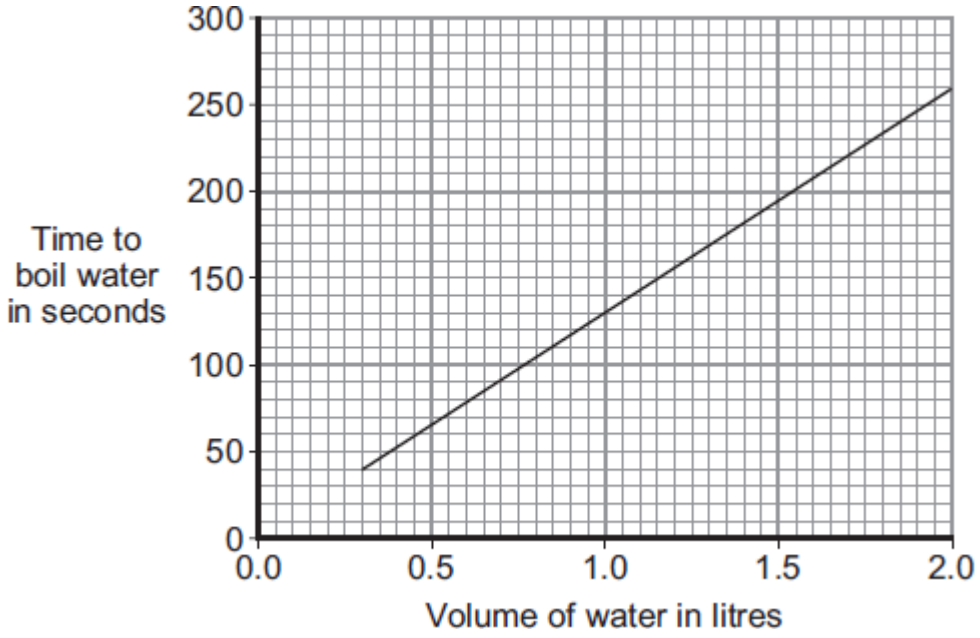
_____

_____

Total cost = _____ pence

**(2)**

(d) The graph shows how the time to boil water in an electric kettle depends on the volume of water in the kettle.




A householder always fills the electric kettle to the top, even when only enough boiling water for one small cup of coffee is required.

Explain how the householder is wasting money.

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_____

_____

_____

_____

_____

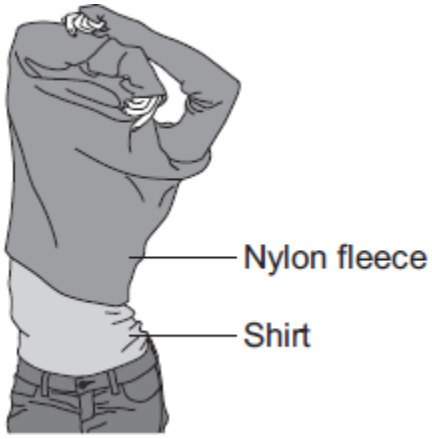
_____

**(3)**

**(Total 8 marks)**

## Q3.

(a) A student takes off his nylon fleece and feels a small electric shock.
He realises that this happens because his fleece becomes charged.




Explain why the fleece becomes charged.

_____

_____

_____

_____

_____

**(2)**

(b) Only **two** of the following statements are correct.

Put a tick (✓) in the boxes next to the **two** correct statements.

Positively charged objects repel negatively charged objects. ☐

Electrical charges move easily through metals. ☐

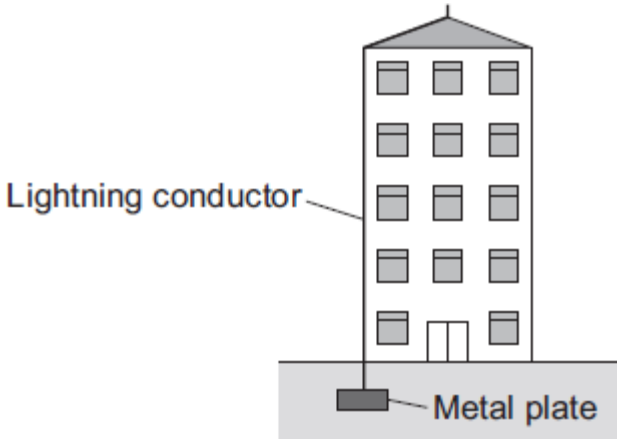
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Static electricity is safe; it never causes any danger. ☐

An electric current is a flow of electrical charge. ☐

**(2)**

(c) The diagram shows a lightning conductor attached to the side of a tall building.




If the building is struck by lightning, charge flows to earth through the lightning conductor.

(i) Which of the materials in the list is used to make the lightning conductor?

Draw a ring around your answer.

**copper** **glass** **plastic**

Give a reason for your answer.

_____

_____

_____

**(2)**

(ii) Complete the sentence by drawing a ring around the correct line in the box.

The resistance of the lightning conductor is

| |
|---|
| higher than |
| the same as |
| lower than |

the resistance of the building.

**(1)**

(iii) It is almost impossible to test different designs of lightning conductor in controlled experiments during a lightning storm.

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Suggest a reason why.

_____

_____

**(1)**

**(Total 8 marks)**

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