

## Electricity

**Total mark – 16**

### Question: 1

- 1 (a) A student rubs a rubber balloon against the sleeve of her woollen jumper. The balloon becomes negatively charged.

- 1 (a) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

electrons	neutrons	protons
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The balloon becomes negatively charged because it gains \_\_\_\_\_ from the jumper.

- 1 (a) (ii) After charging the balloon, what is the overall charge left on the jumper?

[1 mark]

Tick (✓) **one** box.

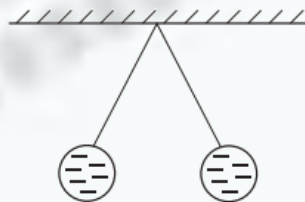
negative ☐

neutral ☐

positive ☐

- 1 (b) **Figure 1** shows two identically charged balloons hanging close together.

**Figure 1**



- 1 (b) (i) Complete the following sentence.

[1 mark]

The balloons carry the same type of charge and so \_\_\_\_\_ each other.

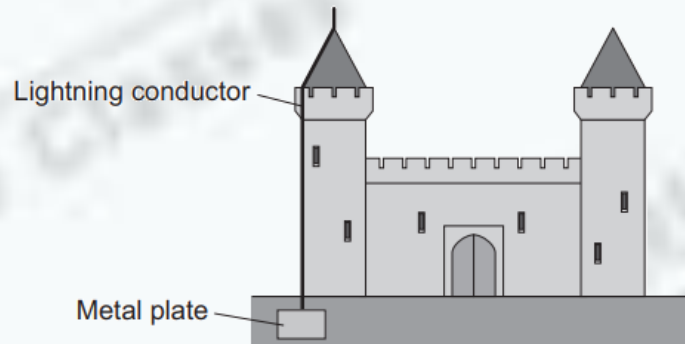
- 1 (b) (ii) From **Figure 1**, what can you conclude about the sizes of the **forces** acting on the balloons?

[1 mark]

\_\_\_\_\_

- 1 (c) A lightning conductor attached to the outside of a building reduces the risk of damage being caused to the building by a lightning strike.

Figure 2



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

- 1 (c) (i) Through which one of the following materials can electrical charge flow easily?

Draw a ring around the correct answer.

[1 mark]

copper

plastic

rubber

- 1 (c) (ii) What happens to the temperature of a lightning conductor when electrical charge flows through it?

[1 mark]

Tick (✓) **one** box.

the temperature decreases

☐

the temperature does not change

☐

the temperature increases

☐

- 1 (c) (iii) During a lightning strike, 4 coulombs of charge flow through a lightning conductor in 0.002 seconds.

Calculate the current in the lightning conductor.

Use the correct equation from the Physics Equations Sheet.

[2 marks]

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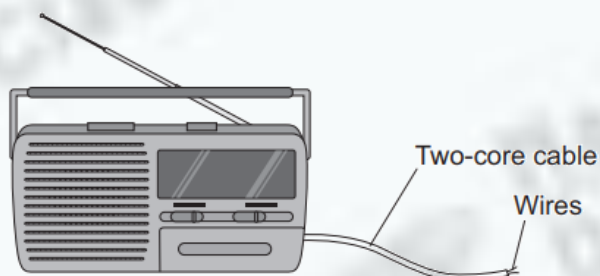
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Current = \_\_\_\_\_ A

## Question: 2

- 4 **Figure 5** shows a radio. The radio can be powered by connecting the two-core cable to the mains electricity supply.

**Figure 5**



- 4 (a) (i) What must be fitted to the cable before it can be connected to the mains electricity supply?

[1 mark]

.....

- 4 (a) (ii) There are only two wires inside the cable.  
What are the names of the two wires inside the cable?

[1 mark]

Tick (✓) **one** box.

Earth and live

☐

Earth and neutral

☐

Live and neutral

☐

- 4 (a) (iii) Use the correct answer from the box to complete the sentence.

[1 mark]

double

extra

fully

It is safe to connect the radio to the mains electricity supply using a two-core cable  
because the radio is ..... insulated.

4 (b) The radio can also be powered by a battery.

What type of current does a battery supply?

[1 mark]

Tick (✓) **one** box.

Alternating current (a.c.) only

☐

Direct current (d.c.) only

☐

Both a.c. and d.c.

☐

4 (c) **Figure 6** shows a fuse and a circuit breaker.

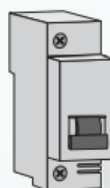
Fuses and circuit breakers are able to disconnect and switch off circuits.

**Figure 6**

**Fuse**



**Circuit breaker**



4 (c) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

earth

live

neutral

A fuse or a circuit breaker is connected to the ..... wire in a circuit.

4 (c) (ii) What happens to cause a fuse or circuit breaker to disconnect a circuit?

[1 mark]

.....

4 (c) (iii) Suggest **two** advantages of using a circuit breaker to disconnect a circuit compared with using a fuse.

[2 marks]

1 .....

.....

2 .....

.....