

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

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.

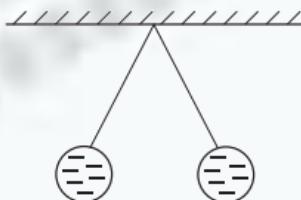
negative

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]

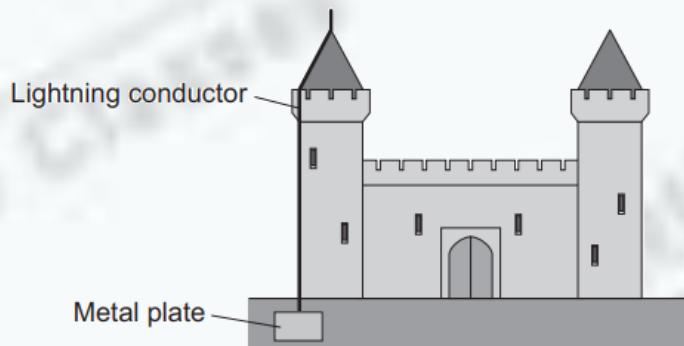
The balloons carry the same type of charge and so _____ each other.

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]

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

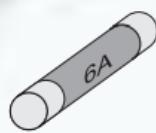
Both a.c. and d.c.

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

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