4. Electricity and magnetism

4.4 Electrical safety

Paper 1 and 2

Question Paper

Paper 1

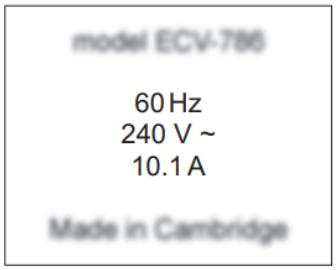
Questions are applicable for both core and extended candidates

1 The mains voltage is 120 V.

Which fuse should be fitted to an electric kettle with a power of 1.5 kW?

A 3 A **B** 5 A **C** 10 A **D** 13 A

2 The diagram shows the safety label on an electric oven.



The oven is connected to a mains electric circuit. A fuse is placed in the circuit to protect the cabling and prevent overheating if there is fault.

Where should the fuse be placed and which rating should the fuse have?

	position of fuse	fuse rating / A
A	live wire	10
B	live wire	13
C	neutral wire	10
D	neutral wire	13

3 The metal case of an electrical appliance is fitted with an earth connection.

What is the purpose of this?

A to complete the circuit supplying the appliance so that it works

B to ensure that the cables supplying the appliance do not become damp

C to prevent the cables supplying the appliance from overheating

D to protect a user of the appliance from electric shock

4 Where must a fuse be connected in a mains electric circuit?

A the earth wire only

B the live wire only

C the neutral wire only

D the live wire and the earth wire

5 An electric heater is plugged into the mains supply using a fused plug.

The current in the heater is 10 A.

The cable attached to the heater is rated at 15 A.

The fuses available are rated at 1.0 A, 3.0 A, 5.0 A and 13 A.

Which fuse should be used?

A 1.0 A **B** 3.0 A **C** 5.0 A **D** 13 A

6 Which statement is correct?

A A fuse is included in a circuit to prevent the current becoming too high.

B A fuse should be connected to the neutral wire in a plug.

C An electric circuit will only work if it includes a fuse.

D An earth wire is needed to prevent the fuse blowing.

7 A double-insulated electrical appliance must be connected safely to the electricity supply.

Which statement is correct?

A It must be connected with a fuse and an earth wire.

B It can be connected with a fuse only.

C It can be connected with an earth wire only.

D It does not need a fuse or an earth wire.

8 Which statement about electrical safety is correct?

A If a device is double insulated, it does not need a fuse.

B A device that has a normal operating current of 3.0 A must be protected by a 3.0 A fuse.

C Switches must always be connected into the live supply wire.

D The metal casing of an electrical device must be connected to the neutral wire.

9 Why is a fuse used in an electric circuit?

A to increase the circuit resistance

B to prevent short circuits

C to reduce the power loss

D to stop the cables from overheating

10 If the insulation within a mains cable becomes damaged, two of the wires in it may touch and cause a short circuit.

Which row is correct?

	the danger when this happens	safety device which avoids this danger
A	a large current will overheat the wiring and lead to a fire	a fuse
B	a large current will overheat the wiring and lead to a fire	a relay
C	the appliance at the end of the cable will be damaged	a fuse
D	the appliance at the end of the cable will be damaged	a relay

11 Why is a fuse used in an electrical circuit?

A so that the current can have only one value

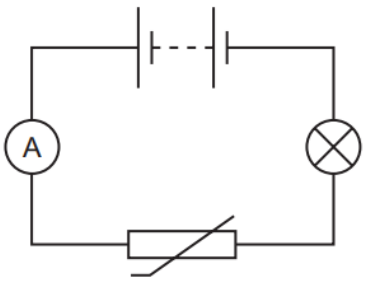
B to prevent the current becoming too large

C to provide a path to earth if a fault occurs

D to save electrical energy

12 Which circuit contains a fuse?

A



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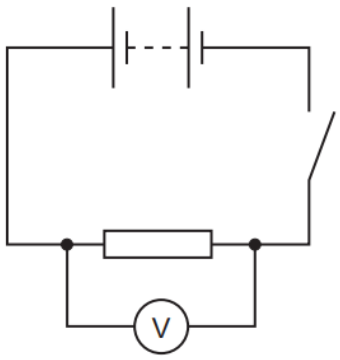

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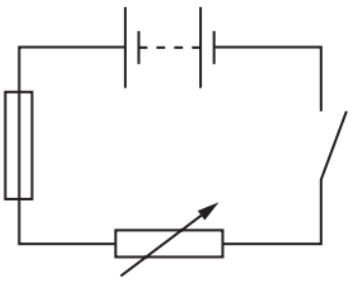

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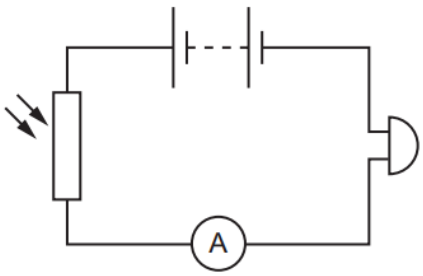

13 Which components are designed to improve the safe working of a mains electrical supply?

	circuit breaker	earth wire	fuse
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✓
D	✓	✓	✓

14 The metal cases of electrical appliances are connected to an earth wire.

Which statement is **not** correct?

A The live wire may become loose and touch the metal case.

B If the metal case becomes live, the earth wire conducts current to the ground.

C The earth wire needs to have a high resistance.

D Earthing metal cases helps prevent a person from receiving an electric shock.

15 A teacher asks, 'Why do we put a fuse in a mains circuit?'

Student 1 says, 'It protects the wiring from overheating.' Student 2 says, 'It protects us from getting a shock if we touch the live wire.'

Who is correct?

A both students

B neither student

C student 1 only

D student 2 only

16 The current in a small electric heater is 4.0 A.

The cable connected to the heater is able to carry currents up to 10 A.

Fuses rated 1 A, 3 A, 5 A and 13 A are available.

Which fuse should be used?

A 1 A **B** 3 A **C** 5 A **D** 13 A

17 A hairdresser is using a hairdryer with a plastic casing. He notices that there is no wire attached to the earth pin of the plug.

Why is an earth connection **not** needed?

A Plastic is an insulator.

B The hairdresser only touches the handle of the dryer.

C The hairdryer uses a.c. so cannot give the hairdresser a shock.

D Wet hands do not conduct electricity.

18 An electric drill, operating from a supply voltage of 240 V, uses a current of 3.5 A.

Which rating of fuse should be used to protect the drill's cable?

A 250 V **B** 200 V **C** 5 A **D** 3 A

19 The current in a lamp connected on its own to the mains supply is 0.60 A.

A table decoration has three of these lamps connected in parallel.

Which rating of fuse is suitable to protect this circuit?

A 0.2 A **B** 0.6 A **C** 1.0 A **D** 5.0 A

20 The information on the back of a television is shown.

220–240 V
~50 Hz
0.6 A

Which fuse provides the best protection for the circuit?

A 0.5 A **B** 1 A **C** 5 A **D** 13 A

21 An electrical appliance is powered from a mains supply.

The appliance normally uses a current of 3 A, but the current briefly rises to 4 A at the instant the appliance is switched on. The cable to the appliance is designed for currents up to 6 A.

A fuse is used to protect the circuit.

What should be the rating of the fuse?

A 1 A **B** 3 A **C** 5 A **D** 13 A

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

22 Two electrical appliances are connected to the mains supply.

The cable connected to one appliance includes an earth wire.

The cable connected to the second appliance does **not** need an earth wire.

What is a reason for this difference?

A One appliance has a metal case, but the other appliance does not.

B One appliance is fitted with a fuse, but the other appliance is not.

C One appliance is fitted with a switch, but the other appliance is not.

D One appliance needs more current than the other appliance.