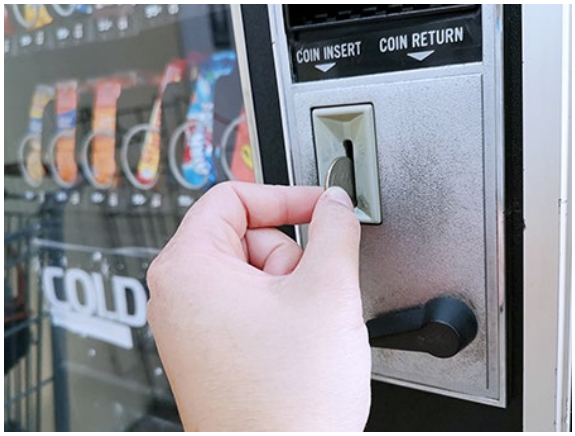
Questions are for both separate science and combined science students

Q1.

Figure 1 shows a student putting a coin into a vending machine that sells food.

Figure 1



The vending machine is connected to the mains electricity supply.

(a) What is the frequency of the mains electricity supply in the UK?

Tick (✓) **one** box.

50 hertz ☐

60 hertz ☐

100 hertz ☐

(1)

(b) What is the potential difference of the mains electricity supply in the UK?

Tick (✓) **one** box.

12 volts ☐

230 volts ☐

20 000 volts ☐

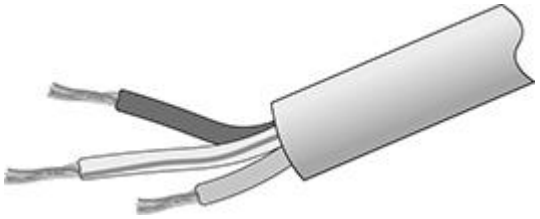
(1)

(Total 2 marks)

Q2.

An electrical appliance is connected to the mains electricity supply using a three-core cable.

The figure below shows a three-core cable.



(a) What colour is the insulation covering the live wire inside the cable?

Tick (✓) **one** box.

Blue ☐

Brown ☐

Green and yellow ☐

Orange ☐

(1)

(b) What colour is the insulation covering the neutral wire inside the cable?

Tick (✓) **one** box.

Blue ☐

Brown ☐

Green and yellow ☐

Orange ☐

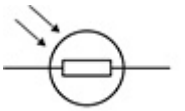
(1)

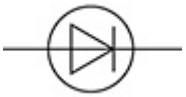
The plug connected to the cable contains a fuse.

A fuse contains a wire that is designed to melt when the current is too great.

(c) What is the circuit symbol for a fuse?

Tick (✓) **one** box.

 ☐

 ☐

 ☐

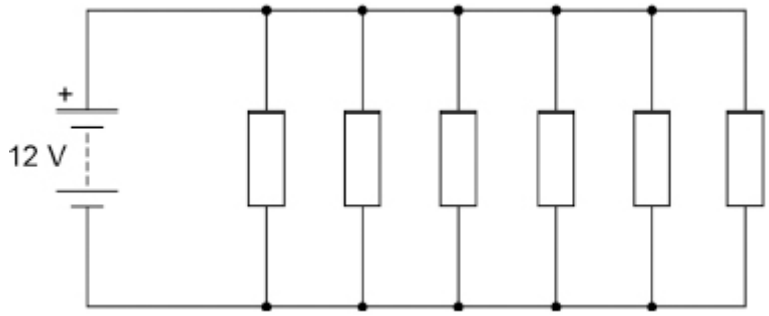
(1)

(Total 3 marks)

Q3.

The figure below shows an electrical circuit used to heat the windscreen of a car.

Each resistor in the circuit represents a heating element.



(a) The 12 V battery supplies direct potential difference.

What is meant by 'direct potential difference'?

_____

_____

_____

(1)

Use the Physics Equations Sheet to answer parts (b) and (c).

(b) Which equation links charge flow (Q), energy (E) and potential difference (V)?

Tick (✓) **one** box.

$E = \frac{V}{Q}$ ☐

$E = QV$ ☐

$E = \frac{Q}{V}$ ☐

$E = \frac{V^2}{Q}$ ☐

(1)

(c) Calculate the charge flow through the 12 V battery when the battery transfers 5010 J of energy.

Charge flow = _____ C

(3)

(Total 5 marks)