

Name of the Student: _____

Max. Marks : 24 Marks

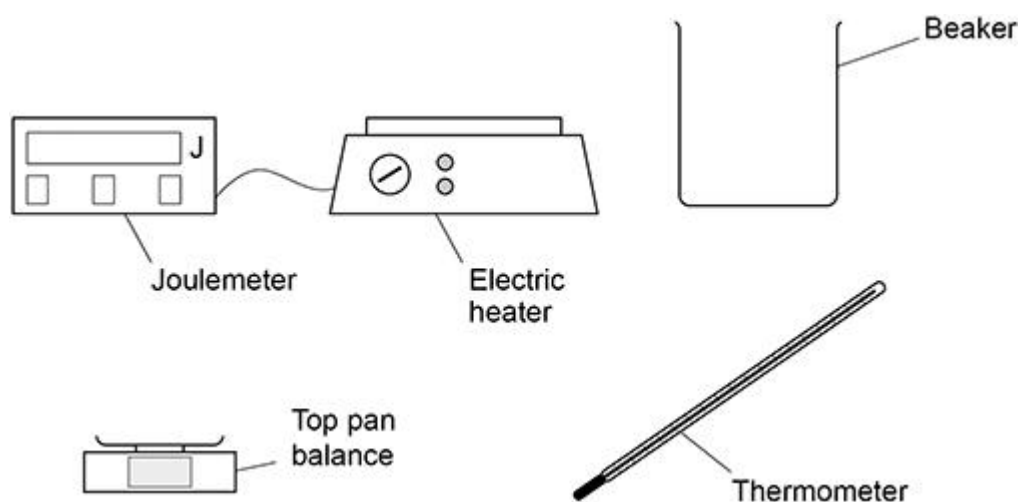
Time : 24 Minutes

Q1.

A student made measurements to determine the specific heat capacity of vegetable oil.

Figure 1 shows the equipment used.

Figure 1



- (a) Describe how the student could use the equipment shown in **Figure 1** to determine the specific heat capacity of vegetable oil.

(6)

(b) Give **one** risk when using the equipment in **Figure 1**.

(1)

A different student did not have a joulemeter and calculated the energy transferred by the electric heater.

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

(c) Write down the equation linking energy transferred (E), power (P) and time (t).

(1)

(d) The electric heater had a power output of 50 watts.

Calculate the time taken for the electric element to transfer 4750 joules of energy to the vegetable oil.

Time taken = _____ s

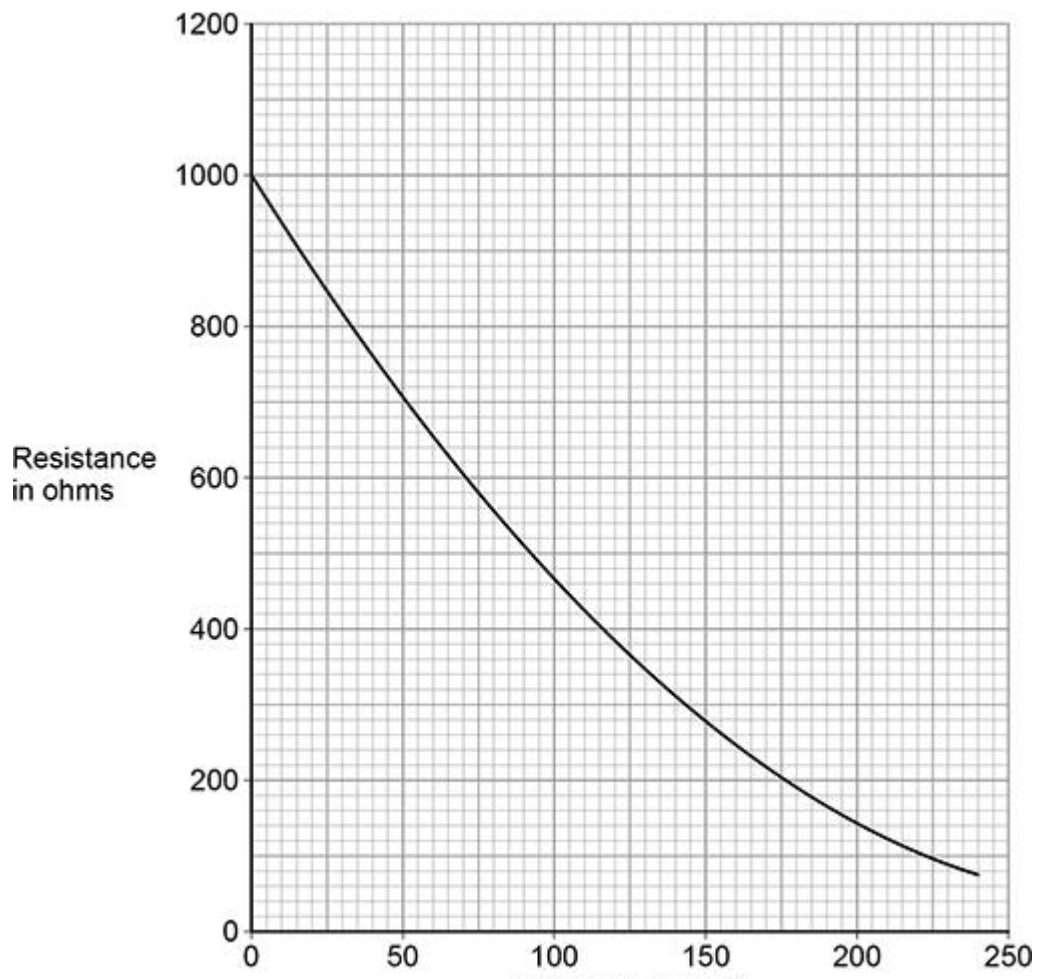
(3)

In a deep fryer, vegetable oil is heated by an electric heating element. Food is then cooked in the hot vegetable oil.

The deep fryer contains an electrical component to monitor the temperature of the vegetable oil.

Figure 2 shows how the resistance of this electrical component changes with temperature.

Figure 2



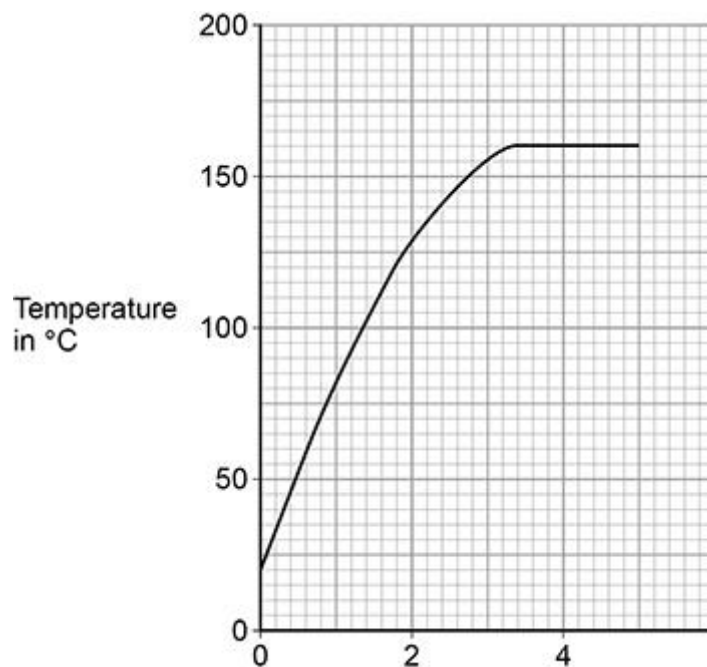
- (e) What electrical component is used to monitor the temperature of the vegetable oil?

(1)

- (f) The electric heating element in the deep fryer automatically switches off when the vegetable oil reaches a certain temperature.

Figure 3 shows how the temperature of the vegetable oil changed after the deep fryer was switched on.

Figure 3



Determine the resistance of the electrical component when the electric heating element automatically switched off.

Use **Figure 2** and **Figure 3**.

Resistance = _____ Ω

(2)

- (g) Some chips were put in the deep fryer.

In the deep fryer, water in the chips underwent a physical change and became steam.

Why is this a physical change?

Tick (✓) **one** box.

All water can change to steam.

☐

No chemicals are involved when water changes to steam.

☐

The change from water to steam can be detected visually.

☐

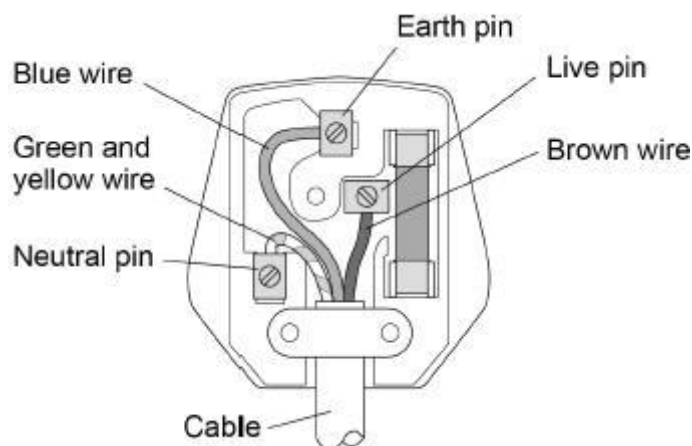
The water will recover its original properties if the steam is cooled.

☐

(1)

Q2.

The diagram below shows the inside of a plug.



- (a) The plug is **not** wired correctly.

What should be done to connect the wires in the plug correctly?

(1)

The correctly wired plug and cable connects a washing machine to the mains electricity supply.

- (b) Give the potential difference and frequency of the mains electricity supply in the UK.

The potential difference is _____ V

The frequency is _____ Hz

(2)

- (c) The washing machine is switched on.

What is the potential difference between the neutral wire and the earth wire?

Potential difference = _____ V

(1)

- (d) The plug has a fuse.

Draw the circuit symbol for a fuse in the space below.

The washing machine has a metal case.

A fault causes the live wire to make an electrical connection with the metal case of the washing machine.

(e) The earth wire is **not** connected to the metal case of the washing machine.

Explain why it would not be safe for a person to touch the metal case.

(2)

(f) The earth wire is now connected to the metal case of the washing machine.

Explain why it would now be safe for a person to touch the metal case, even if the live wire touches the metal case.

(2)

(Total 9 marks)