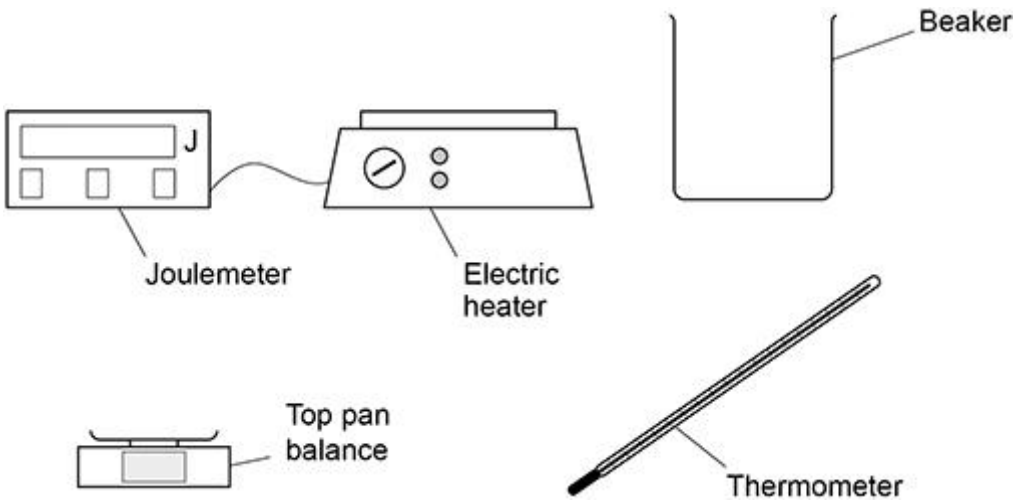
Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

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.

Downloaded from www.merit-minds.com

_____

(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)

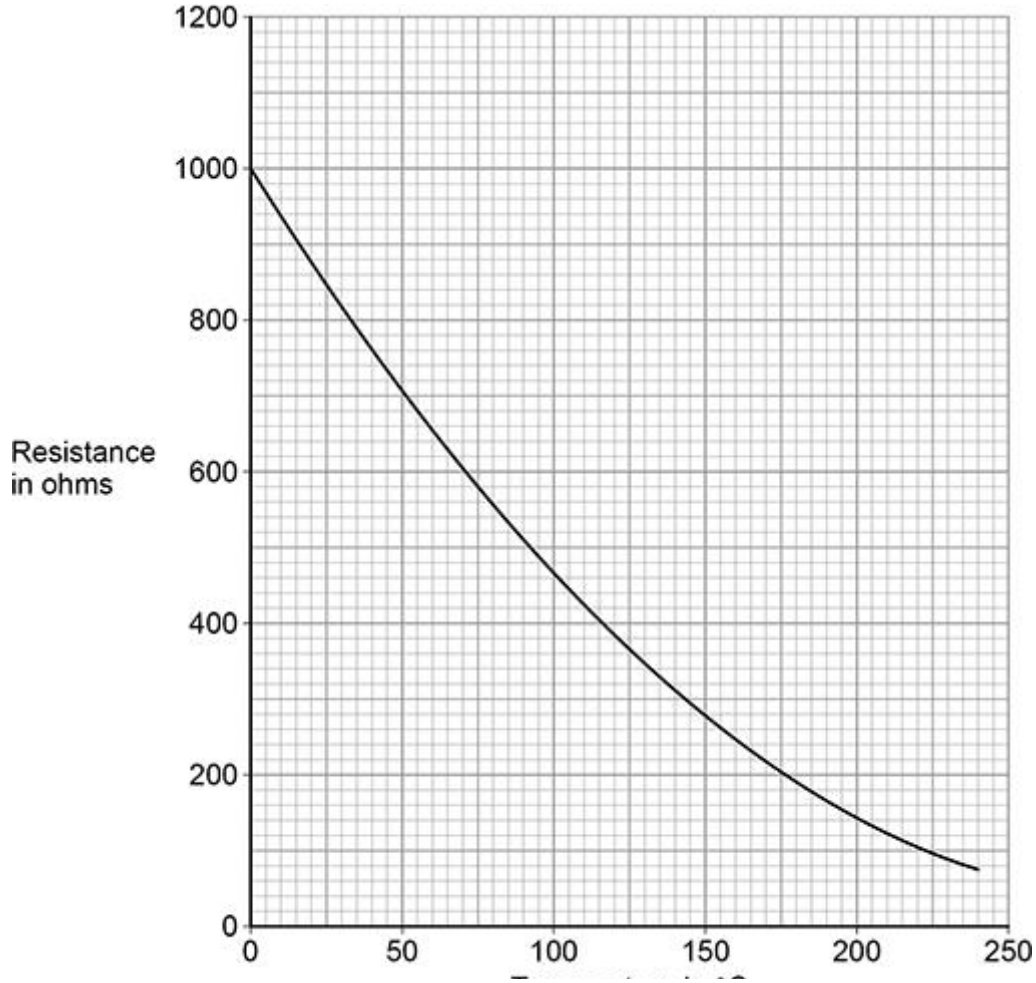
In a deep fryer, vegetable oil is heated by an electric heating element. Food is then cooked in the hot vegetable oil.

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

Downloaded from www.merit-minds.com



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

_____

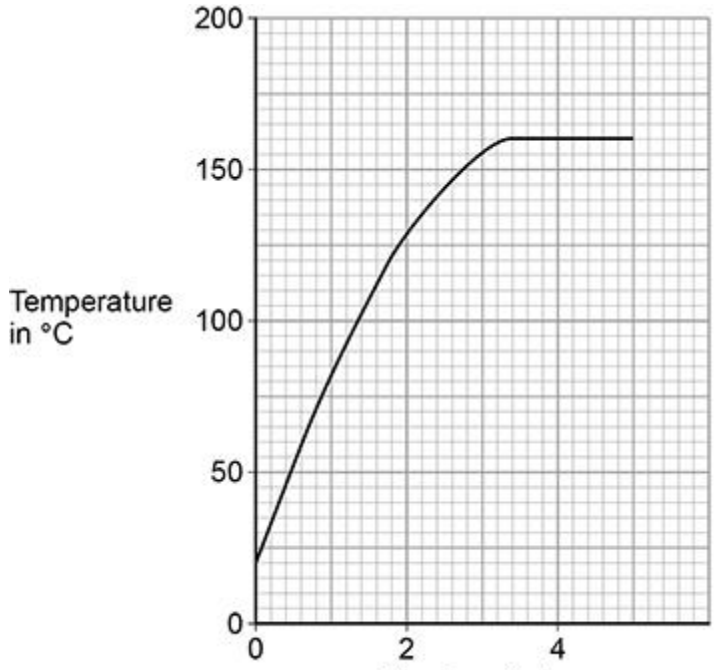
(1)

(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

Downloaded from www.merit-minds.com



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)

Downloaded from www.merit-minds.com

(Total 15 marks)

Q2.

Figure 1 shows a student making potato soup.

Figure 1

(a) The student places 0.5 kg of potato into a pan of water.

During cooking, the temperature of the potato increases from 20 °C to 100 °C

The specific heat capacity of the potato is 3400 J/kg °C

Calculate the change in thermal energy of the potato.

Use the equation:

change in thermal energy = mass × specific heat capacity × temperature change

_____

_____

_____

_____

_____

_____

Change in thermal energy = _____ J

(3)

(b) Why is the energy supplied by the cooker greater than that calculated in part (a)?

_____

(1)

(c) Suggest **one** way that the student could reduce the time to heat the potato to 100 °C

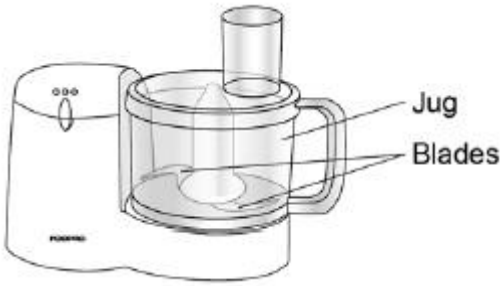
_____

(1)

Figure 2 shows a food processor.

Downloaded from www.merit-minds.com

Figure 2



(d) The student places the cooked potato into the jug of the food processor.

The food processor contains a motor that spins blades to chop the potato.

The total power input to the motor is 500 W

The useful power output from the motor is 300 W

Calculate the efficiency of the motor in the food processor.

Use the equation:

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

_____

_____

_____

Efficiency = _____

(2)

(e) The jug is made of plastic with a low thermal conductivity.

Explain why this is an advantage.

_____

_____

_____

_____

(2)

(Total 9 marks)

Downloaded from www.merit-minds.com