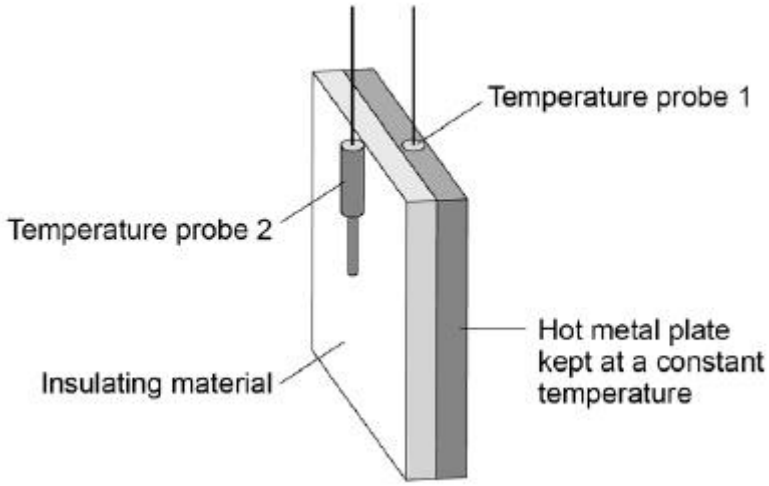
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

A student investigated the properties of three types of insulation.

Figure 1 shows the apparatus the student used.

Figure 1



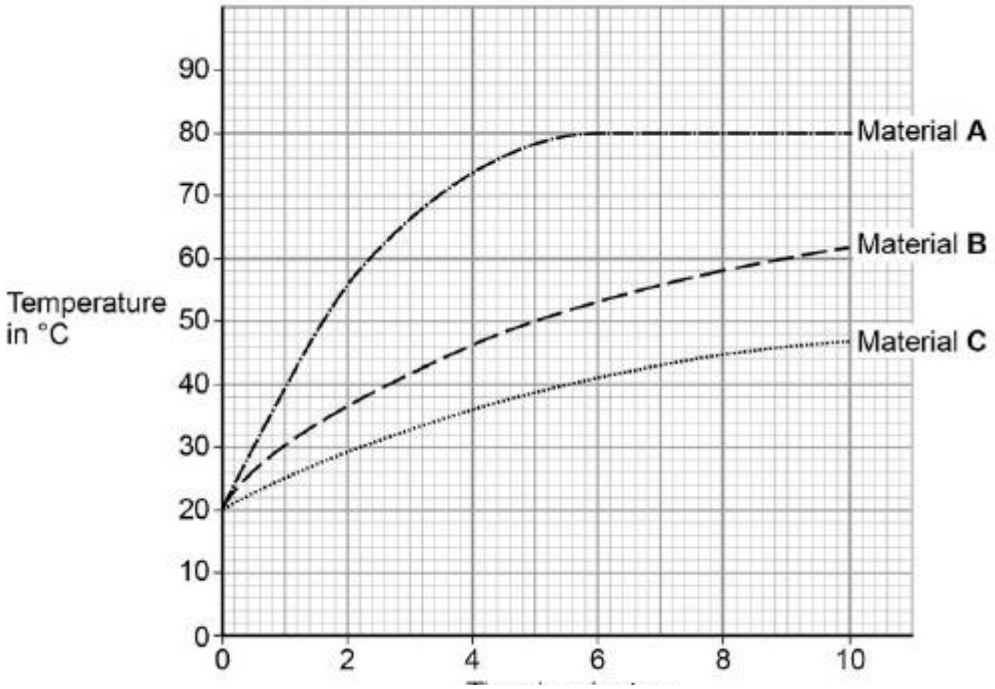
In the investigation different insulating materials were placed in contact with the hot metal plate.

Temperature probes measured the temperature on each side of the material.

The temperature probes were connected to a data logger.

Figure 2 shows how the temperature measured by temperature probe 2 changed over 10 minutes for each of the materials.

Figure 2



(a) What was the temperature of the hot metal plate?

_____ °C

(1)

(b) Which material is the best insulator?

Tick **one** box.

A ☐ **B** ☐ **C** ☐

Give the reason for your answer.

_____

_____

(2)

(c) Another student repeated the investigation but doubled the thickness for all three insulating materials.

Suggest how using thicker insulation would affect the results of the second student's investigation compared with the first student's results.

_____

_____

_____

_____

_____

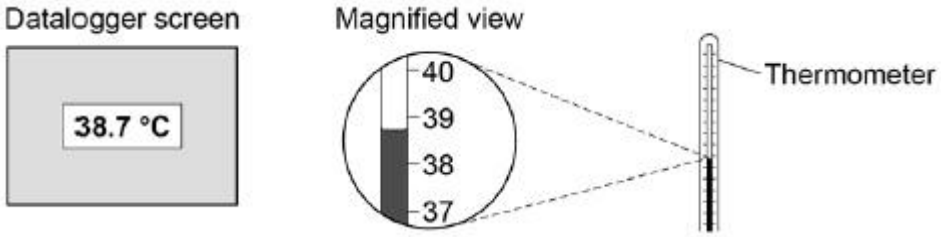
_____

(2)

(d) The students could have used a thermometer instead of temperature probes and a datalogger.

Figure 3 shows the datalogger screen and a thermometer.

Figure 3



Give two advantages of using the datalogger and temperature probes compared to a thermometer.

1. _____

_____

2. _____

_____

(2)

(e) The table gives information about four types of insulation that could be used for insulating the cavity walls of houses.

Type of insulation	**Thermal conductivity in W/m °C**
Felt wool	0.070
Mineral wool	0.040
Polyurethane foam	0.030
Rock wool	0.045

Explain which one of the types of insulation in the table would be the best to use for cavity wall insulation.

_____

_____

_____

_____

_____

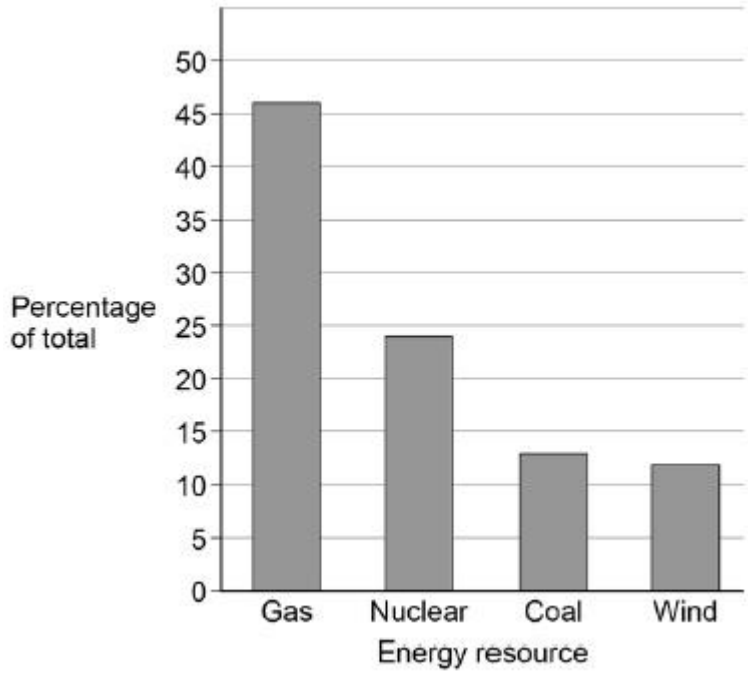
_____

(2)

(Total 9 marks)

Q2.

The graph gives information about the production of electricity in the UK in 2016.



(a) The UK government signed the Paris Climate Agreement in April 2016.

The agreement commits the UK to reduce the amount of carbon dioxide released into the atmosphere.

Explain which energy resources in the graph should be used to meet the UK's commitment to the Paris Climate Agreement.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) On average, there is enough wind in the UK each year to supply all of the UK's electricity needs.

Explain why the UK may still need power stations that use fuel to generate electricity.

_____

_____

_____

_____

(2)

(c) All European countries signed the Paris Climate Agreement in 2016.

In the future, some European countries will only allow electric vehicles.

Suggest how this is likely to affect methods of electricity generation in these countries.

_____

_____

_____

_____

_____

_____

(3)

(Total 9 marks)