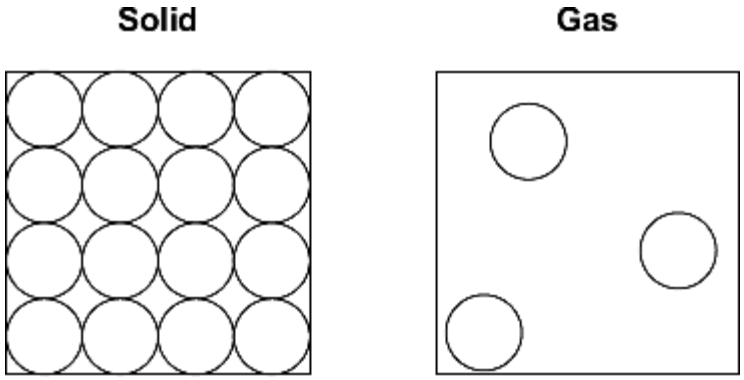
Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

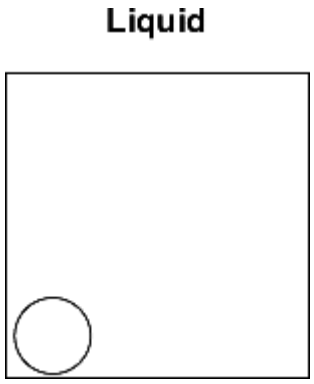
Q1.

(a) The diagrams show the arrangement of the particles in a solid and in a gas.

Each circle represents one particle.



(i) Complete the diagram below to show the arrangement of the particles in a liquid.



(2)

(ii) Explain, in terms of the particles, why gases are easy to compress.

_____

_____

_____

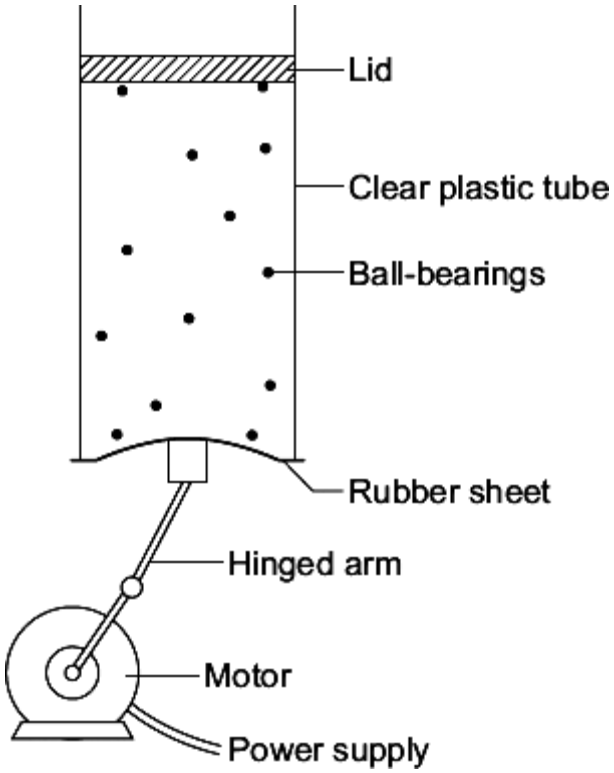
_____

(2)

(b) The diagram below shows the model that a science teacher used to show her students that there is a link between the temperature of a gas and the speed of the gas particles.

Downloaded from www.merit-minds.com

The ball-bearings represent the gas particles. Switching the motor on makes the ball-bearings move around in all directions.



(i) How is the motion of the ball-bearings similar to the motion of the gas particles?

_____

_____

(1)

(ii) The faster the motor runs, the faster the ball-bearings move. Increasing the speed of the motor is like increasing the temperature of a gas.

Use the model to predict what happens to the speed of the gas particles when the temperature of a gas is increased.

_____

_____

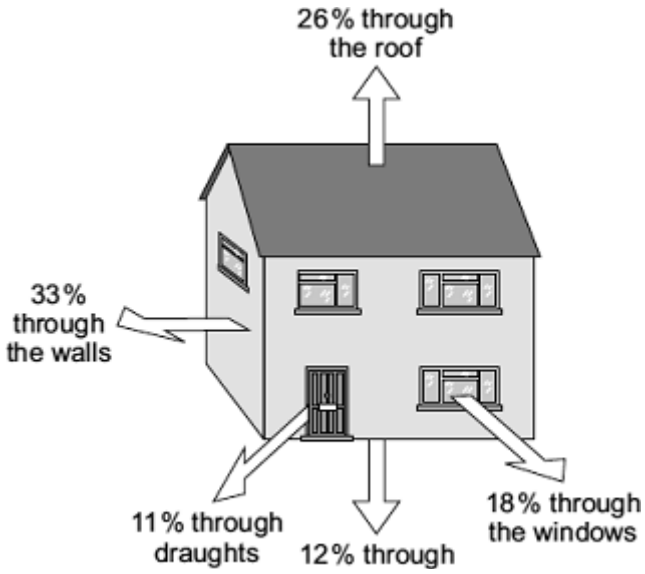
(1)

(Total 6 marks)

Q2.

The diagram shows where heat is lost from a house that is **not** insulated.

Downloaded from www.merit-minds.com



(a) (i) Through which part of the house is most heat lost?

_____

(1)

(ii) How can the heat loss through the windows be reduced?

_____

_____

(1)

(b) A homeowner wants to reduce her energy bills and make her home more energy efficient. The table shows five ways this could be done. The table also shows how much money each way would save the homeowner each year.

	Cost	**Money saved each year**
Installing loft insulation	£175	£60
Fitting draught-proofing	£45	£20
Installing cavity wall insulation	£300	£80
Adding a hot water tank jacket	£15	£20
Using energy efficient light bulbs	£60	£30

(i) Which **one** of the five ways of reducing energy bills would reduce the yearly energy bill the most?

_____

(1)

(ii) This year the homeowner has only got £60 to spend to improve the energy efficiency of her home.

Downloaded from www.merit-minds.com

Use the information in the table to explain what the homeowner should spend this money on.

_____

_____

_____

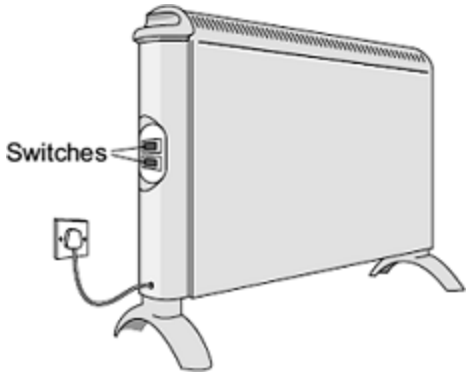
_____

(2)

(Total 5 marks)

Q3.

(a) The diagram shows two switches on a room heater. The heater has three power settings. The power produced by two of the settings is given in the table.



Setting	Power in kW
Low	0.5
Medium	1.5
High	

(i) When both switches are on, the heater works at the high power setting.

What is the power of the heater when it is switched to the **high** power setting?

_____

Power = _____ kW

(1)

(ii) The heater is used on the **medium** power setting. It is switched on for three hours.

Use the equation in the box to work out the energy transferred from the mains to the heater in three hours.

energy transferred (kilowatt-hour, kWh)	=	power (kilowatt, kW)	×	time (hour, h)

Show clearly how you work out your answer.

_____

_____

Energy transferred = _____ kWh

(2)

Downloaded from www.merit-minds.com

(iii) Electricity costs 12 pence per kilowatt-hour.

Use the equation in the box to calculate how much the heater costs to use on **medium** power for three hours.

total cost = number of kilowatt-hours × cost per kilowatt-hour

Show clearly how you work out your answer.

_____

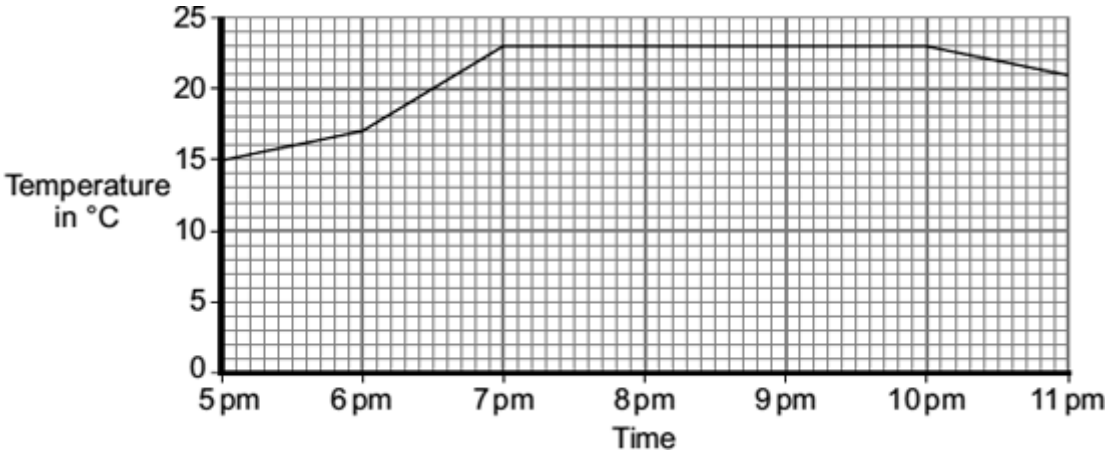
_____

Total cost = _____ pence

(2)

(b) The heater is used to warm a room.

The graph shows how the temperature of the room changes from the moment the heater is switched on.



The heater was first used on the medium setting.

(i) At what time was the heater setting changed to the **high** setting?

_____

Give a reason for your answer.

_____

_____

_____

(2)

(ii) From 7 pm until 10 pm, the temperature of the room is **not** changing.

Which **one** of the following statements gives the reason why the temperature of the room is **not** changing?

Put a tick (✓) in the box next to your answer.

Downloaded from www.merit-minds.com

The room is losing energy slower than the heater supplies energy. ☐

The room is losing energy as fast as the heater supplies energy. ☐

The room is losing energy faster than the heater supplies energy. ☐

(1)

(Total 8 marks)

Downloaded from www.merit-minds.com