AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



EXAM QUESTION PACK

4.3.2.3 CHANGES OF HEAT AND SPECIFIC LATENT HEAT (PACK 2)

SCORE	PERCENTAGE
/42	%

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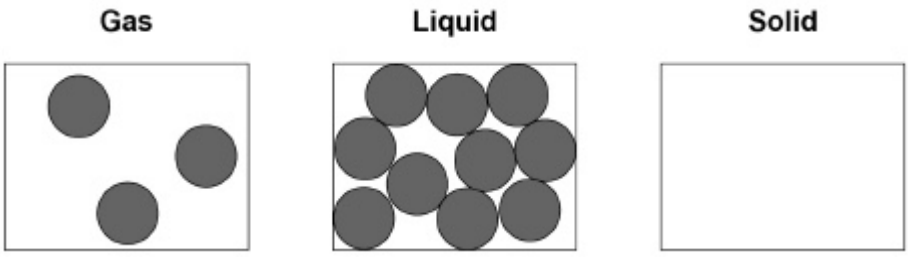
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Q1.

The diagram shows a model of the particles in a gas and in a liquid.



(a) Complete the diagram to show the arrangement of particles of the same substance as a solid.

(2)

(b) What is the name of the process when a substance changes from a gas to a liquid?

Tick **one** box.

Condensing ☐

Evaporating ☐

Freezing ☐

Melting ☐

(1)

(c) The substance in the diagram has a:

- melting point of 98 °C
- boiling point of 883 °C

What is the state of the substance at 20 °C?

Tick **one** box.

Gas ☐ Liquid ☐ Solid ☐

(1)

(d) What type of change is a change of state?

Tick **one** box.

Chemical ☐

Kinetic ☐

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Permanent ☐

Physical ☐

(1)

(e) Which **two** statements are correct about the particles when a liquid turns into a gas?

Tick **two** boxes.

Particles are bigger ☐

Particles are lighter ☐

Particles have more chemical energy ☐

Particles have more kinetic energy ☐

Particles move faster ☐

(2)

(f) Which **two** quantities are needed to calculate the energy required to turn a liquid into a gas with no change in temperature?

Tick **two** boxes.

Mass of the liquid ☐

Specific heat capacity of the gas ☐

Specific latent heat of vaporisation ☐

Time the liquid is heated ☐

(2)

(g) A mass of 2.0 kg of water is heated.

The temperature increase of the water is 80 °C

The specific heat capacity of water is 4200 J / kg °C

Calculate the change in thermal energy when the water is heated.

Use the equation:

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

_____

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Change in thermal energy = _____ J

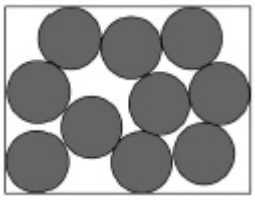
(2)

(Total 11 marks)

Q2.

Figure 1 shows a model of the particles in a liquid.

Figure 1



(a) Give **one** similarity and **one** difference you would see in **Figure 1** if it showed the same substance as a gas.

Similarity _____

Difference _____

(2)

(b) Describe **two** limitations of the model shown in **Figure 1**.

1. _____

2. _____

(2)

(c) Explain why substances have different melting points.

(2)

(d) Some fire extinguishers contain liquid carbon dioxide.

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Suggest how carbon dioxide gas can be changed to liquid carbon dioxide without reducing its temperature.

_____

_____

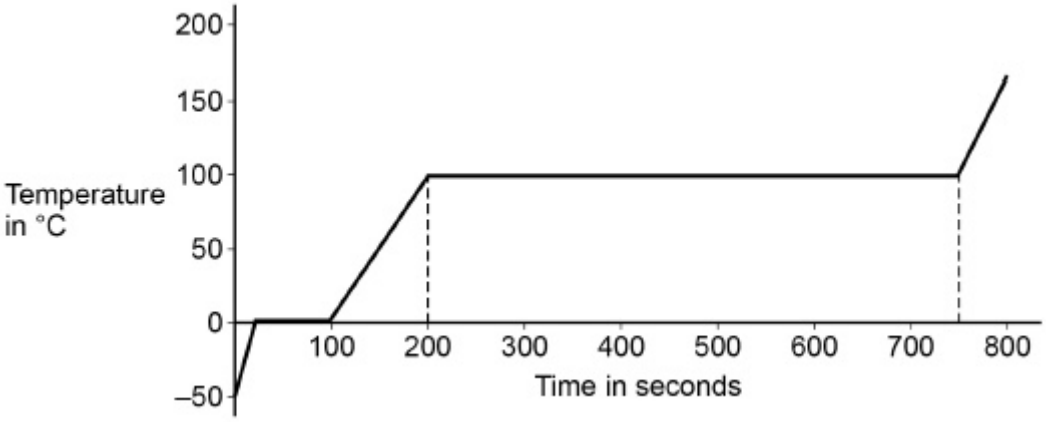
(1)

Ice was heated at a constant rate.

Eventually all the ice changed to a gas.

Figure 2 shows how the temperature changed over 800 seconds.

Figure 2



(e) What change of state occurs between 200 seconds and 750 seconds?

_____

_____

(1)

(f) Explain how **Figure 2** shows that the specific latent heat of vaporisation is greater than the specific latent heat of fusion.

Use data from **Figure 2**.

_____

_____

_____

_____

(2)

(g) 1695 kJ of energy is transferred to water at 100 °C

The specific latent heat of vaporisation of water is 2.260×10^6 J / kg

Calculate the mass of water changed into a gas at 100 °C

Use the Physics Equations Sheet.

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Mass of water = _____ kg

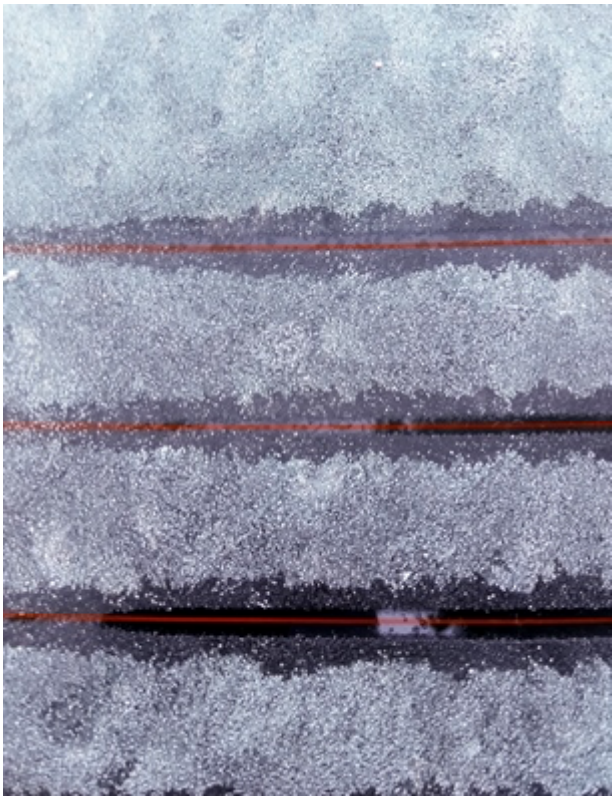
(3)

(Total 13 marks)

Q3.

Figure 1 shows solid ice on a car's rear window.

Figure 1



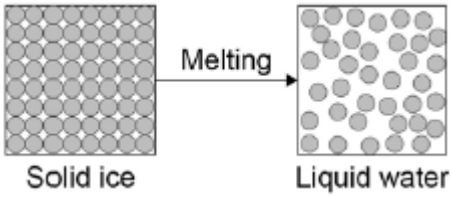
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The glass window contains an electrical heating element.

(a) Use the particle model in **Figure 2** to describe how the heating element causes the arrangement of the ice particles to change as the ice melts.

Figure 2

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You should include a description of how the particles are arranged in the solid ice and in the water.

(6)

(b) A car manufacturer tests different heating elements by measuring how long it takes ice to melt.

During the test some variables must be controlled.

Identify **two** control variables in the car manufacturer's test.

Tick **two** boxes.

- The colour of the car ☐
- The current in the heating element ☐
- The mass of ice ☐
- The size of the car ☐
- The time taken for the ice to melt ☐

(2)

(c) Some of the energy supplied by the heater causes the ice to melt without the temperature of the ice increasing.

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What is the name given to this energy supplied by the heater?

Tick **one** box.

Latent heat of freezing ☐

Latent heat of fusion ☐

Latent heat of vaporisation ☐

(1)

(d) When the heater is supplied with 120 J of energy each second, the internal energy of the ice increases by 45 J each second.

Use the following equation to calculate the efficiency of the heater.

$$\text{Efficiency} = \frac{\text{Output energy transfer}}{\text{input energy transfer}}$$

Give your answer to two decimal places.

_____

_____

_____

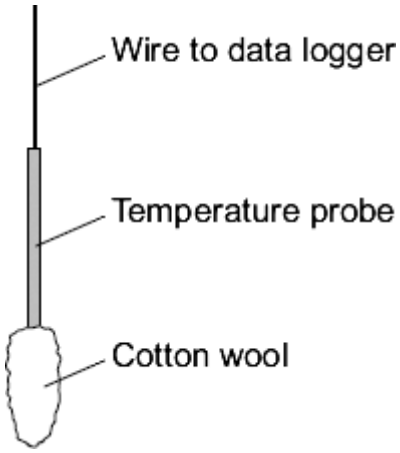
Efficiency = _____

(2)

(Total 11 marks)

Q5.

A student investigated the evaporation of three different liquids using the apparatus shown.



Identical pieces of cotton wool were soaked in one of three liquids, **A**, **B** or **C**, that have different boiling points. The same volume of liquid, at the same starting temperature, was

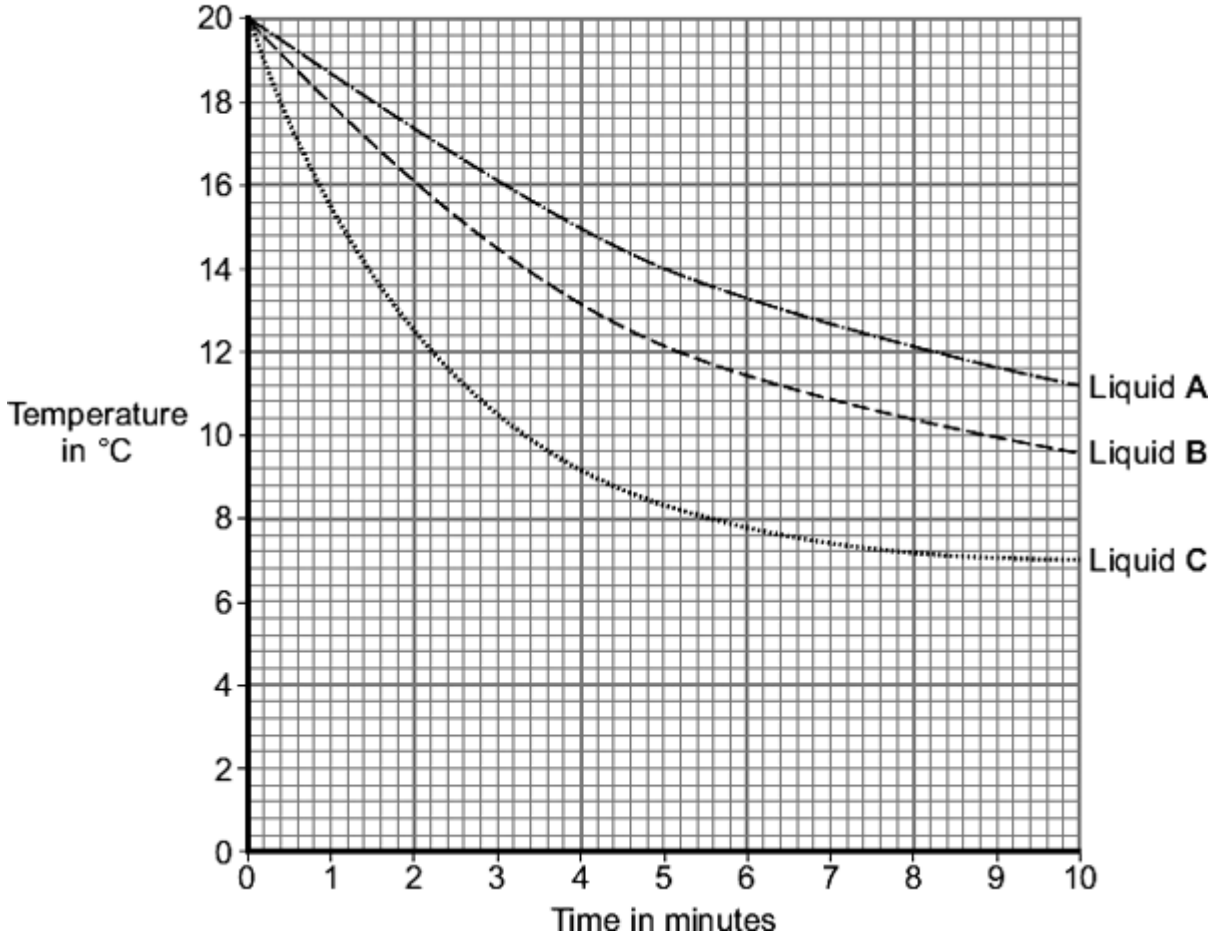
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used each time.

The temperature of the cotton wool was measured during a ten minute period.

The results are shown on **Graph 1**.

Graph 1



(a) Which liquid has the lowest boiling point?

Explain your choice.

Liquid _____

Explanation _____

_____

_____

_____

(2)

(b) Room temperature is 20 °C.

The line for liquid **C** reached a lower limit of 7 °C.

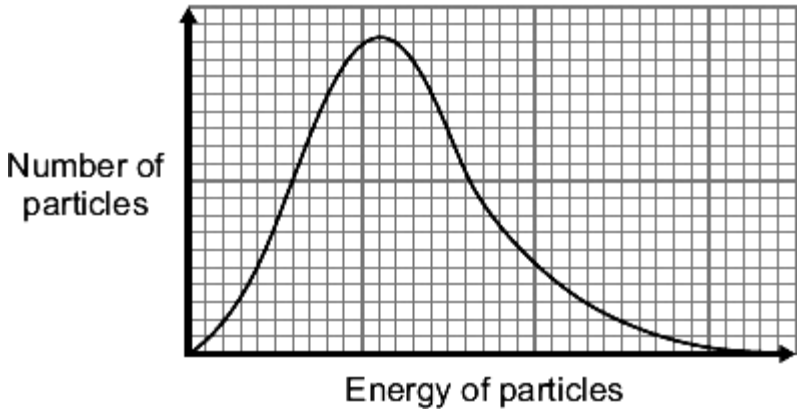
Explain why the temperature did **not** fall below 7 °C.

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(1)

(c) **Graph 2** shows the distribution of energy among particles in a liquid.

Graph 2



Explain, in terms of the particles in a liquid, why evaporation causes cooling.

You may use information from **Graph 2** to help you with your answer.

(4)

(Total 7 marks)

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