# The Particulate nature of matter – 2021 IGCSE 0620

**1.** Nov/2021/Paper_11&21/No.1

Decane has a freezing point of –30 °C and a boiling point of 174 °C.

A small sample of decane is placed in an open beaker in an oven at a temperature of 120 °C and at atmospheric pressure for 24 hours.

What happens to the sample of decane?

**A** It boils.

**B** It evaporates.

**C** It melts.

**D** It sublimes.

**2.** Nov/2021/Paper_12/No.1

Which row describes what happens to the particles in solid iodine when it is heated and turned into a gas?

| | separation of particles | speed of particles |
|---|---|---|
| **A** | closer together | faster |
| **B** | closer together | slower |
| **C** | further apart | faster |
| **D** | further apart | slower |

**3.** Nov/2021/Paper_13/No.1

The particles in a substance are far apart, randomly arranged and moving.

The substance changes state and the particles are now close together. The particles are still randomly arranged and able to move.

What is the change of state of the substance?

**A** gas to liquid

**B** liquid to gas

**C** liquid to solid

**D** solid to gas

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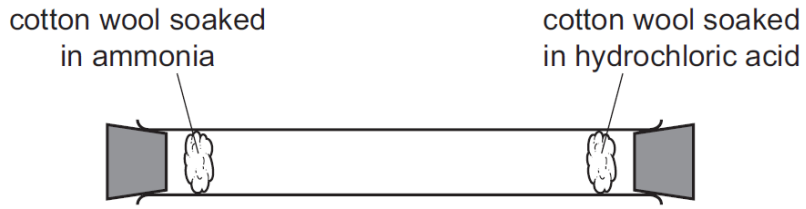
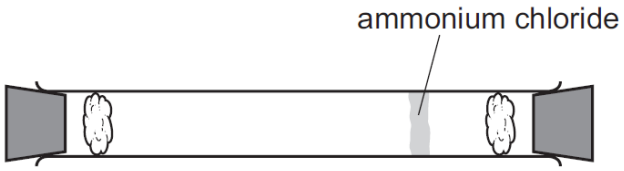
**4.** Nov/2021/Paper_22/No.1

An experiment is set up as shown.




After several minutes, a white ring of ammonium chloride appears as shown.




Which statement explains the observation after several minutes?

**A** Ammonia gas diffuses faster than hydrogen chloride gas because its molecules have a lower molecular mass.

**B** Ammonia gas diffuses faster than hydrogen chloride gas because its molecules have a higher molecular mass.

**C** Ammonia gas diffuses slower than hydrogen chloride gas because its molecules have a lower molecular mass.

**D** Ammonia gas diffuses slower than hydrogen chloride gas because its molecules have a higher molecular mass.

**5.** Nov/2021/Paper_23/No.1

Brownian motion and the diffusion of gases provide evidence for the particulate nature of matter.

Which row identifies an example of Brownian motion and how molecular mass determines the rate of diffusion of gas molecules?

| | Brownian motion | diffusion |
|---|---|---|
| **A** | pollen grains in water are seen to move randomly | heavier gas molecules diffuse more quickly |
| **B** | pollen grains in water are seen to move randomly | lighter gas molecules diffuse more quickly |
| **C** | salt dissolves faster in hot water than in cold water | heavier gas molecules diffuse more quickly |
| **D** | salt dissolves faster in hot water than in cold water | lighter gas molecules diffuse more quickly |

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**6.** Nov/2021/Paper_42/No.1

This question is about states of matter.

**(a)** Complete the table, using ticks (✓) and crosses (✗), to describe the properties of gases, liquids and solids.

| state of matter | particles are touching | particles have random movement | particles are regularly arranged |
|---|---|---|---|
| gas | | | |
| liquid | | | |
| solid | | | |

[3]

**(b)** Substances can change state.

**(i)** Boiling and evaporation are two ways in which a liquid changes into a gas.

Describe **two** differences between boiling and evaporation.

1 .....

2 .....

[2]

**(ii)** Name the change of state when:

- a gas becomes a liquid .....
- a solid becomes a gas. .....

[2]

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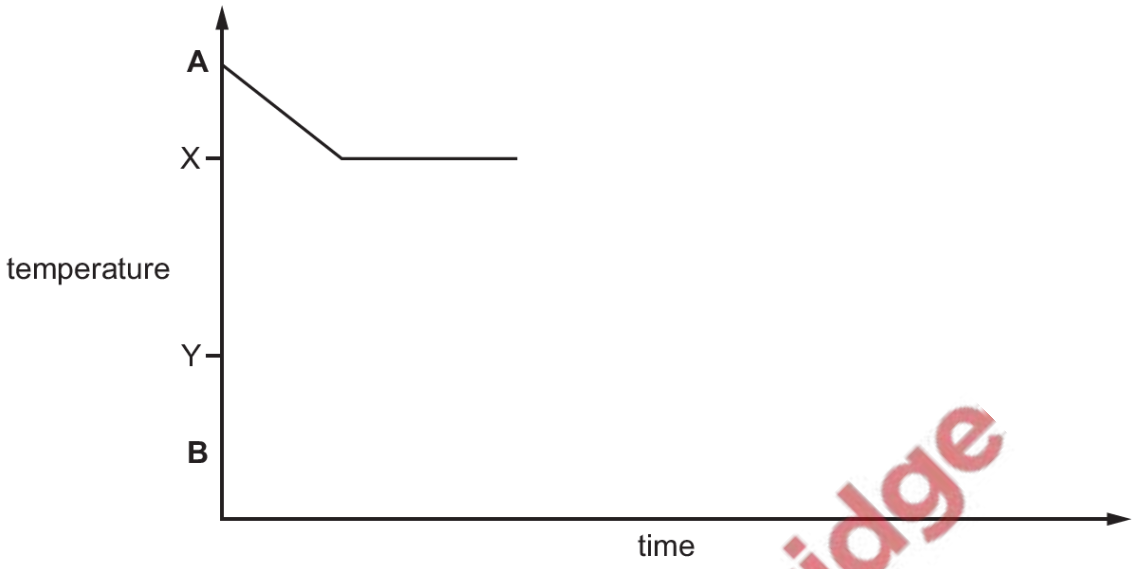
**(c)** A substance boils at temperature X and melts at temperature Y.

Complete the graph to show the change in temperature over time as the substance cools from temperature **A** to temperature **B**.




[2]

**(d)** A solution is a mixture of a solute and a solvent.

**(i)** Name the process when a solid substance mixes with a solvent to form a solution.

..... [1]

**(ii)** Name the type of reaction when two solutions react to form an insoluble substance.

..... [1]

[Total: 11]

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