Paper 3

Questions are applicable for both core and extended candidates

1(a) Fig. 4.1 shows a gas syringe that contains 60 cm^3 of ethene gas.

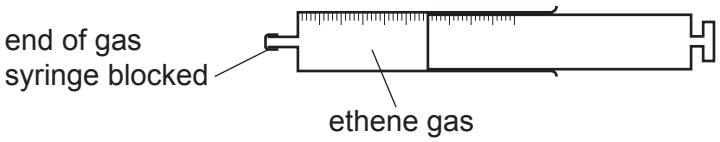


Fig. 4.1

State how the volume of ethene in the gas syringe changes when the temperature is decreased and the pressure remains the same.

..... [1]

2 Sulfur is an element in Group VI of the Periodic Table.

(c) Sulfur is a solid at room temperature and pressure.

Describe the motion and separation of the particles in solid sulfur.

motion .....

.....

separation .....

.....

[2]

(d) Liquid sulfur reacts with chlorine to produce disulfur dichloride.

$$2S + Cl_2 \rightarrow S_2Cl_2$$

(i) Describe how the general physical properties of a liquid differ from those of a solid. Give **two** differences.

1 .....

2 .....

[2]

3 This question is about iron.

(a) Iron is extracted from iron ore in a blast furnace

(iii) Iron collects at the base of the blast furnace as a liquid.

Describe the arrangement and motion of the particles in a liquid.

arrangement .....

.....

motion .....

.....

[2]

4 This question is about nitrogen and compounds of nitrogen.

(c) Ammonia is a simple molecule with covalent bond

(iv) Aqueous ammonia releases ammonia gas.

Ammonia gas turns damp red litmus paper blue.

A long glass tube is set up as shown in Fig. 8.2.

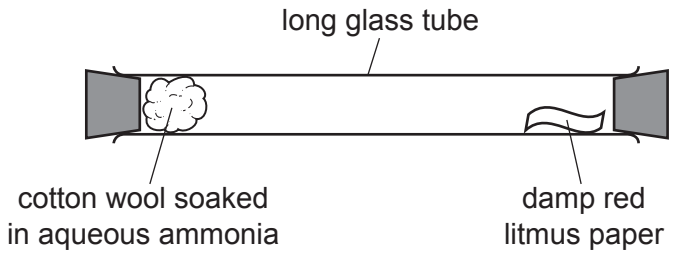


Fig. 8.2

At first the litmus paper does **not** turn blue.
After a short time, the litmus paper turns blue.

Explain these results in terms of the kinetic particle theory.

.....

.....

.....

.....

..... [3]

5 Bromine is a liquid at room temperature.

(a) State **two** general properties of a liquid.

1 .....

.....

2 .....

.....

[2]

(b) Fig. 4.1 shows the physical states of bromine.

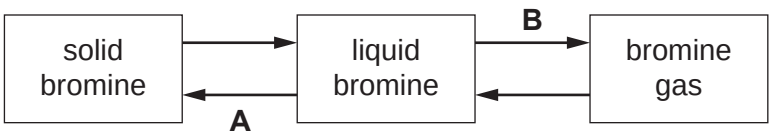


Fig. 4.1

Name the changes of physical states **A** and **B**.

A .....

B .....

[2]

(c) Describe liquid bromine and bromine gas in terms of the arrangement and motion of the particles.

liquid bromine

arrangement .....

.....

motion .....

.....

bromine gas

arrangement .....

.....

motion .....

.....

[4]

(d) A sealed gas syringe contains 80 cm^3 of bromine gas.

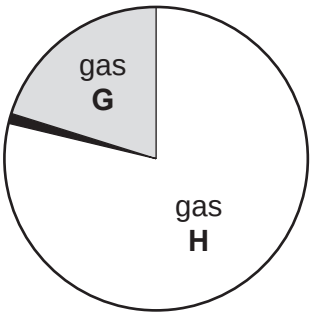
State how decreasing the pressure affect the volume of bromine gas in the gas syringe when the temperature remains constant.

..... [1]

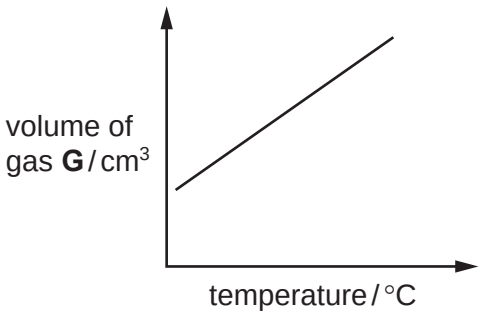
[Total: 9]

6 This question is about air.

(a) The pie chart shows the proportions of the main gases in clean, dry air.



(ii) The graph shows how the volume of a sample of gas **G** changes as temperature increases. The pressure is kept constant.



Describe how the volume of gas **G** changes as temperature increases.

..... [1]

(iv) Describe the arrangement and separation of the particles in a gas.

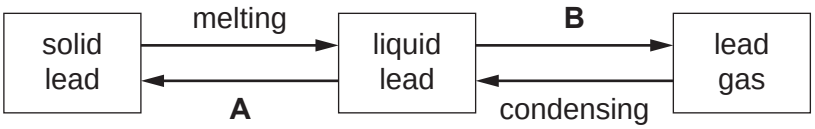
arrangement .....

separation .....

[2]

7 This question is about Group IV elements and their compounds.

(a) The changes of state of lead are shown.



Name the changes of state represented by **A** and **B**.

A .....

B .....

[2]

(b) Use the kinetic particle model to describe the differences between liquid lead and lead gas in terms of:

- the separation of the particles .....

.....

.....

- the motion of the particles. .....

.....

.....

[4]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

8 Element **X** can undergo the following physical changes.

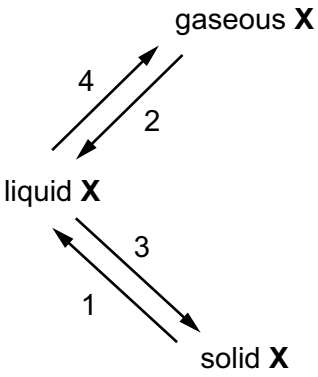


Fig. 1.1

(a) (i) Name each of the numbered physical changes shown in Fig. 1.1.

1 .....

2 .....

3 .....

4 .....

[4]

(ii) One difference between boiling and evaporation is the rate at which the processes occur.

State one **other** difference between boiling and evaporation.

.....

..... [1]

(b) Describe the separation, arrangement and motion of particles of element **X** in the solid state.

separation .....

arrangement .....

motion .....

[3]