

1. The table below gives the number of protons, neutrons and electrons found in four atoms

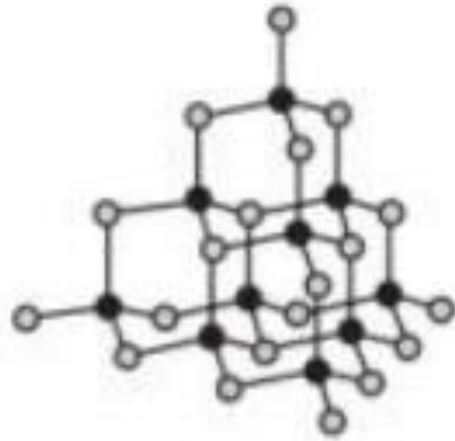
Identify the atom with the negative charge

Atom	Protons	Neutrons	Electrons
A	6	8	6
B	10	10	10
C	11	12	10
D	8	8	10

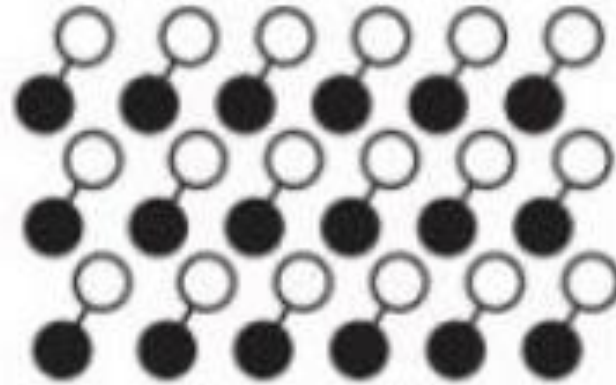
ANSWER = D

2. Which of the following diagrams could represent sodium chloride

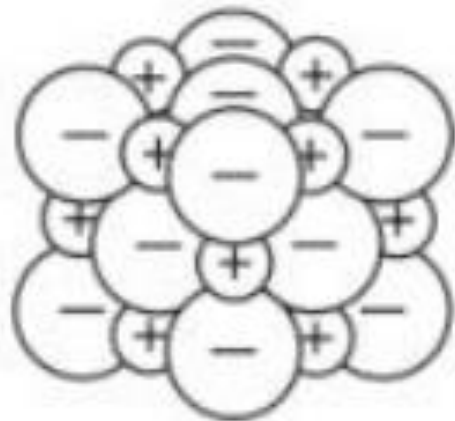
A



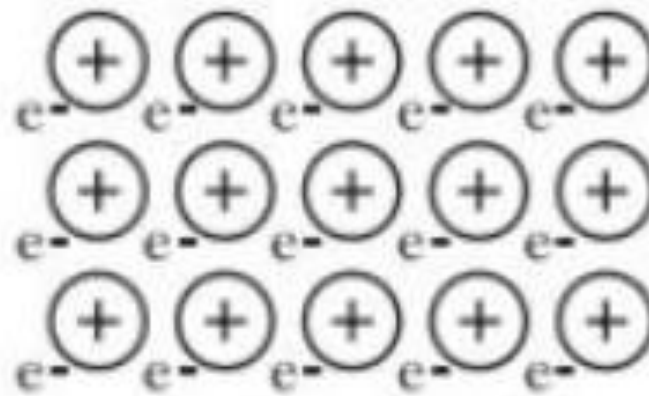
C



B



D



ANSWER = B

3. Identify the two substances that contain ionic bonds

A sodium bromide and cobalt chloride

B sulphur dioxide and sodium chloride

C sulphur dioxide and graphite

D lithium and lithium chloride

ANSWER = A

4. Which of the following statements describes the concentration of hydrogen H^+ ions and hydroxide OH^- ions in a **neutral** solution

- A the concentration of $H^+_{(aq)}$ and $OH^-_{(aq)}$ ion are zero
- B the concentration of $H^+_{(aq)}$ and $OH^-_{(aq)}$ ion are equal
- C the concentration of $H^+_{(aq)}$ ion is greater than the concentration of $OH^-_{(aq)}$ ions
- D the concentration of $OH^-_{(aq)}$ ions is greater than the concentration of $H^+_{(aq)}$ ions

ANSWER = B

5. How many moles are present in 8.8 of carbon dioxide CO_2

- A 44
- B 20
- C 2
- D 0.2

ANSWER = D

6. 2 moles of potassium chloride can be used to prepare

- A 250 cm³ of 0.4 mol l⁻¹ solution
- B 500 cm³ of 0.4 mol l⁻¹ solution
- C 500 cm³ of 4 mol l⁻¹ solution

ANSWER = C

7. Which of the following oxides, when shaken with water, would leave the pH unchanged?

(you may wish to use the data booklet to help you)

- A potassium oxide
- B aluminium oxide
- C sulphur dioxide
- D carbon dioxide

ANSWER = B

8. Ionic compounds conduct electricity only when molten or in solution because

- A the electrons are now free to move
- B the protons are now free to move
- C the ions are now free to move
- D the nucleus is now free to move

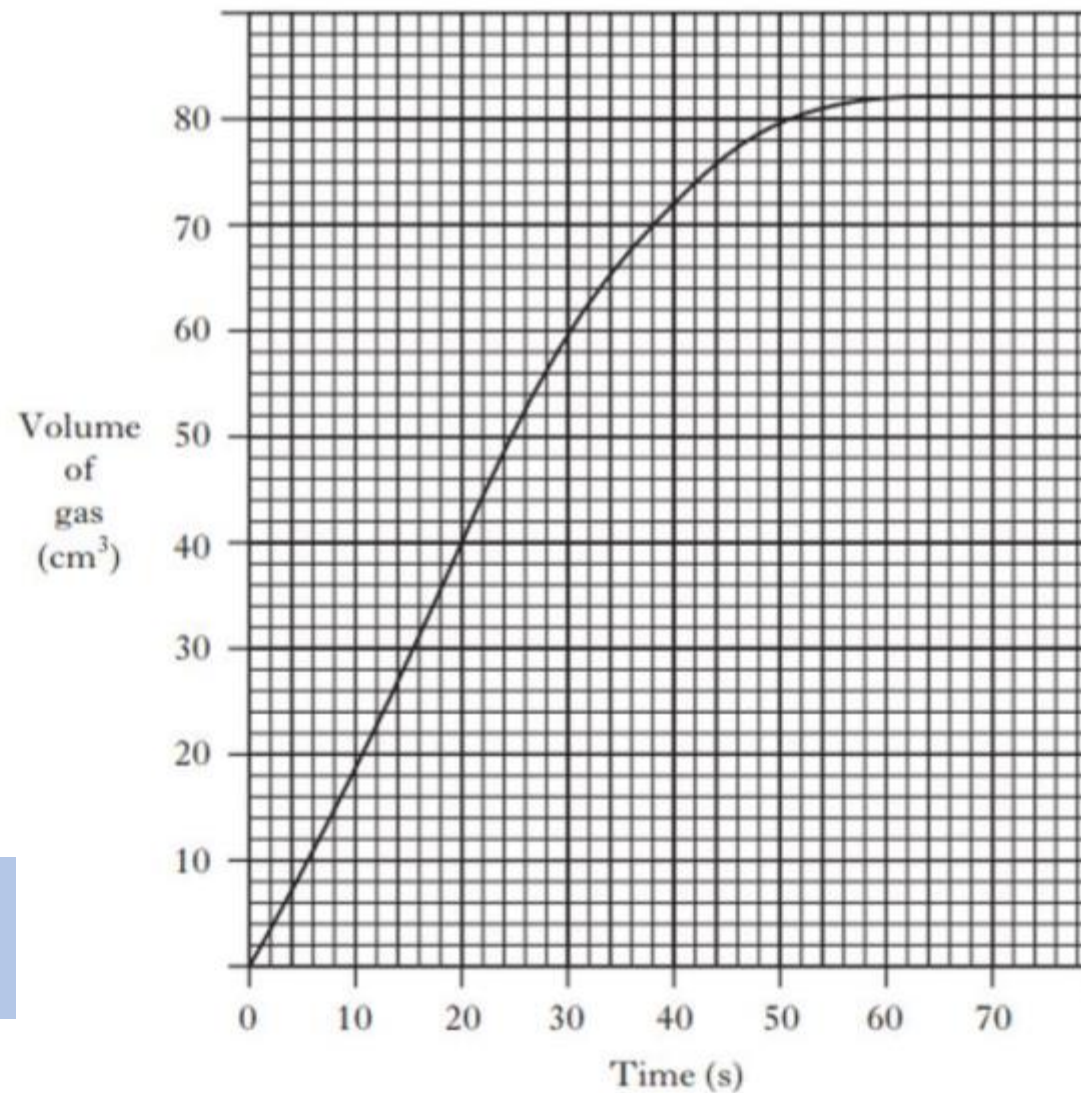
ANSWER = C

1. Graph below can be used to show the change in the rate of a reaction as the reaction proceeds.

The graph shows the volume of gas produced in an experiment over a period of time.

$$(a) = 60 \text{ secs}$$

$$(b) = 2 \text{ cm}^3 \text{ s}^{-1}$$



- (a) State the time, in seconds, at which the reaction stopped. (1)
- (b) Calculate the average rate of reaction, in $\text{cm}^3 \text{ s}^{-1}$, for the first 20 seconds

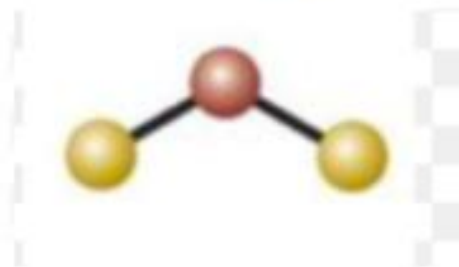
(c) Suggest a reason for the reaction slowing down (1)

(c) Concentration of the reactants
is decreasing

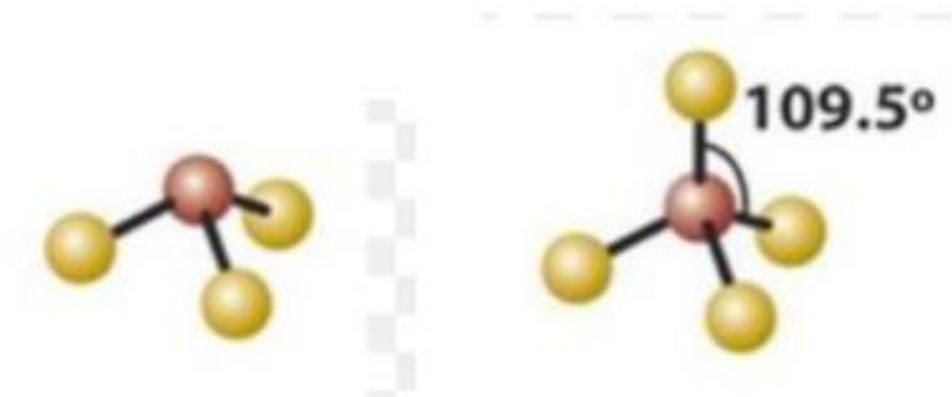
2. The shapes of some molecules are given below



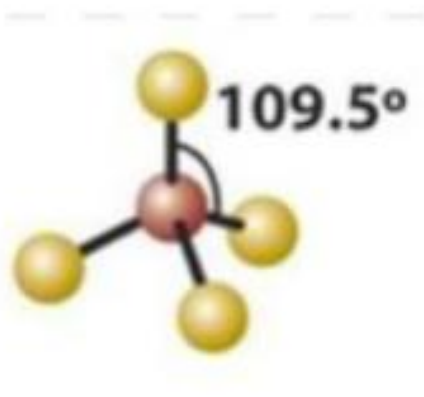
A



B



C



D

- (a) Which shape could represent a methane CH_4 molecule
- (b) What name is given to the shape of molecule D? (1)
- (c) Draw the shape of a water molecule H_2O (1)

(a) D
(b) Tetrahedral
(c) Water molecule



3. Gold jewellery slowly tarnishes in air. This is due to the formation of gold (I) sulfide. The gold (I) sulfide can be converted back to gold. The equation for the reaction is shown



Calculate the mass of gold produced when 0.125g of aluminium is used up

(3)



$$1 \text{ Al} \longleftrightarrow 6 \text{ Au}$$

$$1 \text{ mol} \longleftrightarrow 6 \text{ mol}$$

$$27g \longleftrightarrow 6 \times 197 g$$

$$1 g \longleftrightarrow 43.78g$$

$$0.125 g \longleftrightarrow 43.78 \times 0.125$$

$$5.47g$$

4. A pupil investigated the reaction between dilute sulfuric acid and calcium carbonate

(a) One experiment involved measuring the volume of carbon dioxide produced when calcium carbonate was used.

Time (seconds)	0	10	20	30	40	50	60	70
Volume of CO_2 (cm^3)	0	14	24		36	38	40	40

Draw a line graph of these results on the graph paper provided

(3)

(b) Use the graph to estimate the volume of gas produced at 30 seconds (1)

(c) The experiment was repeated at a higher temperature. The concentration and volume of sulfuric acid and the mass of calcium carbonate were kept the same

Predict the final volume of carbon dioxide produced at this temperature. (1)

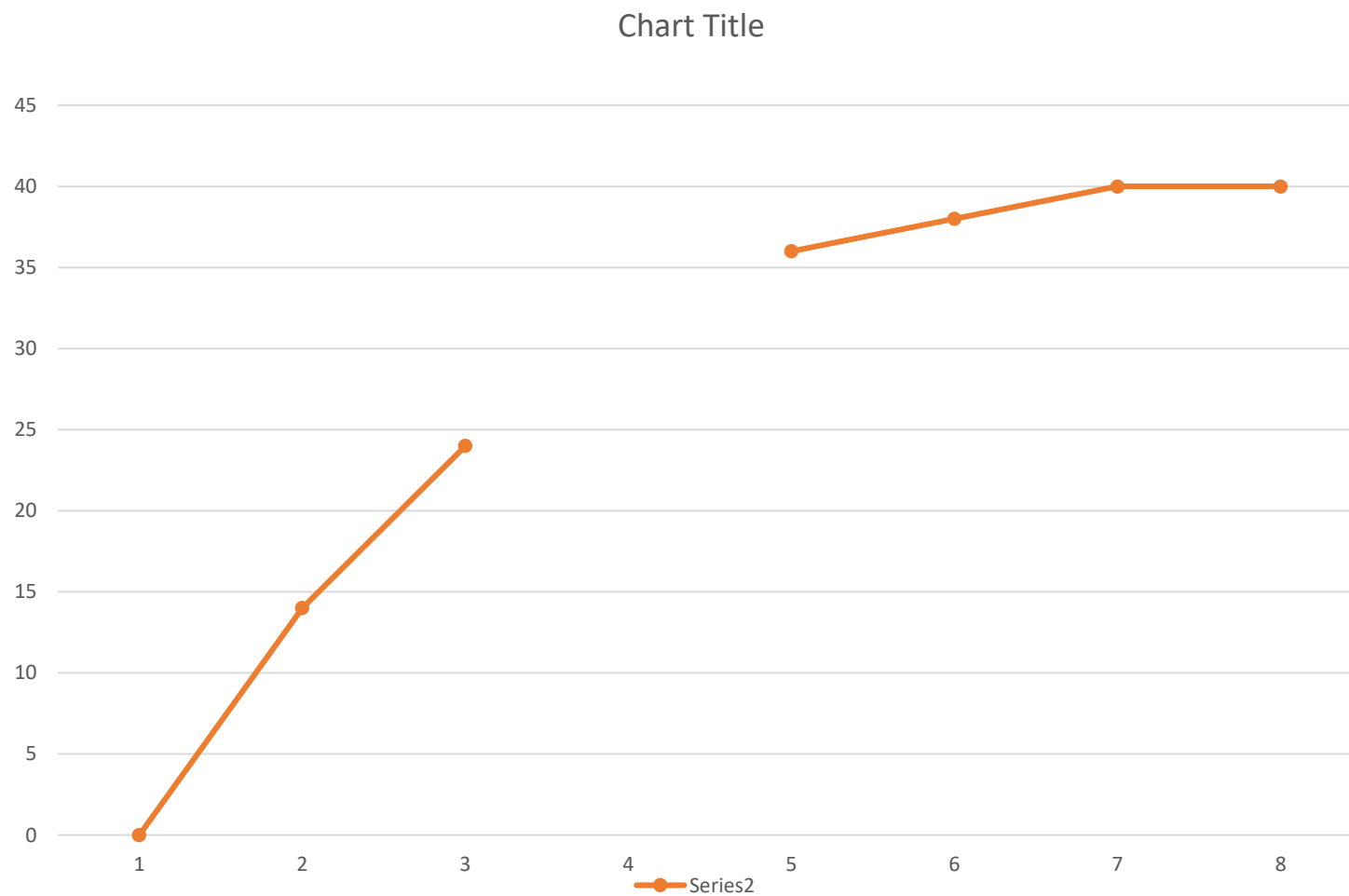
(d) Name the salt produced when dilute sulfuric acid reacts calcium carbonate (1)

(a) 30 cm^3

(b) 40 cm^3

(c) Calcium sulfate

Volume cm³



Time (seconds)

5. A group of students were given a sample of zinc, zinc oxide and zinc carbonate

Using your knowledge of chemistry, suggest how the students could identify each of the four metals.

(3)

- ☐ Observe reaction with acid – zinc oxide would NOT produce a gas
- ☐ Collect gas when added to acid and test for carbon dioxide using lime water – only the carbonate would turn the lime water cloudy
- ☐ Collect gas when added to acid and test for hydrogen – only the zinc would produce hydrogen

6.

A sample of argon contains three types of atom.



(a) State the term used to describe these different types of argon atom.

1

isotopes

(b) Explain why the mass number of each type of atom is different.

1

Different number of neutrons

(c) This sample of argon has an average atomic mass of 36.2.

State the mass number of the most common type of atom in the sample of argon.

1

36