

S6 Mock Examination (2020-2021) Chemistry Paper 1 (2 hours 30 minutes)

Date : 20th January 2021 Time : 8:30a.m.-11:00a.m. Name : ______ Class : _____ No. : _____

GENERAL INSTRUCTIONS

- 1. There are **TWO** sections, A and B, in this Paper. You are advised to finish Section A in about 45 minutes.
- 2. Section A consists of multiple-choice questions in this question paper, while Section B contains conventional questions printed separately in Question-Answer Book **B**.
- 3. Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book B. The Answer Sheet for Section A and the Question-Answer Book for Section B will be collected separately at the end of the examination.
- 4. A Periodic Table is printed on the back of Question-Answer Book **B**. Atomic numbers and relative atomic masses of elements can be obtained from the Periodic Table.

INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

- 1. Read carefully the instructions on the Answer Sheet. Write your name, class and class number in the spaces provided.
- 2. When told to open this book, you should check that all the questions are there. Look for the words **'END OF SECTION A'** after the last question.
- 3. All questions carry equal marks.
- 4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.
- 5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
- 6. No marks will be deducted for wrong answers.

This section consists of two parts. There are 24 questions in PART I and 12 questions in PART II.

Choose the best answer for each question.

Candidates may refer to the Periodic Table printed on the back of Question-Answer Book B.

Part I

1. There is a polluted air sample containing sulphur dioxide and carbon monoxide. The sample is passed through acidified $KMnO_4(aq)$ and NaI(aq). Which of the following observations is correct?

	Acidified KMnO ₄ (aq)	<u>NaI(aq)</u>
A.	No change	Colourless to brown
B.	Purple to colourless	No change
C.	No change	No change
D.	Purple to colourless	Colourless to brown

- 2. Nitrogen can be separated from oxygen by fractional distillation of liquefied air. Which of the following statements is the reason?
 - A. The density of oxygen is lower than that of nitrogen.
 - B. The density of nitrogen is lower than that of oxygen.
 - C. The boiling point of oxygen is lower than that of nitrogen.
 - D. The boiling point of nitrogen is lower than that of oxygen.
- 3. Which of the following statements concerning CH₃COOH(l) are INCORRECT?
 - (1) It is a hydrocarbon compound formed from covalent bonds.
 - (2) Its boiling point is lower than that of $CH_3CH_2OH(l)$.
 - (3) It forms immiscible layers with NaOH(aq).
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

4. The following diagram is a graph of potential energy against reaction coordinate of a reaction.



reaction coordinate

Which of the following statements are INCORRECT?

- (1) B is energetically more stable than A.
- (2) The enthalpy change of the reaction is -30 KJ mol^{-1} .
- (3) The reaction is endothermic.
- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)
- 5. Astatine (At) is a Group VII element in the Periodic Table. Which of the following statements concerning At is / are correct?
 - (1) Oxide of At is a good conductor of electricity.
 - (2) It can be displaced by bromine from NaAt(aq).
 - (3) It displaces iodide ions from NaI(aq).
 - A. (1) only
 - B. (2) only
 - C. (1) and (2) only
 - D. (2) and (3) only
- 6. Which of the following salts gives the largest amount of ammonia upon heating with NaOH(aq)?

(Relative atomic masses: H = 1.0, N = 14.0, O = 16.0, F = 19.0, S = 32.0, Cl = 35.5)

- A. $1.0 \text{ g of } NH_4F(aq)$
- B. 1.0 g of NH₄Cl(aq)
- C. $1.0 \text{ g of } (NH_4)_2 SO_4(aq)$
- D. $1.0 \text{ g of } NH_4NO_3(aq)$

- 7. Which of the following statements concerning mass number of elements are correct?
 - (1) The mass number can be smaller than atomic number.
 - (2) The mass number can be equal to atomic number.
 - (3) The difference between mass number and atomic number can be equal to atomic number.
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

8. 10.0 cm^3 of $O_2(g)$ are reacted with 10.0 cm^3 of CO(g). Which of the following is correct?

seous mixture /
4

- 9. Which of the following statements about hydrogen sulphide are correct?
 - (1) It is polar in nature.
 - (2) Its molecule is V-shape.
 - (3) It obeys the octet rule.
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)
- 10. If there are x atoms in 4 g of nitrogen dioxide, how many atoms are present in 6 g of sulphur trioxide?

(Relative atomic masses: N = 14.0, O = 16.0, S = 32.0)

- A. x
- B. 1.15x
- C. 1.5x
- D. 2x
- 11. Consider the following equation:

 $A(g)+3B_2(g) \rightarrow 2C(g)+4D(l)$

When 4 moles of A(g) reacts with 9 moles of B(g), what is the number of moles of the resultant gaseous mixture?

- A. 5
- B. 6
- C. 7
- D. 8

- 12. A mixture contains only ammonium chloride solid and copper(II) oxide precipitate. Which of the following methods can be used to separate copper(II) oxide from the mixture?
 - (1) Add sodium hydroxide solution to the mixture and then filter.
 - (2) Add water to the mixture and then filter.
 - (3) Add dilute hydrochloric acid to the mixture and then filter.
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)
- 13. A soluble solid gives a brick red flame in flame test. When dilute nitric acid is added into the solid, effervescence occurs. Which of the following could be the solid?
 - A. Calcium nitrate
 - B. Potassium chloride
 - C. Calcium hydrogencarbonate
 - D. Potassium carbonate
- 14. 20.0 cm³ of a tribasic acid X requires 10.0 cm³ of 0.30 M NaOH for complete neutralization. What is the molarity of the acid X?
 - A. 0.05 M
 - B. 0.10 M
 - C. 0.15 M
 - D. 0.20 M
- 15. Which of the following measures can reduce the harmful effect of acid rain in environment?
 - (1) Installing catalytic converter for motor vehicles
 - (2) Installing scrubber in factories
 - (3) Using liquefied petroleum gas as fuel
 - A. (1) only
 - B. (2) only
 - C. (3) only
 - D. (1) and (2) only
- 16. In an experiment of mixing propane with bromine in tetrachloromethane, which of the following statements are correct?
 - (1) Propane can immediately decolorize the bromine.
 - (2) It is a substitution reaction.
 - (3) Propane is oxidized by bromine.
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

- 17. Which of the following statements concerning members of a homologous series is / are correct?
 - (1) Members of the series can be represented by the same molecular formula.
 - (2) The volatility of the members decreases with increasing relative molecular mass.
 - (3) They have the same chemical properties.
 - A. (1) only
 - B. (2) only
 - C. (3) only
 - D. (1) and (2) only
- 18. The structure of a polymer is shown below:

$$-CHC1-CH-CHC1-CH-CHC1-CH-CHC1-CH-$$

$$|$$

$$CH_2C1$$

$$CH_2C1$$

$$CH_2C1$$

$$CH_2C1$$

$$CH_2C1$$

What is the molecular formula of the monomer?

- A. C_3H_4Cl
- B. $C_3H_4Cl_2$
- $C. \quad C_4H_5Cl_2$
- D. C₄H₅Cl₃
- 19. An iron rod and a silver plate are placed in a beaker containing dilute hydrochloric acid as follows:



Which of the following statements concerning the experiment are correct?

- (1) Gas bubbles appear on the silver plate.
- (2) Gas bubbles appear on the iron rod.
- (3) The solution turns green.
- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

20. Which of the following <u>underlined</u> atoms exhibits the lowest oxidation number?

- A. $NH_3\underline{V}O_3$
- $B. \quad KH\underline{S}O_3$
- $C. \quad H_2\underline{S}_2O_7$
- D. <u>N</u>H₂OH

- 21. Which of the following molecules do NOT form intermolecular hydrogen bonds with its own molecules?
 - (1) NF₃
 - (2) $CH_3CH_2NH_2$
 - (3) CH₃CH₂CHO
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)
- 22. The enthalpy changes of formation of $C_2H_4(g)$ and $C_2H_6(g)$ are +53 KJ mol⁻¹ and -85 KJ mol⁻¹ respectively. What is the standard enthalpy change of reaction at 298 K for the hydrogenation of $C_2H_4(g)$?
 - A. +138 KJ mol⁻¹
 - B. -138 KJ mol⁻¹
 - C. +33 KJ mol⁻¹
 - D. -33 KJ mol⁻¹
- 23. Consider the following statements and choose the best answer:

1st statement					2n	nd s	statemer	nt		
The	standard	enthalpy	change	of	HCl(aq)	is	a	strong	acid	while
neutralization between NaOH(aq) and				and	CH ₃ COC	DH(a	q)	is a weal	k acid.	
HCl(aq) is more exothermic than that				that						
between NaOH(aq) and										
CH ₃ C	COOH(aq).									

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true and the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false.
- 24. Consider the following statements and choose the best answer:

1st statement	2nd statement
Ammonia evolved from an experiment	Ammonia is soluble in water.
can be collected by downward delivery.	

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true and the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false

Part II

25. Consider the following chemical reaction:

 $2NaN_3(s) \rightarrow 2Na(s)+3N_2(g)$

 $1.10234 \ g \ of \ NaN_3 \ decomposes \ to \ form \ 0.580 \ dm^3 \ of \ nitrogen \ gas \ at \ certain \ temperature \ and \ pressure.$

(Relative atomic masses: N = 14.0, Na = 23.0)

- A. $22.8 \text{ dm}^3 \text{ mol}^{-1}$
- B. $23.5 \text{ dm}^3 \text{ mol}^{-1}$
- C. $24.0 \text{ dm}^3 \text{ mol}^{-1}$
- D. $25.3 \text{ dm}^3 \text{ mol}^{-1}$

26. Which of the following vanadium compounds is unlikely to exist?

- A. VF
- B. VSO₃
- C. NH₃VO₃
- D. V₂O₅
- 27. Which of the following compounds has the highest boiling point?
 - A. Butanoic acid
 - B. Butan-1-ol
 - C. Butanal
 - D. Butanone
- 28. How many structural isomers does C_4H_8 have?
 - A. 3
 - B. 4
 - C. 5
 - D. 6
- 29. Which of the following compounds can be used as active ingredients of detergents?



- 30. Which of the following statements concerning vegetable oils is INCORRECT?
 - A. The chemical structures of vegetable oils are triestes.
 - B. All vegetable oils are optically inactive.
 - C. Vegetable oils generally contain a higher proportion of triglycerides derived from longchain unsaturated fatty acids.
 - D. Vegetable oil can be converted into margarine by hydrogenation.
- 31. Which of the following physical properties show periodicity across a period?
 - (1) Nature of bonding of elements
 - (2) Solubility of elements in water
 - (3) Density of elements
 - A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)
- 32. Excess magnesium was added to a beaker of aqueous hydrochloric acid on a balance. A graph of the mass of the beaker and contents was plotted against time (curve 1).



Which of the following changes in the experiment could give curve 2?

- (1) Using the same mass of magnesium but in smaller pieces
- (2) Using the same volume and concentration of sulphuric acid
- (3) Using higher temperature
- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only

- 33. Which of the following statements concerning the chemical equilibrium below is / are correct? CaCO₃(s) ⇒ CaO(s)+CO₂(g)
 - (1) Equilibrium can be reached from the backward direction of the reaction.
 - (2) The reaction occurs spontaneously at room conditions.
 - (3) The above chemical equilibrium can only be established in a sealed container.
 - A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only
- 34. For the following reaction:

 $Fe(OH)_2(s) \rightleftharpoons Fe^{2+}(aq) + 2OH^{-}(aq)$ $\Delta H = positive$

The equilibrium concentration of $Fe^{2+}(aq)$ would be increased by

- (1) increasing the temperature.
- (2) adding a few drops of dilute sulphuric acid.
- (3) adding a few drops of dilute sodium hydroxide solution.
- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)
- 35. Consider the following statements and chose the best answer:

1st statement				2nd statement	
HCl	in	methylbenzene	reacts	with	HCl(aq) is a strong acid.
magnesium to give hydrogen.					

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true and the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false.

36. Consider the following statements and chose the best answer:

1st statement	2nd statement
An ethanol can be converted to an ethene by	In the reaction, hydrogen and oxygen in the
hydrogenation.	ratio of 2:1 are eliminated from a compound.

A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.

- B. Both statements are true and the 2nd statement is NOT a correct explanation of the 1st statement.
- C. The 1st statement is false but the 2nd statement is true.
- D. Both statements are false.

END OF SECTION A





FUKIEN SECONDARY SCHOOL

S6 Mock Examination (2020-2021) Chemistry Paper 1 (2 hours 30 minutes)

Date : 20th January 2021 Time : 8:30a.m.-11:00a.m.

Name : ______ Class : ______No. : _____

SECTION B : Question-Answer Book B

INSTRUCTIONS FOR SECTION B

- 1. Write your name, class and class number in the spaces provided on this page.
- 2. Refer to the general instructions on the cover of the Question Book for Section A.
- 3. This section consists of TWO parts.
- 4. Answer ALL questions in each part. Write your answers in the spaces provided in this Question-Answer Book.
- 5. A Periodic Table is printed on the back of this Question-Answer Book. Atomic numbers and relative atomic masses of elements can be obtained from the Periodic Table.
- 6. An asterisk (*) has been put next to the questions where one mark will be awarded for effective communication.

PART I

Answer **ALL** questions. Write your answers in the spaces provided.

1. A student tried to draw the 3-dimentional structure of an atom of Element E (mass number = 15).



(a) What is the name of the central part?

(1 mark)

(b) Briefly describe the structure of the central part, in terms of number, names and the arrangement of the sub-particles.

(3 marks)

- (c) Element E can react with Element W (atomic number = 55) to form a compound.
 (i) Write a balanced chemical equation for the reaction.
 - (ii) By showing the electrons in the outermost shell only, draw the electron diagram of the compound formed.

(2 marks)

- 2. Cobalt (Co) and potassium (K) are located in the same period in the Periodic Table. When cobalt is heated strongly in air, it forms TWO types of oxides, CoO and Oxide G respectively.
 - (a) Write down the number of electrons in each occupied electron shell of Co in CoO.

1 st Shell	2 nd Shell	3 rd Shell	4 th Shell
			0
			_

(b) List ONE physical property of cobalt.

(1 mark)

(1 mark)

- (c) Cobalt is commonly used in construction work but potassium is not.
 - (i) Give a reason, by referring to its physical properties, for not using potassium.

(1 mark)

(ii) Give a reason, by referring to its chemical properties, for not using potassium.

(1 mark)

(d) Oxide G of cobalt contains 26.59% of oxygen by mass. What is the empirical formula of the Oxide G?
 (Relative atomic masses: Co = 58.9, O = 16)

(2 marks)

(e) CoO reacts with oxygen to form Oxide G on heating over 900°C. By using your answer to (d), write a balanced chemical equation for the reaction.

3. When dilute $HNO_3(aq)$ was added gradually to a fixed volume of a suspension which consists of magnesium hydroxide and distilled water, there was a temperature change and a clear solution was formed. The graph below shows the temperature change in the experiment.



(a) Explain, with the aid of an equation, the formation of the clear solution when dilute $HNO_3(aq)$ is added to the suspension.

(3 marks)

(b) Explain the temperature change of the mixture in the following stages:(i) From A to B

(2 marks)

(ii) From B to C

(c) Sodium hydrogencarbonate was used to remove excess stomach acid in the past but it is replaced by magnesium hydroxide now. Why?

- 4. Answer the following questions.
 - (a) Explain whether dilute H_2SO_4 can be used to prepare calcium sulphate from calcium granules.

(2 marks)

(b) When 1 cm³ of bromine solution is added into 4 cm³ but-2-ene, it takes 2 seconds to become colourless. If butane is used to replace but-2-ene, it takes 15 minutes with mild heating to become colourless. Explain the difference in time.

(2 marks)

(c) Standard solution can be prepared by dissolving a known mass of solute into a known volume of distilled water. Explain whether potassium hydroxide can be used to prepare a standard solution by this method.

(2 marks)

- 5. Silicon and carbon are both Group IV elements and they can combine together to form silicon carbide. All atoms form 4 bonds tetrahedrally with other four different atoms. Its structure is similar to that of diamond. The chemical formula of silicon carbide is SiC. It cannot conduct electricity in both solid and molten states. SiC can be used to make crucible which can withstand the high temperature of molten iron.
 - (a) Graphite is an electrical conductor. However, diamond and silicon carbide are not. Why?

(1 mark)

(b) What type of bonding exists in silicon carbide? How is the bonding formed between the elements in silicon carbide?

(2 marks)

(c) Propose a possible type of structure of silicon carbide and explain its usage in marking the crucible for holding molten iron.

(2 marks)

- 6. Ethene (C_2H_4) is a reactive gas and it can be converted to many other chemicals.
 - (a) Give the structural formula of ethene.

(1 mark)

- (b) The formation of carbon monoxide is due to the incomplete combustion of fossil fuels. A student tried to burn 1 mole of ethene inside a closed vessel with limited supply of oxygen in order to determine the enthalpy change of incomplete combustion of ethene.
 - (i) Assuming that the incomplete combustion of ethene produces carbon monoxide, carbon dioxide and water. Write a thermochemical equation for the incomplete combustion of ethene.

(1 mark)

given

(ii)

below:		
	$C_2H_4(g)$	CO(g)
ΔH_{C}^{θ} (KJ mol ⁻¹)	-1141.7	-110.4

Calculate the enthalpy change of incomplete combustion of $C_2H_4(g)$.

The standard enthalpy changes of combustion of C₂H₄(g) and CO(g) are

(2 marks)

(iii) Draw an enthalpy level diagram for the incomplete combustion of ethene, labelling the axes and the chemicals in the diagram.

7. 0.0795 g of $H_2A \cdot xH_2O(s)$ was dissolved in distilled water and made up to 100 cm³ in a volumetric flask. 20 cm³ of this dibasic acid solution was pipetted into a conical flask and titrated against 0.017 mol dm⁻³ NaOH(aq) with an indicator. The titration was then repeated twice to obtain the results below:

Burette reading	Titration 1	Titration 2	Titration 3
Final reading	13 cm ³	25 cm ³	37 cm ³
Initial reading	0 cm ³	11 cm ³	24 cm ³

- (a) Which titration result should not be used? Why?
- (1 mark)(b) What is the reasonable average volume of NaOH(aq) added in the experiment?

(1 mark)

(c) The molar mass of H_2A is 55 g mol⁻¹. Find out the value of x in $H_2A \bullet xH_2O(s)$. (Relative atomic masses: H = 1, O = 16)

- 8. The negative electrode of the lead-acid accumulator is a lead plate and the positive electrode is made of Metal X coated with lead(IV) oxide. The electrolyte is sulphuric acid. During discharge, the lead metal on the negative electrode reacts with the sulphuric acid to form lead(II) sulphate and hydrogen ions. The lead(IV) oxide on the positive electrode also reacts with the sulphuric acid to form lead(II) sulphate and water.
 - (a) State and explain whether Metal X can be made of zinc in the lead-acid accumulator or not.

(1 mark)(b) Write an ionic half equation that occurs on the negative electrode during discharge.

(1 mark)

(c) Write the equation of the overall reaction in the lead-acid accumulator during discharge.

(1 mark)

(d) Give ONE reason for not using lead-acid accumulator in mobile phones.

(1 mark)

(e) Nowadays, many small portable electronic devices are equipped with rechargeable cells. Suggest ONE advantage of using rechargeable cells to the environment.

(1 mark)

9. Magnesium consists of a mixture of isotopes. The information of the isotopes are shown in the following table:

	Isotopes	ⁿ Mg	^{n+1}Mg	^{n+2}Mg
ſ	Relative abundance	79.0%	10%	11.0%
(a) Define the meaning of the term 'isotope'.				

(1 mark)

(b) The relative atomic mass of magnesium is 24.3. Find out the mass number of the isotope, ^{n+2}Mg .

(2 marks)

* (c) Magnesium is used to prevent some iron objects from rusting. Name this method. Briefly describe the principle and application of this method.

PART II

*10. Arrange NaH, SiH₄ and HCl in descending order of melting point. Explain this order in terms of structure and bonding.



11. Refer to the following conversion steps.



(a) For Step 1, give the reagent(s) and reaction condition (if appropriate).

(b) In Step 2, $C_5H_{10}OCl_2$ reacts with excess HCOOH and concentrated H_2SO_4 to form Compound C.

- (i) Name the type of reaction in Step 2.
- (ii) Write down the molecular formula of Compound C.

(c) Give the structural formula of Compound **D**.

(1 mark)

(d) If 10 g of Compound B can be converted to 5.75 g of Compound C through Step 1 and Step 2, what is the percentage conversion of mole in Step 2?
 (Given: the percentage conversion of mole in Step 1 = 75%)

(2 marks)

(1 mark)

12. At 30°C, the equilibrium constant (K_c) for the following reaction is 5.0 mol⁻¹ dm³. A(g)+B₂(g) \rightleftharpoons AB₂(g)

A sealed container of 400 cm³ maintained at 30°C initially contains 0.5 mol of A(g), 0.3 mol of $B_2(g)$ and 0.4 mol of $AB_2(g)$.

(a) Calculate its reaction quotient, Q_c , when the reaction just starts.

(2 marks)

(b) By using the answer to (a), predict and explain, whether the forward reaction rate or the backward reaction rate would be greater in order to attain equilibrium.

(2 marks)(c) When the system attains equilibrium at 30°C, calculate the concentration of B₂(g).

(3 marks)

- 13. Carbon disulphide (CS₂) and carbon dioxide are both Group IV compounds.
 - (a) Draw the electron diagram of carbon disulphide, showing electrons in the outermost shells only.

(1 mark)

- (b) In an experiment, 20 cm³ of carbon disulphide is allowed to react with 107 g of chlorine to form tetrachloromethane and disulphur dichloride (S_2Cl_2).
 - (i) Write a balanced equation for the reaction.
 - (ii) What is the volume (in cm³) of tetrachloromethane formed? (Density: $CS_2 = 1.27$ g cm⁻³, tetrachloromethane = 1.59 g cm⁻³) (Relative atomic masses: H = 1.0, C = 12.0, S = 32.1, Cl = 35.5)

(3 marks)

14. A student used the following setup to compare the rate of reaction of a metal in different concentrations and volumes of HCl(aq).



(a) Name a metal used for this experiment.

(1 mark)

(b) Syringe C is used to monitor the progress of the reaction. By using glassware apparatus in a school laboratory, sketch another labelled simple setup to collect and measure the volume of gas evolved.

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(c) The student used the following experiments to compare the rate of reaction of metal **X** in different concentrations and volumes of HCl(aq).

Experiment	Concentration of HCl(aq)	Volume of HCl(aq)
А	0.1 mol dm ⁻³	100 cm^3
В	? mold m ⁻³	? cm ³

The results are shown below:



- Time (s)
- (i) If the same mass of powder form of Metal **X** is used instead of piece form of Metal **X** in the Experiment A, sketch the result in the above graph, labelling the curves as 'C'.

(1 mark)

(ii) State and explain the difference in the acid used in Experiment A and Experiment B.

(2 marks)

END OF SECTION B

END OF PAPER

PERIODIC TABLE 周期表

GROUP 族

Lu 175.0 103 Lr 260) Yb 173.0 102 No (259) $\begin{array}{c|c} & \mathbf{IV} \\ \hline & \mathbf{6} \\ \mathbf{C} \\ \mathbf{C} \\ \mathbf{Si} \\ \mathbf{$ Tm 168.9 100 Md 258) $\begin{array}{c|c} \text{III} & \\ \hline & & \\ \hline & & \\ \textbf{B} \\ \textbf$ Er 167.3 100 Fm (257) H0 164.9 99 Es (252) Zn 65.4 48 48 Cd 80 80 Hg 200.6 Cu 63.5 47 47 47 107.9 79 Au 197.0 Dy 162.5 98 Cf (251) relative atomic mass 相對原子質量 Tb 97 Bk (247) Ni 58.7 46 Pd 106.4 78 Pt 195.1 Co 58.9 45 45 Rh 102.9 1r 192.2 Gd 157.3 96 Cm (247) atomic number 原子序 Eu 152.0 95 Am (243) Fe 55.8 44 101.1 76 Os 0s Sm 150.4 94 Pu (244) Mn 54.9 43 43 43 (98) 75 Re Re Cr 42 Mo 95.9 74 183.9 Pm (145) 93 Np (237) $\begin{array}{c} 23 \\ \mathbf{V} \\ \mathbf{V} \\ 41 \\ \mathbf{Nb} \\ \mathbf{Nb} \\ \mathbf{Nb} \\ \mathbf{Nb} \\ \mathbf{V} \\ \mathbf{10} \\ 105 \\ 105 \\ 105 \\ \mathbf{Db} \end{array}$ Nd 144.2 92 U 238.0 Η Pr 140.9 91 Pa (231) Ti 47.9 40 **Zr** 72 72 72 104 104 **Rf Rf** Ce 140.1 90 232.0 Sc 39 39 88.9 57 * 138.9 89 *** 89 ***

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