

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2019

CHEMISTRY PAPER 1
SECTION B : Question-Answer Book B

This paper must be answered in English

INSTRUCTIONS FOR SECTION B

- (1) After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1, 3, 5, 7 and 9.
- (2) Refer to the general instructions on the cover of the Question Paper for Section A.
- (3) This section consists of TWO parts, Parts I and II.
- (4) Answer ALL questions in both Parts I and II. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
- (5) An asterisk (*) has been put next to the questions where one mark will be awarded for effective communication.
- (6) Supplementary answer sheets will be provided on request. Write your candidate number, mark the question number box and stick a barcode label on each sheet, and fasten them with string INSIDE this Question-Answer Book.
- (7) No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.



PART I

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

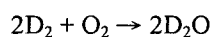
1. The table below shows some information of three atoms :

	Number of protons	Number of electrons	Number of neutrons
Protium	1	1	0
Deuterium	1	1	1
Oxygen	8	8	8

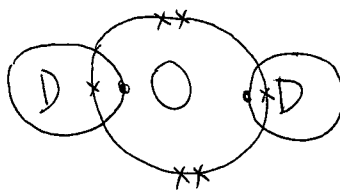
- (a) Explain why protium and deuterium are isotopes.

They are different atom of the same element with the same no. of protons (1) and different no. of neutrons (0 and 1) (1 mark)

- (b) Deuterium can be represented by D. It reacts with oxygen as shown in the equation below :



Draw the electron diagram for a D_2O molecule, showing ELECTRONS IN THE OUTERMOST SHELLS only.



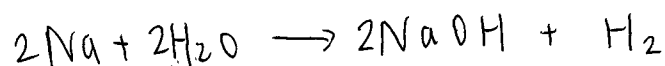
(1 mark)

- (c) A small piece of sodium metal is placed into liquid D_2O at room conditions.

- (i) State TWO expected observations.

Hissing sound is heard
colourless gas bubbles are produced

- (ii) Write the chemical equation for the reaction involved.



(3 marks)

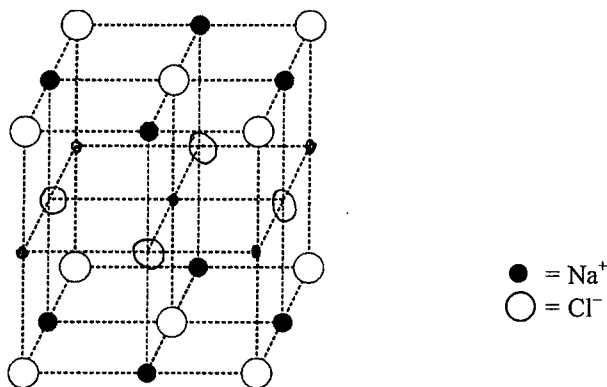
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2. Sodium chloride crystal has a giant ionic structure.

- (a) The diagram below shows a part of the structure of sodium chloride crystal with some ions missing.



Complete the diagram by using ● as Na⁺ ion and ○ as Cl⁻ ion.

(1 mark)

- (b) From an experiment, it was found that there are 4 Na⁺ ions and 4 Cl⁻ ions in a cube of sodium chloride crystal of volume $1.80 \times 10^{-22} \text{ cm}^3$.

- (i) Express the total mass of 4 Na⁺ ions and 4 Cl⁻ ions in terms of the Avogadro's constant L.

(Relative atomic masses : Na = 23.0, Cl = 35.5)

$$\text{no. of moles of } 8 \text{ ions} = \frac{8}{L}$$

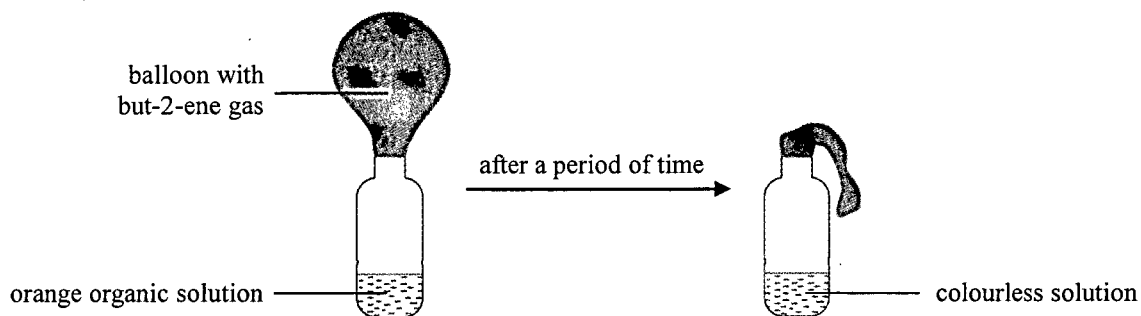
$$\text{Total mass of crystal} = \frac{8}{L} \times (35.5 \times 4 + 23 \times 4) = \frac{1872}{L}$$

- (ii) Hence, calculate the Avogadro's constant L, given that 1.00 cm^3 of sodium chloride crystal weighs 2.17 g.

$$\begin{aligned} \text{no. of ions} &= \frac{8}{1.80 \times 10^{-22}} = 4.44 \times 10^{22} & \text{no. of moles} &= \frac{2.17}{23 + 35.5} \\ \text{Avogadro constant} &= 4.44 \times 10^{22} \div 0.0371 & &= 0.0371 \\ &= 1.20 \times 10^{24} & & \end{aligned}$$

(3 marks)

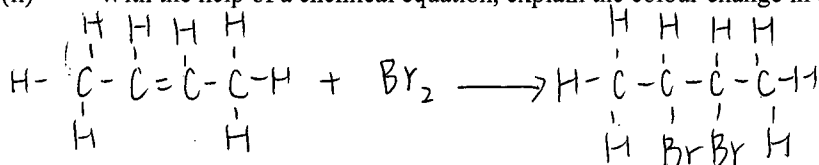
3. An experiment was carried out as shown below :



- (a) (i) Suggest what the orange organic solution may be.

Bromine

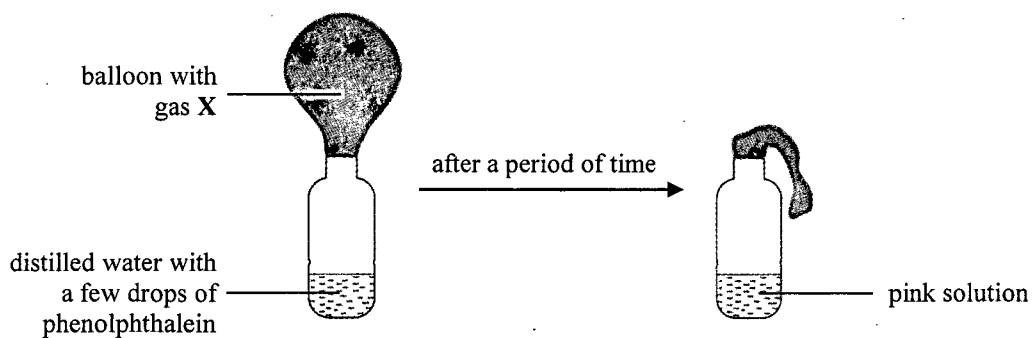
- (ii) With the help of a chemical equation, explain the colour change in the solution.



But-2-ene undergo addition reaction with bromine, bromine is decolorized.

(3 marks)

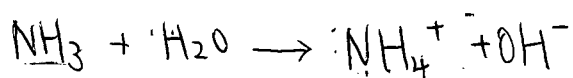
- (b) Another experiment was carried out as shown below :



With the help of a chemical equation, suggest and explain what gas X may be.

Ammonia gas

Ammonia is alkaline which turns phenolphthalein pink when dissolve in water as it form hydroxide ions,



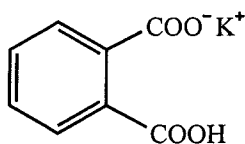
(3 marks)

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4. Solid potassium hydrogenphthalate can be used to prepare standard solutions. Its structure is shown below :



- (a) You are provided with 1.12 g of solid potassium hydrogenphthalate.
- (i) Describe briefly how a 250.0 cm³ of standard solution containing 1.12 g of potassium hydrogenphthalate can be prepared in a laboratory.

Dissolve 1.12 of potassium hydrogenphthalate in distilled water. Transfer it to a 250cm³ volumetric flask. Add distilled water until the bottom of meniscus reach the graduation mark.

- (ii) Calculate the molarity of the standard solution obtained in (i).
(Formula mass : potassium hydrogenphthalate = 204.1)

$$\begin{aligned} \text{no. of moles} &= 1.12 \div 204.1 = 5.49 \times 10^{-3} \\ \text{molarity} &= \frac{5.49 \times 10^{-3}}{250 \div 1000} = 0.022 \text{ M} \end{aligned}$$

(4 marks)

- (b) At room conditions, the pH of a 0.060 M of potassium hydrogenphthalate solution is 3.30. Based on this information and appropriate calculation, comment whether the -COOH group in potassium hydrogenphthalate is completely ionised.

$$\text{pH} = -\log [\text{H}^+(\text{aq})] = 3.30$$

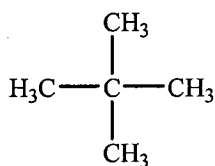
$$[\text{H}^+(\text{aq})] = 10^{-3.30}$$

$$[\text{H}^+(\text{aq})] = 5.01 \times 10^{-4} \text{ M}$$

concentration of H⁺ ions when completely ionize = $0.060 \times \frac{5}{204.1}$
 $\therefore \text{H}^+$ ionized < concentration of that completely ionized = $1.47 \times 10^{-3} \text{ M}$ (2 marks)
 $\therefore$ NO

Answers written in the margins will not be marked.

5. The structure of a compound is shown below :



Reacting with a reagent under certain conditions, it can give two compounds with the same molecular formula $\text{C}_5\text{H}_{10}\text{Cl}_2$ but different structures.

- (a) Suggest what the reagent is.

Chlorine

(1 mark)

- (b) State the condition needed for the reaction to occur at room temperature.

Under diffuse sunlight

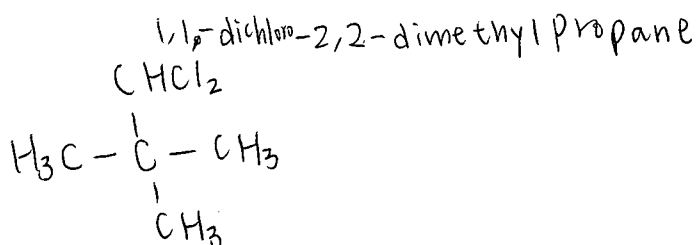
(1 mark)

- (c) Name the type of the reaction involved.

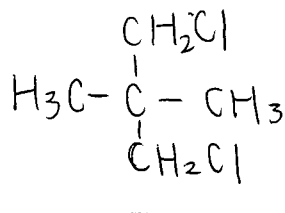
Substitution

(1 mark)

- (d) (i) Draw the structure of ONE of these two compounds and give its systematic name.



- (ii) Draw the structure of the other compound.



- (iii) These two compounds are isomers. State the type of isomerism exhibited by them.

Position isomerism

(4 marks)

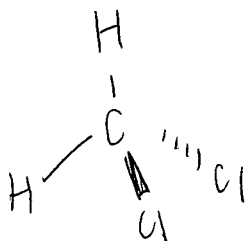
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6. Consider CH_2Cl_2 and CCl_4 molecules :

(a) Draw the three-dimensional structure of a CH_2Cl_2 molecule.



(1 mark)

(b) (i) Explain why CH_2Cl_2 is a polar molecule but CCl_4 is not.

Atoms of CH_2Cl_2 is not arranged on the same plane and polarities cannot cancel out each other.

Atoms of CCl_4 are arranged symmetrically and their polarities can cancel out each other.

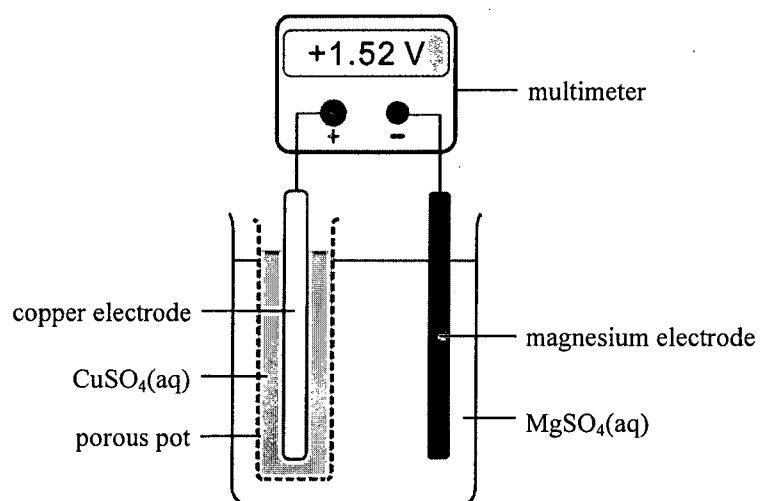
(ii) Explain why CCl_4 has a higher boiling point than CH_2Cl_2 .

CCl_4 has a larger molecular mass. Thus, it has stronger van der Waals' force between molecules. More energy is needed to separate molecules, so it has higher boiling point.

(3 marks)

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7. (a) Consider the chemical cell as shown below :



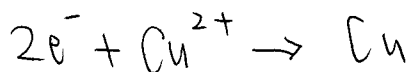
- (i) What is the function of the porous pot ?

Prevent direct mixing and let the ions to pass through between two half cell.

- (ii) Deduce whether the electrons flow through the external circuit from the magnesium electrode to the copper electrode.

from magnesium electrode to copper electrode.

- (iii) Write the half equation for the change that occurs at the cathode.



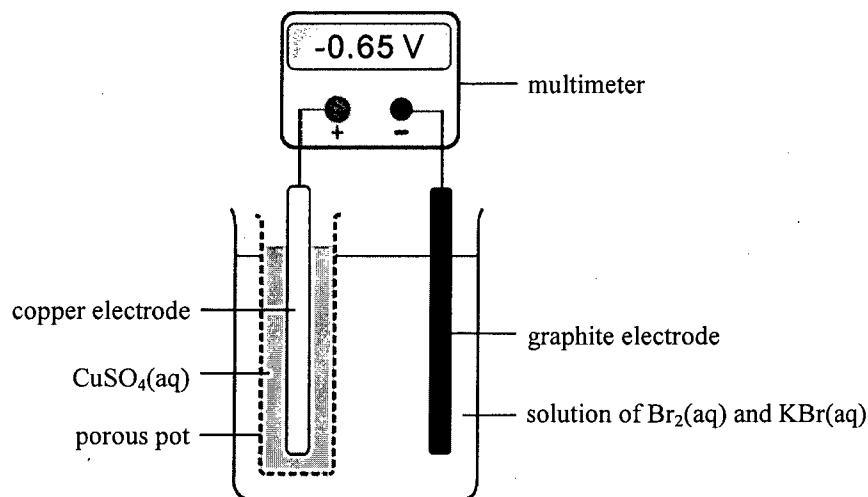
(3 marks)

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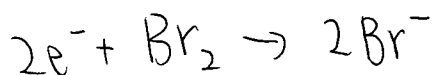
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7. (b) Consider another chemical cell as shown below :



- (i) Write the half equation for the change that occurs at the graphite electrode.



- (ii) State the expected observation at the copper electrode.

It becomes thinner

- (iii) Would the multimeter reading become more negative, less negative or remain unchanged if the solution of $Br_2(aq)$ and $KBr(aq)$ is replaced by a solution of $I_2(aq)$ and $KI(aq)$, while the other conditions remain unchanged? Explain your answer.

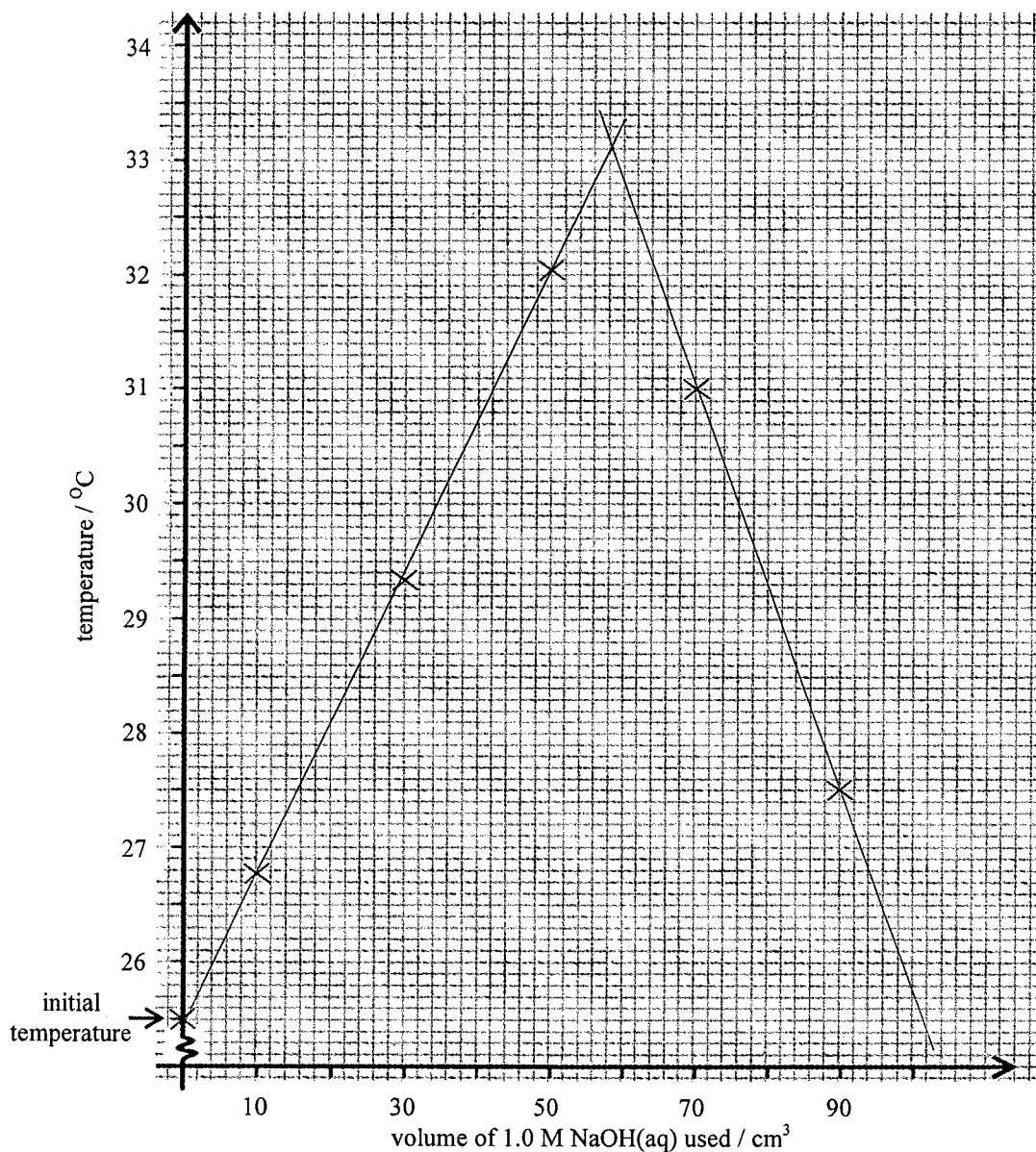
Less negative. I_2 is ~~a~~ a weaker ~~ox~~ oxidizing agent than Br_2 as it has a higher position in Ecs. The difference between voltage of I_2 and Copper will be ^{less} than Br_2 .

(4 marks)

8. Several trials of an experiment were performed for determining the enthalpy change of neutralisation for a reaction. For each trial, a total volume of 100.0 cm^3 of a solution was obtained from mixing specified volumes of a HCl(aq) and 1.0 M NaOH(aq) as shown below in an expanded polystyrene cup. The HCl(aq) and NaOH(aq) were kept at the same initial temperature before mixing.

Trial	1	2	3	4	5
Volume of the HCl(aq) used / cm^3	90	70	50	30	10
Volume of 1.0 M NaOH(aq) used / cm^3	10	30	50	70	90

For each trial, the mixture was stirred and its maximum temperature reached was recorded. A graph of the maximum temperature reached for each trial is shown below :

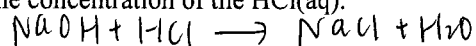


- (a) It is estimated from the graph that 58.0 cm^3 of NaOH(aq) (and 42.0 cm^3 of HCl(aq)) is required for obtaining the possible maximum temperature reached in this experiment. Show how this estimation can be done in the above graph.

(1 mark)

Answers written in the margins will not be marked.

8. (b) (i) Calculate the number of moles of NaOH(aq) reacted with HCl(aq) in (a). Hence, find the concentration of the HCl(aq).



$$\text{no. of moles of NaOH} = 1 \times (58 \div 1000) = 0.058$$

$$\text{no. of moles of HCl} = 0.058$$

$$\text{Concentration of HCl} = \frac{0.058}{42 \div 1000} = 1.38 \text{ M}$$

- (ii) Given that the initial temperature of the mixture for each trial is 25.5°C, calculate the enthalpy change of neutralisation of the reaction, in kJ mol⁻¹.
(Density of the mixture = 1.00 g cm⁻³;
specific heat capacity of the mixture = 4.18 J g⁻¹ K⁻¹;
heat capacity of the expanded polystyrene cup : negligible)

$$mc\Delta T = 100 \times 4.18 \times (33.1 - 25.5) = 3176.8 \text{ J}$$

$$\text{enthalpy change} = -\frac{3176.8}{0.058 \times 1000} = -54.77 \text{ kJ mol}^{-1}$$

(4 marks)

- (c) The one determined above is not the standard enthalpy change of neutralisation. What, then, is meant by the term 'standard enthalpy change of neutralisation'?

Standard enthalpy change of neutralization is the enthalpy change of 1 mole of water is produced by neutralization of an acid and an alkali under standard condition.

(1 mark)

9. Iron cans used to store food products are commonly coated with a thin layer of tin.

(a) The thin layer of tin prevents iron cans from corrosion.

(i) Briefly describe the principle for this kind of corrosion prevention.

The layer form a preventive layer to block the contact with air and water.

(ii) Explain whether these iron cans would corrode more readily once their surfaces are damaged by scratching.

Iron is more reactive than tin. It lose electrons more readily than tin. When tin attached but scratched. Iron will lose electrons to form Fe^{2+} ions more readily.

(iii) Suggest why galvanisation is not suitable to prevent corrosion in iron cans that are used to store food products.

Zinc is poisonous.

(3 marks)

(b) There is an increasing trend for manufacturers to use cans made entirely of aluminium for storing food products.

(i) Explain why aluminium is more resistant to corrosion than iron, although it occupies a higher position than iron in the reactivity series.

Aluminium form oxide layer readily and its oxide layer is impermeable to water and air.

(ii) Name the process that increases the corrosion resistance of aluminium cans.

Anodization

(iii) Other than corrosion resistance, suggest one advantage of using aluminium to make cans.

Can be dyed easily

(3 marks)

Answers written in the margins will not be marked.

*10. You are provided with common laboratory apparatus and the following chemicals :

iron powder

zinc powder

aqueous ammonia

distilled water

Describe how zinc sulphate crystals can be obtained from a solid sample of zinc sulphate containing copper(II) sulphate as impurity. (Not all chemicals must be used.)

(5 marks)

Dissolve the sample in distilled water.

Add excess zinc powder into the solution.

Reddish brown copper will form due to displacement as zinc is more reactive than copper.

Filter the solid obtained and zinc powder remained by using a filter funnel.

Heat the solution until it is saturated. Cool down and obtain crystals.

Filter and wash it with little cold distilled water.

Dry it by using a filter paper.

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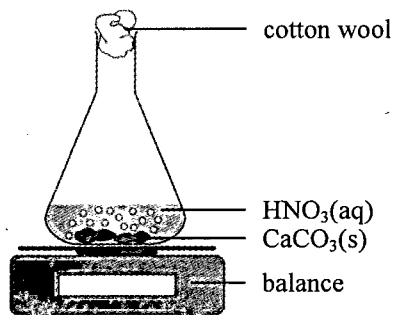
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PART II

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

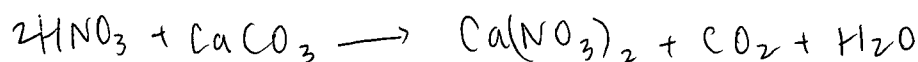
11. Two trials of an experiment were performed using the set-up below to study the reaction between nitric acid and calcium carbonate. A gas was formed in the reaction.



The chemicals used are listed in the table below while other experimental conditions were the same.

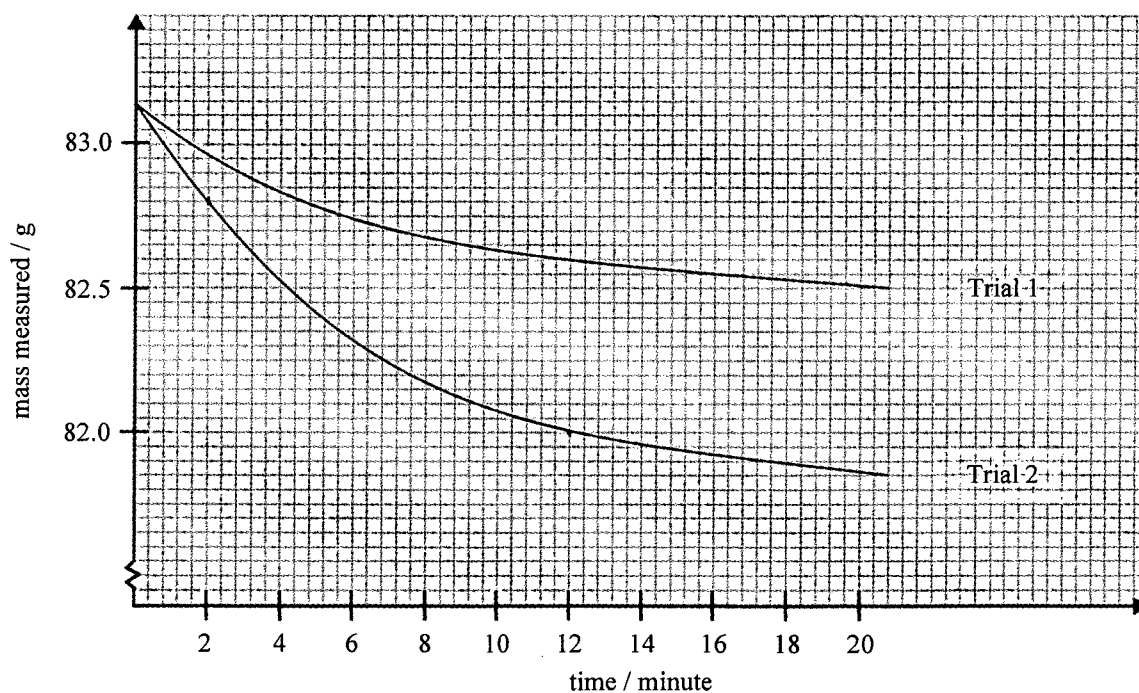
Trial	Mass of $\text{CaCO}_3(\text{s})$ added / g	Volume of 3.0 M $\text{HNO}_3(\text{aq})$ added / cm^3	Volume of $\text{H}_2\text{O}(\text{l})$ added / cm^3
1	3.0	10.0	20.0
2	3.0	20.0	10.0

- (a) Write the chemical equation for the reaction between nitric acid and calcium carbonate.



(1 mark)

- (b) The graph below shows the variation of the mass measured with time for the two trials.



Answers written in the margins will not be marked.

11. (b) (i) Calculate the average rate of formation of the gas from the 2nd minute to the 12th minute for Trial 2.

$$\text{Average rate} = \frac{1}{(12-2) \times 60} = 1.67 \times 10^{-3} \text{ s}^{-1}$$

- (ii) Explain ONE difference in the shape of the curves for Trial 1 and Trial 2.

The volume of HNO_3 added in trial 1 is smaller than that of trial 2. As HNO_3 is limiting, the no. of moles of HNO_3 increased in trial 2, CO_2 gas produced will also increase and escape the set-up. Mass measured will also be smaller.

(4 marks)

- (c) Suggest how the effect of surface area of solid reactant on the rate of reaction can be studied using the above set-up.

Use calcium carbonate granules and calcium carbonate powder separately to do the reaction.

Powder with larger surface area should have faster rate.

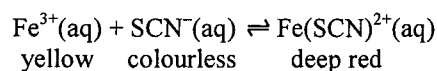
(1 mark)

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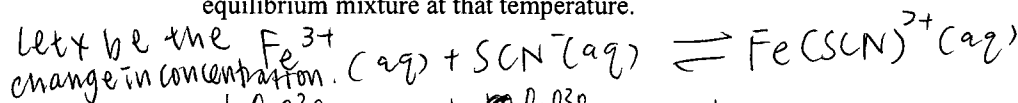
12. Consider an equilibrium mixture of the following chemical reaction :



- (a) Write an expression for the equilibrium constant K_c for the reaction.

$$K_c = \frac{[\text{Fe}(\text{SCN})^{2+}(\text{aq})]_{\text{eqm}}}{[\text{Fe}^{3+}(\text{aq})]_{\text{eqm}} [\text{SCN}^{-}(\text{aq})]_{\text{eqm}}} \quad (1 \text{ mark})$$

- (b) At a certain temperature, the equilibrium constant K_c for the reaction is $1.08 \times 10^3 \text{ dm}^3 \text{ mol}^{-1}$. The equilibrium mixture is prepared by mixing 20.0 cm^3 of $0.030 \text{ M Fe}(\text{NO}_3)_3(\text{aq})$ with 10.0 cm^3 of $0.030 \text{ M KSCN}(\text{aq})$ in an acidic medium. Calculate the concentration of $\text{Fe}(\text{SCN})^{2+}(\text{aq})$ in the equilibrium mixture at that temperature.



I	$\frac{0.030}{20 \div 1000} = 1.5$	$\frac{0.030}{10 \div 1000} = 3$	0
C	$-x$	$-x$	$+x$
E	$1.5 - x$	$3 - x$	x

$$\frac{x}{(1.5 - x)(3 - x)} = 1.08 \times 10^{-3}$$

$$x = 1.08 \times 10^{-3} (4.5 - 4.5x + x^2)$$

$$1.08 \times 10^{-3} x^2 - 5.86 \times 10^{-3} + 4.86 \times 10^{-3} = 0$$

$$x = 1.022 \text{ or } 4.404 (\text{rej.})$$

$\therefore$ Concentration of $\text{Fe}(\text{SCN})^{2+}(\text{aq})$ is 1.022 M

- (c) It is known that the equilibrium constant K_c increases when temperature increases. Suggest and explain whether the enthalpy change of the reaction is positive, negative or zero.

Positive. Increase in temperature favours endothermic reaction.

K_c increase when equilibrium is shift to right. Enthalpy change will be greater than zero as the forward reaction is endothermic.

(1 mark)

- (d) When a little amount of $\text{Na}_2\text{SO}_3(\text{s})$ is added to the equilibrium mixture, the colour of the mixture becomes paler. Explain this observation.

Addition of Na_2SO_3 will reduce Fe^{3+} to Fe^{2+} . Concentration of Fe^{3+} decrease. Equilibrium position will shift to left and the colour will become paler.

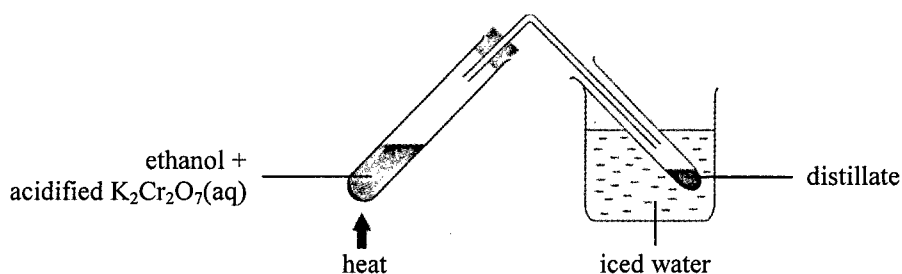
(2 marks)

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13. (a) It was intended to prepare ethanoic acid from ethanol by the following set-up. However, the distillate collected mainly contained another organic product X but not ethanoic acid.



- (i) What is X?

ethanal

- (ii) Explain why the distillate collected mainly contained X but not ethanoic acid.

The heating is too gentle.

(2 marks)

- (b) Ethanoic acid can be converted to an unsubstituted amide.

- (i) Give the systematic name of this amide.

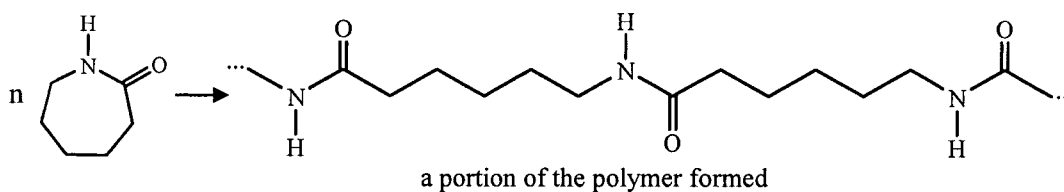
ethanamide

- (ii) Suggest what reagent and condition are needed for this conversion.

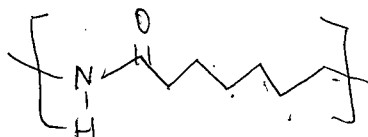
1. PCl_3 2. NH_3 , heat

(2 marks)

- (c) The following shows the formation of a polymer from an amide :



- (i) Draw the repeating unit of the polymer formed.

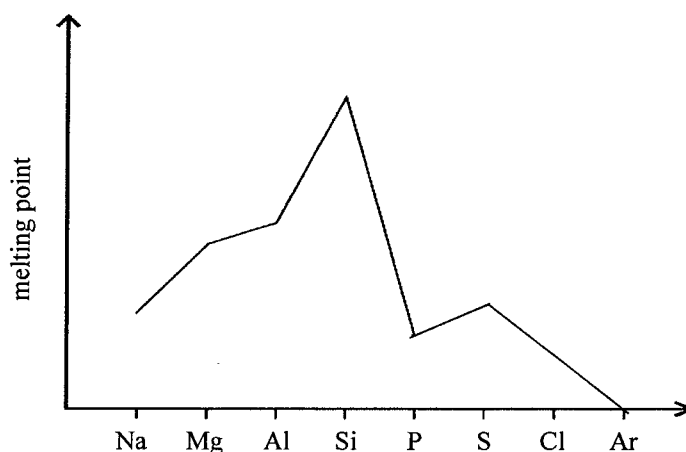


- (ii) There is a view which suggests that the above polymerisation does not involve condensation. Give a reason to support this view.

no small molecules are eliminated.

(2 marks)

14. The following graph shows an incomplete sketch of the variation in melting points of the elements in the third period of the Periodic Table.



- (a) Complete the sketch on the graph above.

(1 mark)

- (b) Explain why the melting point of Mg is higher than that of Na.

Mg has 2 electrons contributing to the 'sea of electrons'. Na only has 1. With more delocalised electrons, Mg has a stronger metallic bond than Na. More energy is needed to separate.

(1 mark)

- (c) Explain why the melting point of Si is higher than that of P.

Si has a giant covalent structure. Atoms are held by strong covalent bonds. P has a molecular structure. Molecules are held by weak ^{simple} van der Waals' force. More energy is needed to break Si atoms down.

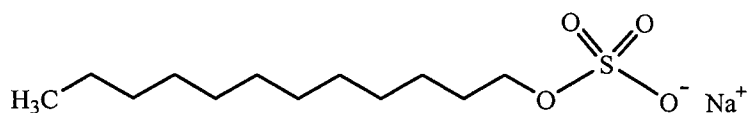
(2 marks)

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Answers written in the margins will not be marked.

- *15. With reference to the structure of sodium lauryl sulphate (SLS) below, explain why it has cleansing properties.



(5 marks)

In the structure of SLS, there is an ionic head SO_3^- and a hydrocarbon tail and it acts as a soapless detergent. When it is added, hydrophilic head will dissolve in water and hydrophobic tail will dissolve in oil. After stirring, oil droplets are formed by lifting up the grease. Stable emulsion formed. Negatively charged oil droplets repel each other, so grease can be easily removed.

END OF SECTION B
END OF PAPER

Answers written in the margins will not be marked.

PERIODIC TABLE 周期表

GROUP 族

atomic number 原子序

		0																
		I		II		III		IV		V		VI		VII		He		
3	Li	4	Be															2
6.9		9.0																4.0
11	Na	12	Mg															9
23.0		24.3																F
																		19.0
																		8
																		O
																		16.0
																		7
																		N
																		14.0
																		6
																		C
																		12.0
																		13
																		Al
																		27.0
																		14
																		Si
																		28.1
																		31
																		Ga
																		69.7
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2019 DSE (D)

香港考試及評核局

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY

香港中學文憑考試

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

答題簿

ANSWER BOOK

考生須知

- (一) 宣布開考後，考生須首先在第 1 頁之適當位置填寫考生編號，並在第 1 及 3 頁之適當位置貼上電腦條碼。
- (二) 每題 (非指分題) 必須另起新頁作答，並須在每一頁的相應試題編號方格填畫「X」號，以表示選答的題號 (見下例)，並在第一頁之適當位置填寫作答的試題編號。
- (三) 紙張兩面均應使用，並應每行書寫。不可在各頁邊界以外位置書寫。寫於邊界以外的答案，將不予評閱。
- (四) 如有需要，可要求派發方格紙及補充答題紙。每一紙張均須填寫考生編號、填畫試題編號方格、貼上電腦條碼，並用繩縛於簿內。
- (五) 試場主任宣布停筆後，考生不會獲得額外時間貼上電腦條碼及填畫試題編號方格。

INSTRUCTIONS

- (1) After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1 and 3.
- (2) Start each question (not part of a question) on a new page. Put 'X' in the corresponding question number box on each page to indicate the appropriate question number (see the example below), and write the question number(s) of the question(s) attempted in the space provided on Page 1.
- (3) Write on both sides using each line. Do not write in the margins. Answers written in the margins will not be marked.
- (4) Graph paper and supplementary answer sheets will be supplied on request. Write your Candidate Number, mark the question number box and stick a barcode label on each sheet, and fasten them with string INSIDE this book.
- (5) No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.

例 Example:

試題編號 Question No. = 3

試題編號 Question No.																							
1	2	3	4	5	6	7	8	9	10	11	12												
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13	14	15	16	17	18	19	20	21	22	23	24	≥25											

Level 5 Exemplar Paper 2

由考生填寫 To be filled in by the candidate	
試題編號 Question No.	1
	3

試題編號 Question No.

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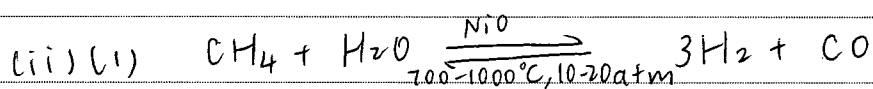
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13 14 15 16 17 18 19 20 21 22 23 24 ≥25

每題另起新頁作答。

Start each question on a new page.

1.(a)⁽ⁱ⁾ more Ammonia is produced for fertilizers.



(2) More H_2 can be produced which is an important fuel for production of methanol.

(iii) From experiment 2 and 3, when concentration of A is doubled, holding B's concentration unchanged, initial rate is also doubled. The order of reaction with respect to A is 1. From experiment 1 and 2, when concentration of B is doubled, ~~initial~~ holding concentration of A constant, rate is increased to 9 times of the original, the order of reaction with respect to B is 2.

b) (i) In a membrane electrolytic cell, Cl^- ions in brine is preferentially discharged to form $\text{Cl}_2(\text{g})$ in the anode. $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$. At cathode, $\text{H}^+(\text{aq})$ ions in water preferentially discharged to form $\text{H}_2(\text{g})$. $2\text{H}^+ \rightarrow \text{H}_2$. Only cations (Na^+) can pass through the membrane. Water continue to ionize, leaving excess OH^- ions. Na^+ ions pass through the membrane and produce pure sodium hydroxide with OH^- ions.

寫於邊界以外的答案，將不予評閱。

Answers written in the margins will not be marked.

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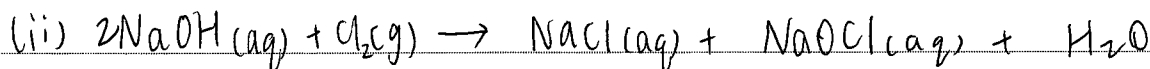
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13 14 15 16 17 18 19 20 21 22 23 24 ≥25

每題另起新頁作答。

Start each question on a new page.



(iii) Atom economy of reaction(I) = $\frac{32.0}{74.5 + 2 \times 17} \times 100\% = 29.5\%$

Atom economy of reaction(II) = $\frac{32.0}{34 + 2 \times 17} \times 100\% = 47.1\%$

∴ Reaction(II) has a high atom economy, It is greener than reaction(I)

c)(i) chalk

(ii) Carbon will react with oxygen and produce heat.

(iii) Expensive to maintain high pressure.

It is dangerous.

(iv) $k = Ae^{-\frac{E_a}{RT}}$

$k_1 = Ae^{-\frac{160}{8.31 \times 1500}}$

$= Ae^{-\frac{32}{2493}}$

$k_2 = Ae^{-\frac{160}{8.31 \times 1200}}$

$= Ae^{-\frac{40}{2493}}$

$\frac{k_1}{k_2} = \frac{Ae^{-\frac{32}{2493}}}{Ae^{-\frac{40}{2493}}}$

$= e^{\frac{8}{2493}}$

$= 1$

∴ ratio is 1:1

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每題另起新頁作答。
Start each question on a new page.

(V) The energy in zone B is higher which more particles have energy higher or equal than the activation energy and start the reaction.

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Start each question on a new page.

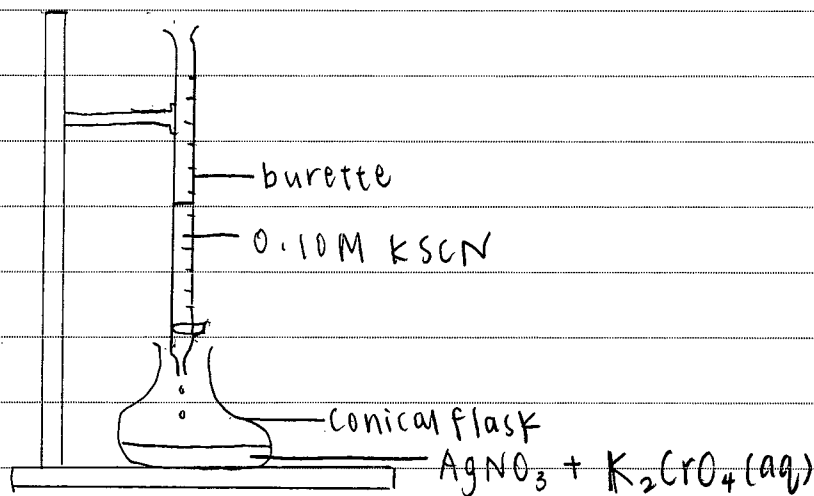
3. a) (i) As it only has a peak at 2150cm^{-1} , it contains $\text{C}\equiv\text{C}$ group.
It has a relative molecular mass = 40. So it has a structure $\text{CH}\equiv\text{CCH}_3$.

(ii) Catalyst of organic reactions

(iii) Test them by adding Tollen's reagent. A will form a ~~new~~ silver mirror on the surface but B will not.

b) (i) To remove insoluble impurities.

(ii)



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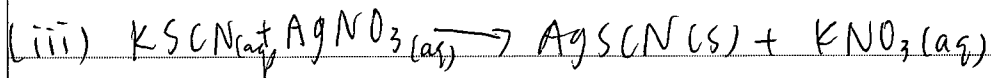
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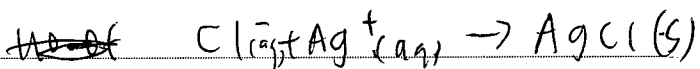
Start each question on a new page.



no. of moles of KSCN used = $0.1 \times (9.42 \div 1000) = 9.42 \times 10^{-4}$

no. of moles of $\text{AgNO}_3 = 9.42 \times 10^{-4}$

no. of moles of AgNO_3 react with $\text{Cl}^- = 1 \times (2.5 \div 1000) - 9.42 \times 10^{-4}$
 $= 1.56 \times 10^{-3}$



no. of moles of Cl^- reacted = 1.56×10^{-3}

Mass of NaCl = $1.56 \times 10^{-3} \times (23 + 35.5) = 0.091269$

Percentage by mass of Na = $\frac{0.091269 \times 23}{23 + 35.5} \times 100\% = 1.79\%$

c) (i) (1) Different component have different tendencies in stationary phase and mobile phase

(2) Using separating funnel

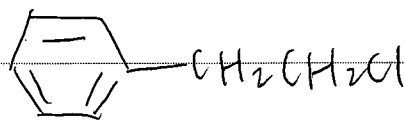
(ii) It has ^{three} absorption peak.

$m/z = 142$ | $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2^{37}\text{Cl}^+$

$m/z = 140$ | $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2^{35}\text{Cl}^+$

$m/z = 91$ | $\text{C}_6\text{H}_5\text{CH}_2^+$

Its structure will be



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13 14 15 16 17 18 19 20 21 22 23 24 ≥25

每題另起新頁作答。

Start each question on a new page.

(iii) (1) It is carcinogenic

(2) It cause harm to human body.

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