Introduction Intro

書本簡介

書名	Mastering Chemistry
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原價	$78
英皇學生	**優惠價 $67**

- Alan Cheng最新力作，助短時間內提升實力
- MC題全攻略，讓學生控制做卷時間
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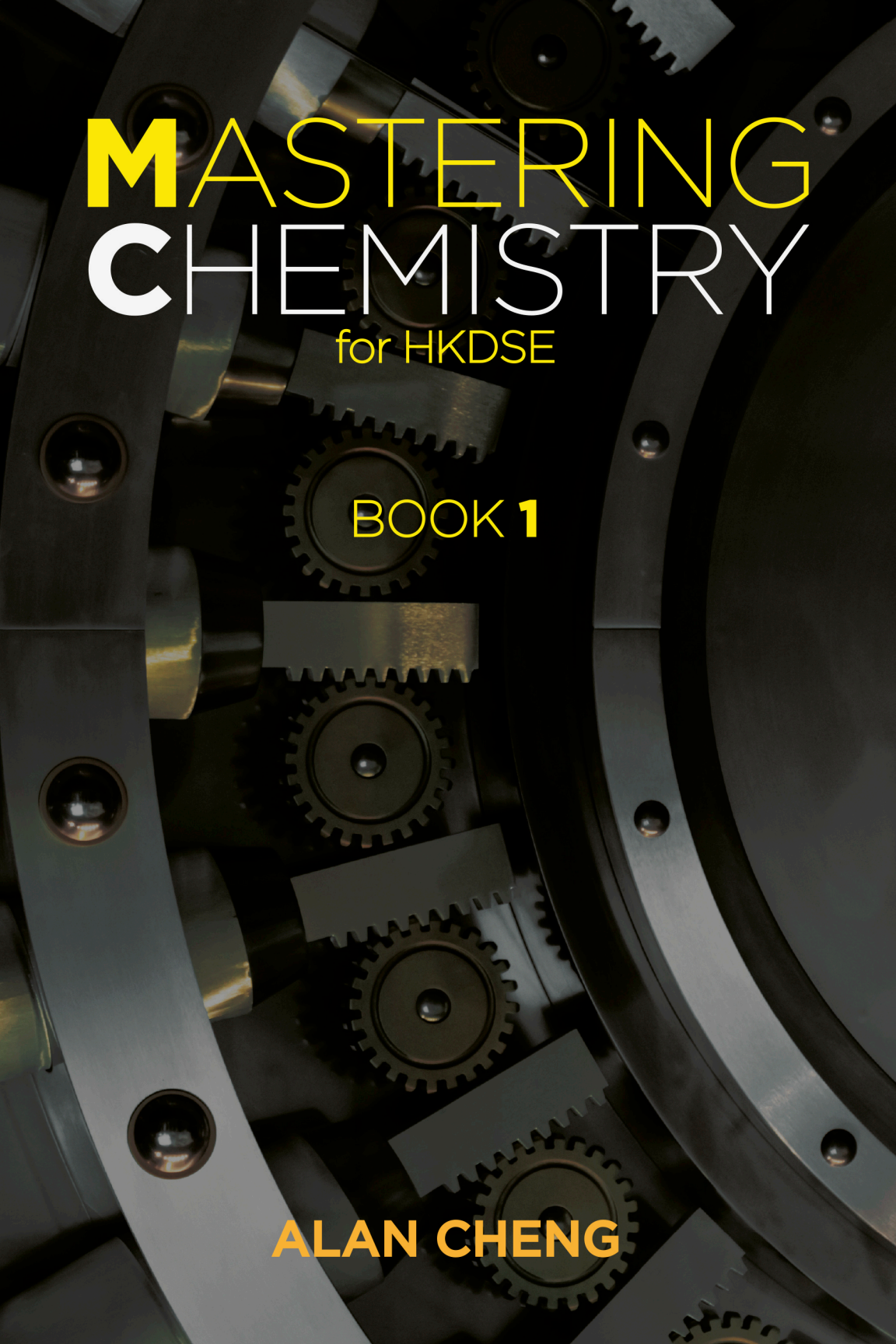
MASTERING
CHEMISTRY
for HKDSE
BOOK 1
ALAN CHENG

PREFACE

Mastering **C**hemistry is a set of quality multiple choice exercise books for the new HKDSE Chemistry examination.

Key features of the series:

1. All questions are set in the same style as those in the past HKDSE papers.
2. Detailed explanations to each question are given.
3. Teachers and students can choose the particular topic for their learning or teaching schedule.

I wish to take this opportunity to thank Mr. Lee for his invaluable advice for this book. Comments from teachers and students are cordially welcome.

Alan Cheng

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TOPIC

04 Chemical Bonding

Choose the best answer for each question.

1. Which of the following compound has the highest boiling point?

A. NaCl

B. CCl_4

C. NH_3

D. H_2

2. Which of the following aqueous solution is orange in colour?

A. KCl

B. $Cu(NO_3)_2$

C. $NiSO_4$

D. $Na_2Cr_2O_7$

3. The atom of element **X** has 20 protons, it form a stable compound with nitrate with a chemical formula of

A. $\mathbf{X}_2NO_3$.

B. $\mathbf{X}NO_3$.

C. $\mathbf{X}(NO_3)_2$.

D. $\mathbf{X}(NO_3)_3$.

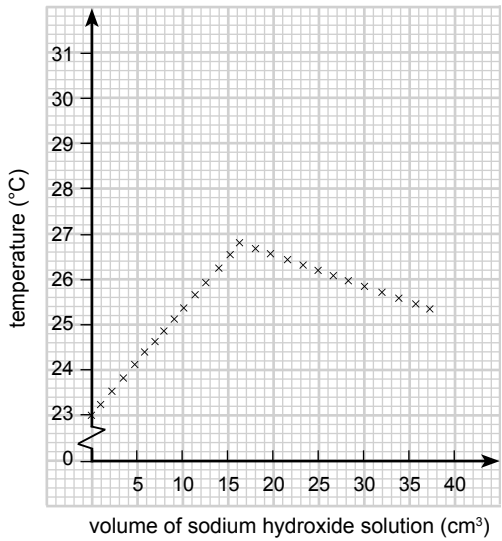
Directions: Each question below (Questions 19 to 22) consists of two separate statement. Decide whether each of the two statements is true or false; if both are true, then decide whether or not the second statement is a *correct* explanation of the first statement. Then select the one option from A to D according to the following table:

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

	1st statement	2nd statement	
19.	Pure ammonia does not conduct electricity.	Pure ammonia is a covalent compound, does not contain mobile ions.	
20.	Potassium carbonate is a base.	The pH value of potassium carbonate solution is greater than 7.	
21.	$NaOH_{(aq)}$ should be stored in glass bottle.	$NaOH_{(aq)}$ is a strong alkali.	
22.	Limewater can be used to distinguish between carbon dioxide gas and sulphur dioxide gas.	Carbon dioxide turns limewater milky.	

Directions: Questions 19 to 20 refer to the following experiment.

An experiment was carried out to determine the concentration of ethanoic acid. 25.0 cm^3 of the acid was placed in a polystyrene cup and 0.8 M sodium hydroxide solution was added from the burette. The temperature of the solution in the polystyrene cup was measured with a thermometer at regular time intervals. The recordings of temperature are shown in the graph below:



19. From the graph, estimate the greatest temperature rise of the solution in the polystyrene cup.

A. 3.8 ˚C

B. 4.4 ˚C

C. 5.2 ˚C

D. 6.0 ˚C

20. What is the concentration of the ethanoic acid?

A. 0.13 M

B. 0.26 M

C. 0.52 M

D. 0.65 M

Topic 4 – Chemical Bonding

1. A

NaCl has giant ionic structure. CCl_4, NH_3 and H_2 have simple molecular structure.

Substance with giant ionic structure has higher boiling point than simple molecular structure.

2. D

$Cr_2O_7^{2-}{}_{(aq)}$ is orange in colour.

3. C

Atom **X** has 20 protons and 20 electrons. The electronic arrangement of **X** is (2, 8, 8, 2). **X** is a Group II element which forms a stable cation $\mathbf{X}^{2+}$.

$\therefore$ It gives a formula of $\mathbf{X}(NO_3)_2$ with NO_3^-.

4. C

It is iodine.

It is a covalent substance with simple molecular structure.

5. A

The atom of **X** has four outermost shell electrons.

6. B

X is a Group IV element, $\therefore$ the compound may be carbon dioxide.

7. B

$AgNO_{3(aq)}$ is an ionic compound. It conducts electricity in aqueous state due to the presence of mobile ions.

20. C

$K_2CO_{3(s)}$ is not a base.

$K_2CO_{3(aq)}$ is an alkaline solution because it is a salt formed from a strong alkali (KOH) and weak acid (H_2CO_3).

21. C

$NaOH_{(aq)}$ can attack glass. It should be stored in plastic bottle.

22. C

Both $CO_{2(g)}$ and $SO_{2(g)}$ can turn limewater milky.

$$CO_{2(g)} + Ca(OH)_{2(aq)} \rightarrow CaCO_{3(s)} + H_2O_{(l)}$$

$$SO_{2(g)} + Ca(OH)_{2(aq)} \rightarrow CaSO_{3(s)} + H_2O_{(l)}$$

The mass of $C_{(s)}$ in the sample $= 5.45 - 1.3943$

$= 4.0558$ g

The percentage by mass of $C_{(s)}$ in the sample $= (\frac{4.0558}{5.45}) \times 100\%$

$= 74.4\ \%$

16. A

17. C

18. A

$H^+ + OH^- \rightarrow H_2O$

The no. of moles $NaOH_{(aq)}$ used $= 1 \times (\frac{24.8}{1000})$

$= 0.0248$ mol

The no. of moles of $OH^-_{(aq)}$ = The no. of moles of $NaOH_{(aq)}$

$= 0.0248$ mol

The no. of moles of $H^+_{(aq)}$ reacted = The no. of moles of $OH^-_{(aq)}$

$= 0.0248$ mol

The no. of moles of acid $= 1 \times (\frac{25}{1000})$

$= 0.025$ mol

$$\text{Basicity} = \frac{\text{no. of moles of } H^+_{(aq)}}{\text{no. of moles of acids}}$$

$$= \frac{0.025}{0.0248}$$

$= 1$

19. A

Temperature rise $= 26.8 - 23.0$

$= 3.8\ ^\circ C$

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About the Author

Mr. Alan Cheng is a renowned Chemistry teacher in Hong Kong. He has been teaching senior-form Chemistry for 15 years in a highly esteemed educational institution with great success. With his distinguished tenacity in teaching Chemistry for public examination and assessment, he has prepared a vast amount of quality exam-oriented notes, exercise books and mock exam papers to help local students in their public examinations.

Mastering **C**hemistry is a fine reference book series setting for HKDSE candidates. It provides excellent practice for getting flying colours in public examination.

Features of the Series

- Detailed answers and explanation
- Questions resemble closely to HKDSE papers

ISBN 978-962-296-090-9
9 789622 960909

Martindale Press Limited