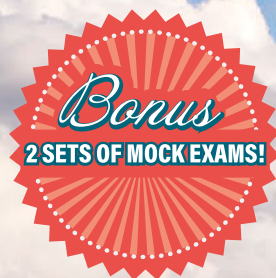


MASTERING CHEMISTRY

for HKDSE

BOOK 3



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CONTENTS

TOPIC 22	Rate of Reaction	1
TOPIC 23	Chemical Equilibrium	12
TOPIC 24	Homologous Series and IUPAC naming	25
TOPIC 25	Isomerism	39
TOPIC 26	Typical reactions of various functional groups and Inter-conversions of carbon compounds	51
TOPIC 27	Important Organic Substances	72
TOPIC 28	Patterns in the Chemical World	86
Mock Exam 1		98
Mock Exam 2		111

ANSWERS

TOPIC 22	Rate of Reaction	127
TOPIC 23	Chemical Equilibrium	134
TOPIC 24	Homologous Series and IUPAC naming	142
TOPIC 25	Isomerism	147
TOPIC 26	Typical reactions of various functional groups and Inter-conversions of carbon compounds	155
TOPIC 27	Important Organic Substances	169
TOPIC 28	Patterns in the Chemical World	177
Mock Exam 1		183
Mock Exam 2		189

TOPIC
24

Homologous Series and IUPAC naming

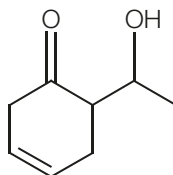
Choose the best answer for each question.

1. Which of the following combination is correct?

<u>homologous series</u>	<u>functional group presence</u>
A. carboxylic acid	hydroxyl group
B. alkanol	amino group
C. aldehyde	carbonyl group
D. amine	carboxyl group



2. Consider the structure of the following organic compound:



Which of the following statements concerning the above organic compound are correct?

- (1) It has a hydroxyl group.
(2) It has a molecular formula of $C_8H_{12}O_2$.
(3) It has an ester group.

- A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

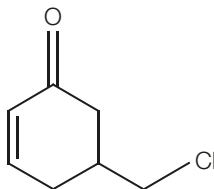


TOPIC
26

Typical reactions of various functional groups and Inter-conversions of carbon compounds

Choose the best answer for each question.

1. An organic compound **X** has the following structure:



X can react with

- (1) $\text{PCl}_{3(l)}$
- (2) $\text{NaOH}_{(aq)}$
- (3) LiAlH_4 / dry ether

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)



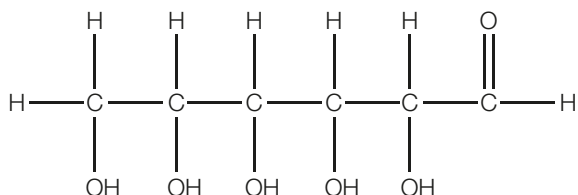
2. Which of the following compounds can react with $\text{KOH}_{(aq)}$?

- A. $\text{CH}_3\text{CH}_2\text{OH}$
- B. CH_3CHO
- C. CH_3COCH_3
- D. $\text{CH}_3\text{COOCH}_2\text{CH}_3$



Choose the best answer for each question.

1. The structure of glucose is shown below:

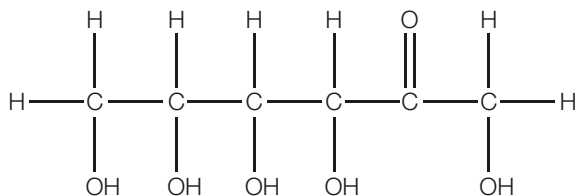


Which of the following statements about glucose is correct?

- A. It is insoluble in water.
- B. Its molecule has three chiral carbon centers.
- C. It can turn acidified potassium dichromate solution from orange to green.
- D. It is a disaccharide.



2. The structure of fructose is shown below:



Which of the following statements about fructose is incorrect?

- A. It is soluble in water.
- B. Its molecule has three chiral carbon centers.
- C. It is a simple sugar.
- D. It has an ester group.



TOPIC
28

Patterns in the Chemical World

Choose the best answer for each question.

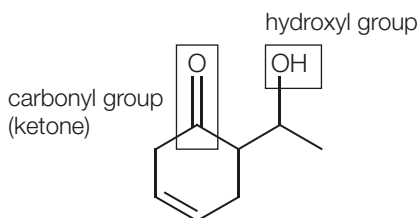
1. Sodium and potassium have similar chemical properties because
- A. they are Group I elements.
 - B. they are alkali metal.
 - C. they have same number of outermost shell electrons.
 - D. they conduct electricity.
- ☐
2. Which of the following statements concerning Group II elements is incorrect?
- A. They are alkaline earth metal.
 - B. Their melting point decreases down the group.
 - C. Their reducing power decreases down the group.
 - D. Their atomic size increases down the group.
- ☐
3. Across Period 3 of the Periodic Table from left to right,
- A. the atomic size decreases.
 - B. the metallic character of elements increases.
 - C. elements have similar chemical properties.
 - D. elements have similar physical properties.
- ☐
4. Which of the following statements concerning Group VII elements is correct?
- A. Their melting point decreases down the group.
 - B. They exists as diatomic molecule under room conditions.
 - C. Their oxidizing power increases down the group.
 - D. Their density decreases down the group.
- ☐

Topic 24 – Homologous Series and IUPAC naming

1. C

<u>homologous series</u>	<u>functional group presence</u>
A. carboxylic acid	carboxyl group
B. alkanol	hydroxyl group
C. aldehyde	carbonyl group
D. amine	amino group

2. A



3. C

$\text{CH}_3\text{CH}_2\text{NH}_2$ ionizes in water to give hydroxide ions.

4. B

(A) is incorrect because it is not a hydrocarbon.

The molecule of this compound is polar but it is not polar enough to dissolve in water.

The systematic name of this compound is 1-chlorobut-2-ene.

Topic 26 – Typical reactions of various functional groups and Inter-conversions of carbon compounds

1. C

The -Cl can react with $\text{NaOH}_{(aq)}$ to give -OH .

The ketone group can be reduced by LiAlH_4 to give -OH .

2. D

Ester undergoes alkaline hydrolysis with $\text{KOH}_{(aq)}$.

3. B

Amide undergoes acid hydrolysis with $\text{HCl}_{(aq)}$.

Amine undergoes neutralization with $\text{HCl}_{(aq)}$.

4. B

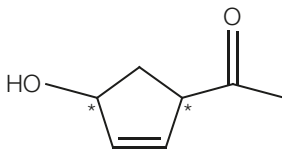
(1) is incorrect because pentane should be in excess if 2-chloropentane is the major product.

(2) is incorrect because substitution reaction must be carried out in the presence of light.

5. D

Both the hydroxyl group and the ketone group can be oxidized by $\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}^+_{(aq)}$.

(A) is incorrect because it has chiral centers in molecule.

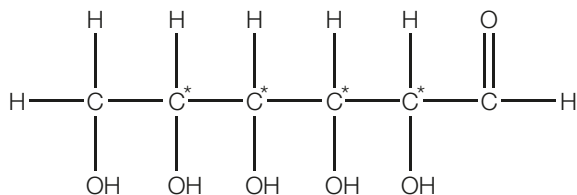


(C) is incorrect because it has totally ten hydrogen atoms in the molecule.

Topic 27 – Important organic substances

1. C

Its molecule has four chiral carbon centers.

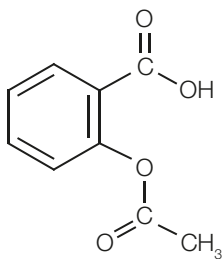


The hydroxyl group in molecule can turn acidified potassium dichromate solution from orange to green.

2. D

It has a ketone group and hydroxyl groups.

3. A



The carboxyl group can react with $\text{Na}_2\text{CO}_{3(aq)}$.

4. D

Vegetable oils can be hardened by hydrogenation (addition reaction) to some of the $\text{C}=\text{C}$ of the carboxylic acids, decreasing the degree of unsaturation.

Topic 28 – Patterns in the chemical world

1. C

Elements in the same group have similar chemical properties because they have the same number of outermost shell electrons.

2. C

For Group II elements, down the group,

- melting point decreases;
- reducing power increases.

3. A

Across period three of the periodic table from left to right,

- atomic size decreases;
- metallic character decreases;
- different physical and chemical properties.

4. B

Under room conditions, they exist as diatomic molecules. (e.g. F_2 , Cl_2 , Br_2 , I_2).

5. D

Be has higher electrical conductivity than Li because Be has a larger amount of valence electrons available for delocalization than Li.

6. A

Al has a larger charge density than Na and Mg, it has the strongest metallic bond.