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HUA YI SECONDARY SCHOOL
Preliminary Examination

4NA

4NA

SCIENCE (CHEMISTRY)

5105/03

5107/03

Paper 3 Multiple Choice

2 August 2023

Paper 3 & 4: 1 hour 15 minutes

Candidates answer on the Multiple Choice Answer Sheet
Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write your Name, Index Number and Class on the Answer Sheet in the spaces provided.
Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.

There are **twenty** questions on this paper. Answer **all** questions.
For each question there are four possible answers **A, B, C** and **D**.
Choose the one you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.

For Examiner's Use

Paper 3

This document consists of **8** printed pages including the cover page.
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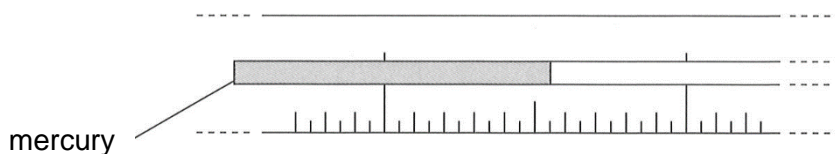
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[Turn Over

- 1 The boiling point of liquid X is lower than that of water.

A student places a mercury thermometer in boiling liquid X.

The diagram represents part of the stem of this thermometer without numbers.



What is the boiling point of liquid X?

- A** 75.5 °C **B** 84.5 °C **C** 104.5 °C **D** 105.5 °C
- 2 A student is given a mixture of three substances P, Q and R.

The table shows some of the properties of P, Q and R.

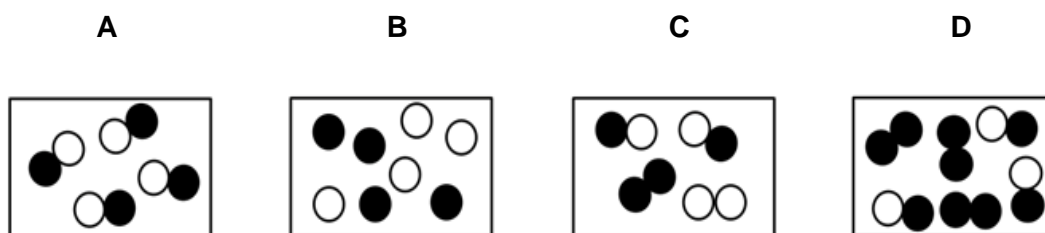
substance	state	solubility in water	solubility in ethanol
P	solid	yes	no
Q	liquid	no	yes
R	solid	no	no

Which method describes how a pure sample of substance Q can be separated from the original mixture?

- A** add ethanol, filter, distil the filtrate
B add ethanol, filter, add water to residue, filter
C add water, filter, dry the residue
D add water, filter, add ethanol to residue, filter
- 3 Which of the following occurs when water vapour condenses?

	space between particles	energy of particles
A	decreases	increases
B	decreases	decreases
C	increases	decreases
D	increases	increases

- 4 Which diagram shows a mixture of one element and one compound?



- 5 Which row has a value of +1?

- A** relative charge of proton
B relative charge of electron
C relative mass of electron
D relative mass of neutron

- 6 A student makes some crystals.

How does the student test the purity of the crystals?

- A** check the melting point of the crystals
B observe the shape of the crystals
C measure the size of the crystals
D test the solubility of the crystals in water

- 7 The formulae of two ionic compounds of chromium are CrCl_2 and $\text{Cr}_2(\text{CO}_3)_3$.

What are the charges on the chromium ions in these compounds?

	CrCl_2	$\text{Cr}_2(\text{CO}_3)_3$
A	2-	3-
B	2+	2+
C	2+	3+
D	2+	6+

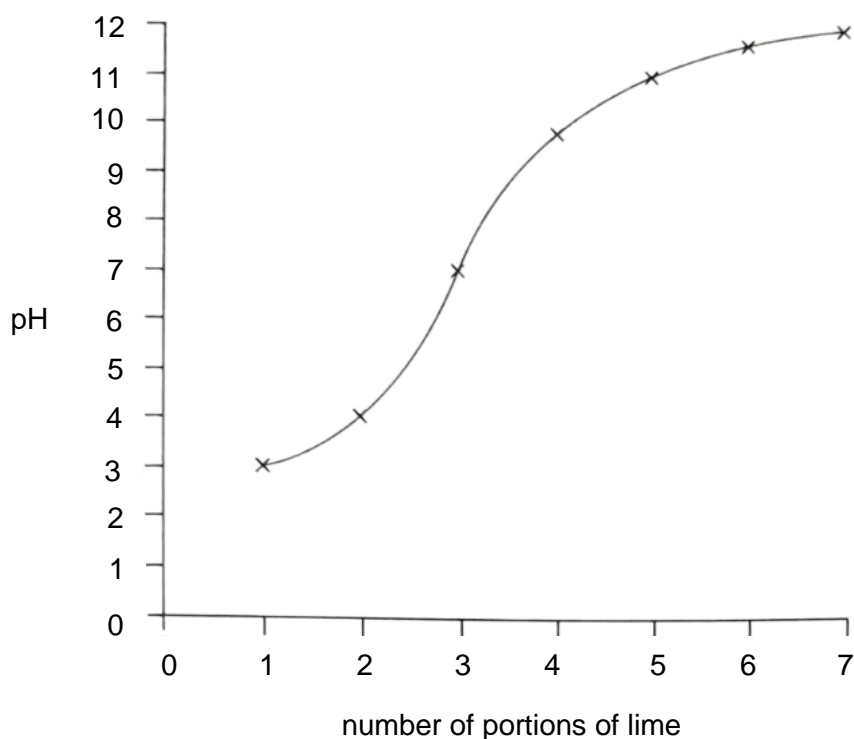
- 8 The pH of a solution is found to be 13.

Which of the following substances will react with this solution to produce a gas that turns red litmus paper blue?

- A ammonium nitrate
- B calcium carbonate
- C nitric acid
- D sodium hydroxide

- 9 In an experiment, equal portions of lime are added to 30 cm³ of vinegar.

The graph shows the pH of the vinegar after each portion is added.



How many portions of lime are required to neutralise **60 cm³** of vinegar?

- A 3
- B 6
- C 8
- D 14

10 Which of the following solutions, when mixed together, form an insoluble salt?

- A** dilute sulfuric acid and lead(II) nitrate
- B** dilute hydrochloric acid and barium nitrate
- C** dilute sulfuric acid and magnesium chloride
- D** dilute hydrochloric acid and magnesium sulfate

11 A student is given dilute sulfuric acid and the four solids listed below.

- 1 copper
- 2 copper(II) carbonate
- 3 copper(II) chloride
- 4 copper(II) oxide

Which of these solids **cannot** be reacted with dilute sulfuric acid to obtain copper(II) sulfate?

- A** 1 and 2 only
- B** 1 and 3 only
- C** 2 and 3 only
- D** 2 and 4 only

12 Which statement(s) about the general properties of metals is/are correct?

- 1 conduct electricity when solid
- 2 form acidic oxide
- 3 high melting point

- A** 1 only
- B** 2 only
- C** 1 and 3
- D** 2 and 3

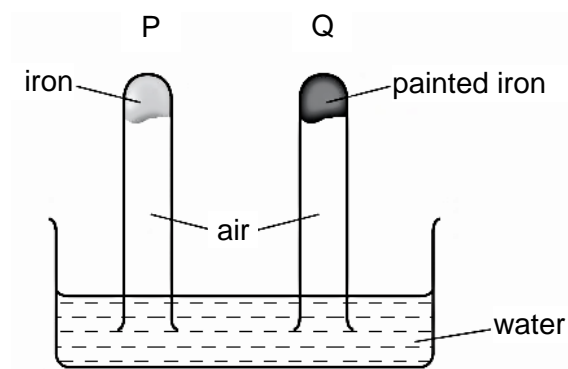
- 13 Which row describes the properties of a simple covalent substance?

	boiling point	electrical conductivity	
		solid	liquid
A	high	poor	poor
B	high	good	good
C	low	poor	poor
D	low	good	good

- 14 In the Periodic Table, how does the metallic character of the elements change from left to right across a period?

- A** It decreases.
B It increases.
C It increases, then decreases.
D It remains the same.

- 15 The experiment shown in the diagram is set up to show if paint affects rusting.



The apparatus is left for one month.

What happens to the water level in test tubes P and Q?

	test tube P	test tube Q
A	falls	rises
B	no change	rises
C	rises	falls
D	rises	no change

- 16 More than 90 % of all gold is recycled but less than 50 % of iron is recycled.

Based on economic grounds, what is the main reason for this difference?

- A Disposal of gold will cause more pollution than disposal of iron.
- B Gold is scarcer and more valuable than iron.
- C Gold will run out faster than iron.
- D It is easier to recycle gold than iron.

- 17 Statement 1: The burning of fossil fuels containing sulfur is a cause of 'acid rain'.

Statement 2: Acid rain is formed from sulfur dioxide which is produced when sulfur compounds burn.

Which of the following is true?

- A Both statements are correct and statement 2 explains statement 1.
- B Both statements are correct, but statement 2 does not explain statement 1.
- C Statement 1 is correct but statement 2 is incorrect.
- D Statement 2 is correct but statement 1 is incorrect.

- 18 Which of the following statements about compounds in a homologous series is false?

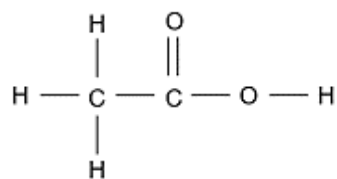
- A They have same functional group.
- B They have same molecular formula.
- C They have similar chemical properties.
- D They show a gradual change in physical properties.

- 19 Which of the following equations represents a substitution reaction?

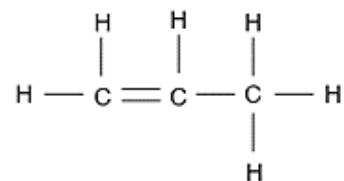
- A $\text{C}_2\text{H}_4 + \text{H}_2 \rightarrow \text{C}_2\text{H}_6$
- B $\text{C}_3\text{H}_6 + \text{Cl}_2 \rightarrow \text{C}_3\text{H}_6\text{Cl}_2$
- C $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$
- D $\text{C}_{10}\text{H}_{22} \rightarrow \text{C}_4\text{H}_8 + \text{C}_6\text{H}_{14}$

20 Which structure shows a polyunsaturated hydrocarbon?

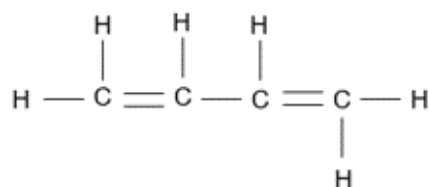
A



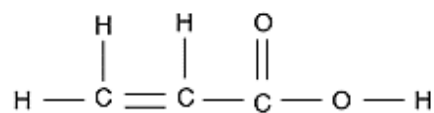
B



C



D



End of Paper