

Class	Register Number	Name
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南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL

Mid-Year Examination 2014
Secondary Three

CHEMISTRY

1 hour 30 minutes

Section A

Multiple Choice

Tuesday

6 May 2014

1145- 1315

Additional materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write in soft pencil.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Write your name, class and register number on the Multiple Choice Answer Sheet provided.

There are **twenty** questions in 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 answer sheet.

INFORMATION FOR CANDIDATES

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.

The periodic table can be found on page 8.

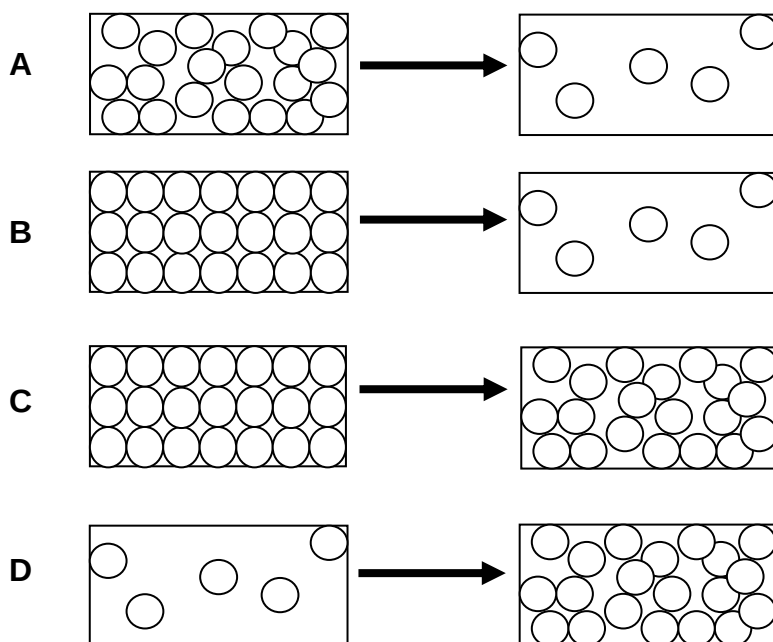
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This document consists of **8** printed pages.

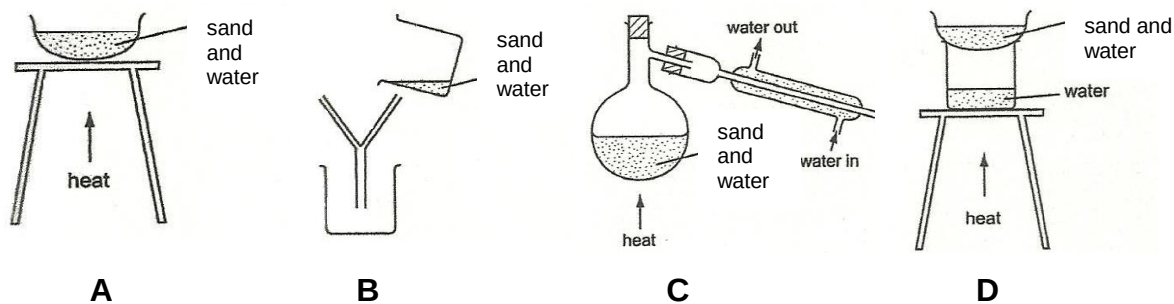
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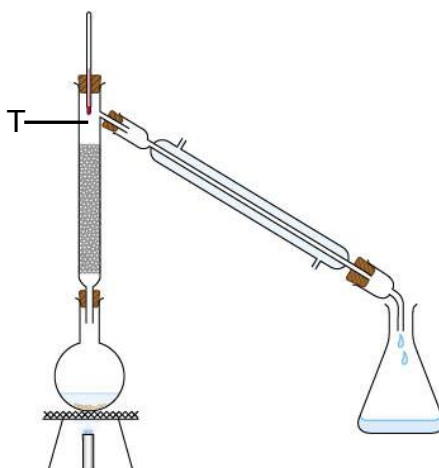
- 1 Which of the following diagram represents the change in the arrangement of particles during the condensation process?



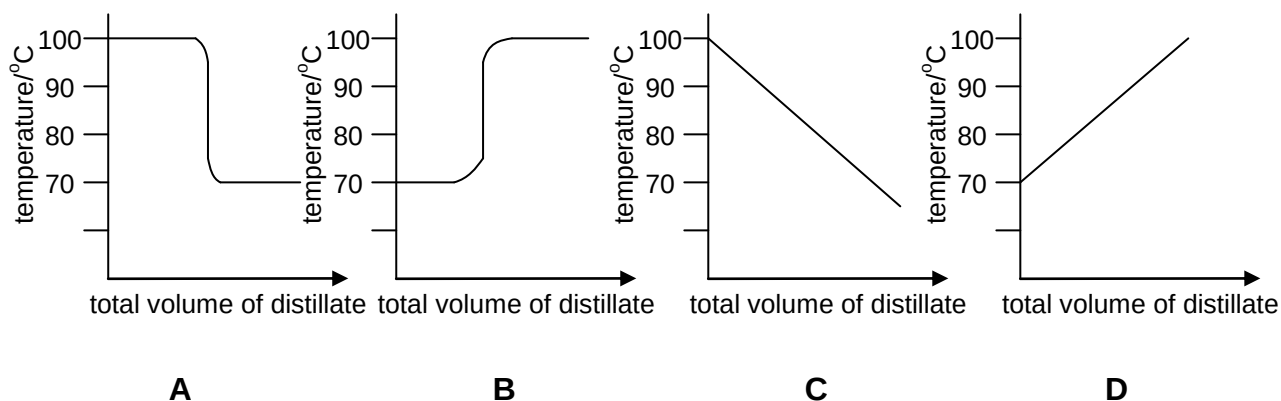
- 2 Which apparatus is **most** suitable to obtain water from a mixture of sand and water?



- 3 The diagram below shows the apparatus used to separate hexane (boiling point, 70°C) and heptane (boiling point, 98°C).



Which graph would be obtained if the temperature at point T was plotted against the total volume of distillate collected?



4 Which sub-atomic particle do atoms of ${}_{13}^{27}\text{Al}$ and ${}_{14}^{28}\text{Si}$ have the same number?

- A** electrons
- B** protons
- C** neutrons
- D** nucleons

5 The elements **X** and **Y** form the compound with a chemical formula of X_2Y_3 . What is the correct electron arrangement of the atoms of **X** and **Y**?

	atom of X	atom of Y
A	2, 8, 2	2, 8, 3
B	2, 8, 6	2, 8, 3
C	2, 8, 3	2, 8, 6
D	2, 8, 2	2, 8, 6

6 Which of the following molecules contains six shared electrons?

- A** CH_4
- B** CO_2
- C** H_2S
- D** NCl_3

7 Which oxide has a simple molecular structure?

- A** MgO
- B** Al_2O_3
- C** SiO_2
- D** P_2O_5

- 8 The table gives information about the ability of three substances to conduct electricity.

Substance	Property
W	does not conduct under any conditions
X	conducts when molten and when solid
Y	conducts when molten and in aqueous solution

What could these three substances be?

	W	X	Y
A	Fe	MgCl ₂	NH ₃
B	N ₂	Fe	MgCl ₂
C	MgCl ₂	Fe	NH ₃
D	MgCl ₂	N ₂	Fe

- 9 Which of the following oxides is unlikely to dissolve in aqueous sodium hydroxide?

- A** Al₂O₃
- B** CaO
- C** P₄O₁₀
- D** SiO₂

- 10 Arsine, AsH₃ is a gas used in the semiconductor industry to manufacture microchips. It behaves like ammonia when dissolves in water. Which of the following ions will be produced when arsine dissolves in water?

- A** AsH₃⁺, H⁺
- B** AsH₄⁺, H⁺
- C** AsH₃⁺, OH⁻
- D** AsH₄⁺, OH⁻

- 11 In order for plants to grow well, pH of the soil must be controlled and essential nutrients of nitrogen, phosphorus and potassium must be added.

Lime, CaO, is used to reduce the acidity of soil. Ammonium sulfate is a nitrogenous fertiliser. Why is it that the two substances are not added together in damp soil?

- A** Sulfuric acid will form.
- B** The dry mixture is explosive.
- C** Ammonia gas is given off.
- D** Calcium oxide is acidic oxide.

- 12** When a mixture of white solids, **Z** is treated with an excess of dilute hydrochloric acid, a colourless gas is evolved and some, but not all, of the mixture dissolves.

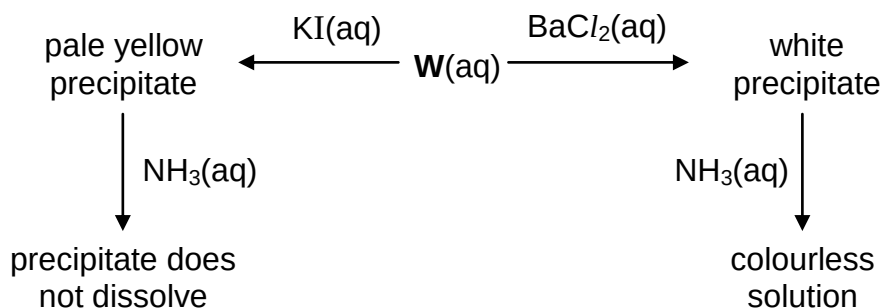
Which mixture could be **Z**?

- A** $\text{Ba}(\text{NO}_3)_2$ and $\text{Ca}(\text{OH})_2$
- B** BaSO_4 and CaCO_3
- C** CaCO_3 and MgSO_4
- D** $\text{Ca}(\text{OH})_2$ and MgCO_3

- 13** Which of the following salts can be prepared by an acid-alkali titration method?

- A** aluminium sulfate
- B** ammonium sulfate
- C** copper(II) sulfate
- D** zinc sulfate

- 14** Two precipitates can be prepared from reacting compound **W** with aqueous potassium iodide, $\text{KI}(\text{aq})$ and aqueous barium chloride, $\text{BaCl}_2(\text{aq})$.



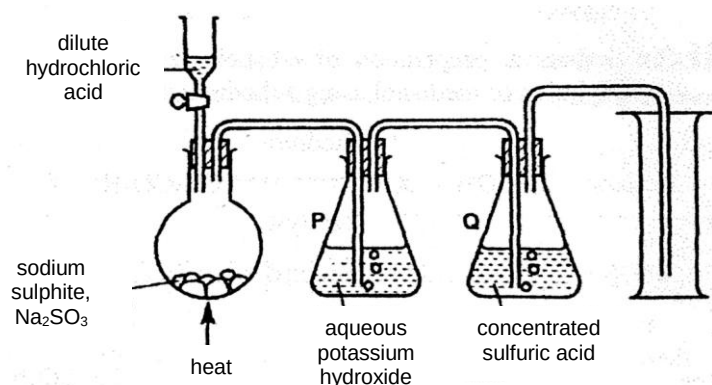
What could compound **W** be?

- A** AgNO_3
- B** CaSO_4
- C** $\text{Ca}(\text{NO}_3)_2$
- D** PbSO_4

- 15** Which one of the following equations represents the reaction that occurs when calcium carbonate is heated strongly?

- A** $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}$
- B** $2\text{CaCO}_3 \rightarrow 2\text{CaO}_2 + \text{CO}_2$
- C** $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- D** $2\text{CaCO}_2 \rightarrow \text{Ca}_2\text{O} + 2\text{C} + 2\text{O}_2$

- 16** Which of the following equations represents the ionic equation for the reaction between sodium carbonate and dilute sulfuric acid?
- A** $\text{CO}_3^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow \text{H}_2\text{CO}_3(\text{aq})$
B $\text{CO}_3^{2-}(\text{aq}) + \text{H}^+(\text{aq}) \rightarrow \text{HCO}_3^-(\text{aq})$
C $\text{CO}_3^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
D $\text{CO}_3^{2-}(\text{aq}) + \text{H}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
- 17** An aqueous solution containing a mixture of copper(II), lead(II) and zinc ions was treated with an excess of aqueous ammonia. What is the resulting precipitate(s)?
- A** copper(II) hydroxide only
B lead(II) hydroxide only
C zinc hydroxide and lead(II) hydroxide
D zinc hydroxide and copper(II) hydroxide
- 18** The diagram represents an unsuccessful attempt to prepare and collect sulfur dioxide.



Which modification would make the experiment successful?

- A** omitting flask **P** entirely
B collecting the gas by upward delivery
C using dilute sulfuric acid instead of dilute hydrochloric acid
D using water in flask **P** instead of aqueous potassium hydroxide
- 19** On passing carbon dioxide into an aqueous solution of **P**, a white precipitate, **Q** is formed. This disappears when more carbon dioxide is passed, forming a colourless solution of **R**. What could be the formulae of compounds, **P**, **Q** and **R**?

	P	Q	R
A	$\text{Ca}(\text{OH})_2$	CaCO_3	$\text{Ca}(\text{HCO}_3)_2$
B	$\text{Ca}(\text{OH})_2$	$\text{Ca}(\text{HCO}_3)_2$	CaCO_3
C	CaCO_3	$\text{Ca}(\text{OH})_2$	$\text{Ca}(\text{HCO}_3)_2$
D	CaCO_3	$\text{Ca}(\text{HCO}_3)_2$	$\text{Ca}(\text{OH})_2$

- 20** In a laboratory experiment, oxygen is produced when aqueous hydrogen peroxide is decomposed in the presence of copper(II) oxide as a catalyst.

A catalyst is a substance which increases the speed of a chemical reaction and remains chemically unchanged at the end of the reaction.

What did the tube contain when the reaction was complete?

- A** a black solid and a colourless liquid
- B** a light blue solid and a colourless liquid
- C** a black solid and a blue liquid
- D** a blue liquid only

----- End Of Paper -----

The Periodic Table of the Elements

[illegible]

*58-71

Lanthanoid

90-103

Actinoid

series

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

Mid-Year 2014 Section A – MCQ

1	D	5	C	9	B	13	B	17	B
2	B	6	D	10	D	14	A	18	A
3	B	7	D	11	C	15	C	19	A
4	C	8	B	12	B	16	C	20	A