

Name	Class	Index Number
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**ANG MO KIO SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2025
SECONDARY FOUR NORMAL ACADEMIC**

SCIENCE (CHEMISTRY)

Paper 3 Multiple Choice

5105/03

5 August 2025

Setter: Ms Audrey Ferng

Papers 3 and 4: 1 hour 15 minutes

Additional Materials: OTAS Paper

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, class and index number in the spaces at the top of this paper and the OTAS.

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 OTAS.

Read the instructions on the OTAS very carefully.

Answers to Paper 3 and Paper 4 must be handed in separately.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

You are advised to spend no more than **30 minutes** on **Paper 3**.

You may proceed to answer Paper 4 as soon as you have completed Paper 3.

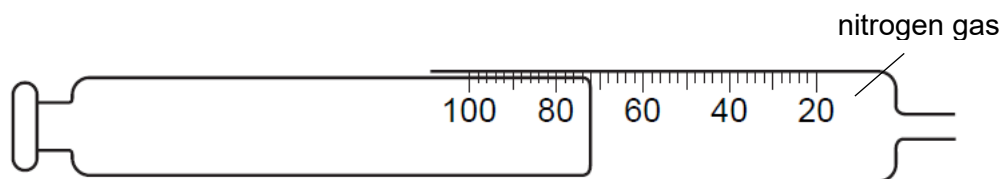
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 9.

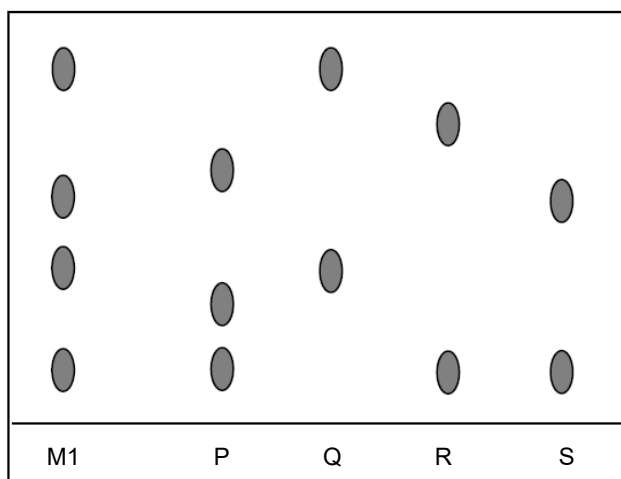
The use of an approved scientific calculator is expected, where appropriate.

This document consists of 9 printed pages and 1 blank page.

- 1 The diagram below shows the volume of nitrogen gas collected in a gas syringe. What is the reading shown?



- A 66.0 cm³
 B 70.5 cm³
 C 72.0 cm³
 D 84.0 cm³
- 2 A lab analyst carried out paper chromatography to investigate the presence of banned performance-enhancing drug substances P, Q, R and S in the urine sample of athlete M1. The paper chromatogram of the results is shown below.



Which of the following drugs P, Q, R and S did the athlete M1 consume?

- A P and Q
 B Q and R
 C Q and S
 D R and S

- 3 Some sodium chloride salt has been mixed with sand.
What is the correct order to purify the salt using water as a solvent?

A dissolving → filtering → distillation
B dissolving → filtering → evaporating
C filtering → evaporating → dissolving
D filtering → dissolving → evaporating

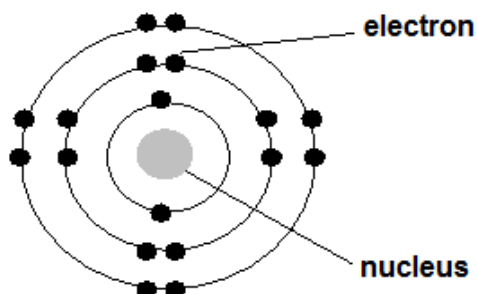
- 4 The following table shows the boiling points of the elements found in a sample of liquid air.

element	boiling point / °C
argon	-186
helium	-269
neon	-246
nitrogen	-196
oxygen	-183

Which elements would be gaseous at -190°C ?

A argon, helium and nitrogen
B argon, nitrogen and oxygen
C helium, neon and nitrogen
D helium, neon and oxygen

- 5 The diagram below represents a particle. What is the identity of the particle?

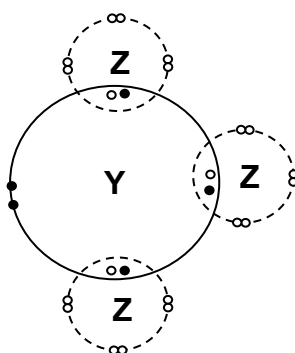


A F^- ion
B K^+ ion
C Na^+ ion
D Ne atom

6 Which two elements combine to form an ionic compound?

- A beryllium and sodium
- B carbon and nitrogen
- C potassium and chlorine
- D silicon and oxygen

7 The diagram shows the electron arrangement in a molecule of compound YZ_3 .



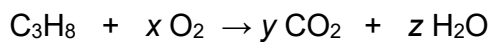
Identify elements Y and Z.

	Y	Z
A	aluminium	chlorine
B	nitrogen	fluorine
C	phosphorus	hydrogen
D	sulfur	nitrogen

8 Which of the following shows the electrical conductivities of an ionic compound in different physical states?

	electrical conductivity in solid state	electrical conductivity in molten state	electrical conductivity in aqueous state
A	good	good	good
B	poor	good	good
C	poor	poor	good
D	good	good	poor

- 9 The following chemical equation shows the burning of propane in an excess of air.



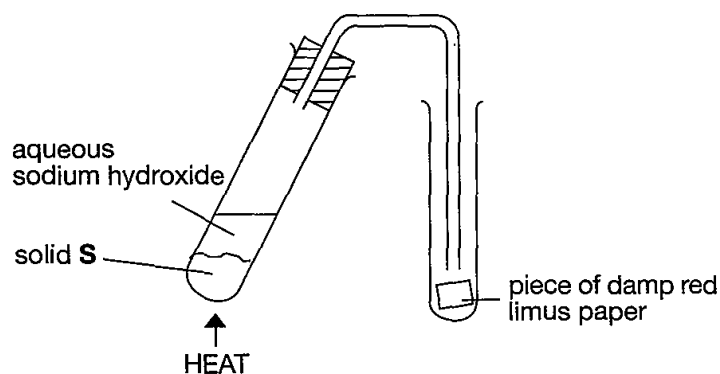
What values of x , y and z would balance the equation?

	x	y	z
A	3	5	5
B	4	4	5
C	5	3	3
D	5	3	4

- 10 A compound has the chemical formula $\text{Fe}(\text{OH})_x$.
The relative molecular mass of the compound is 107.
What is the value of x ?

A 1 **B** 2 **C** 3 **D** 4

- 11 The apparatus was set up as shown.



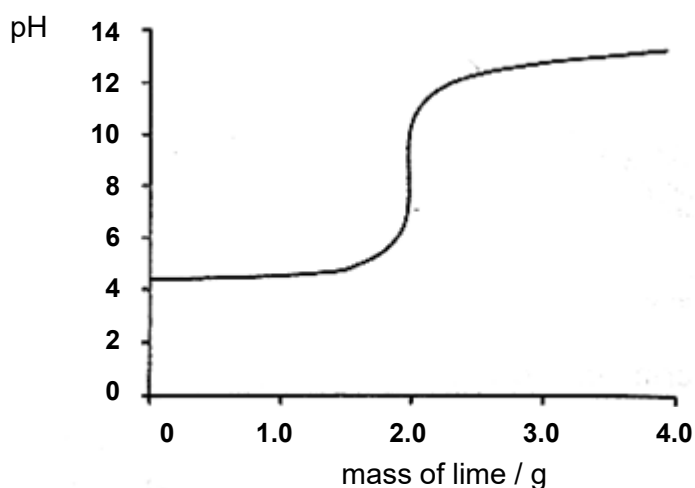
When the test tube was heated, the litmus paper turned blue.
What could solid S be?

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

12 Which substance **cannot** react with either hydrochloric acid or sodium hydroxide?

- A carbon monoxide
- B magnesium oxide
- C sulfur dioxide
- D zinc oxide

13 The graph shows the pH of a sample of soil as lime (calcium oxide) is added.



How much lime is added to make the same sample of soil neutral?

- A 1.5 g
- B 2.0 g
- C 3.0 g
- D 4.0 g

14 The diagram shows some elements in Period 3 of the Periodic Table. Which statement is **not** true?

11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
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- A Aluminium atom a relative mass of 13.
- B Sodium atom has 12 neutrons.
- C The electrons of each atom of silicon occupy three electron shells.
- D The phosphorus atoms gain electrons to form negative ions.

- 15** Caesium, Cs, is an element in Group 1 of the Periodic Table.

Which statements about Caesium are true?

- 1 Caesium conducts electricity both when solid and when molten.
- 2 Caesium reacts explosively with water.
- 3 Caesium reacts with water and forms a solution of pH less than 7.

A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

- 16** Which of the following shows the correct method used in the extraction of the metal from its ore?

	metal	method of extraction
A	copper	electrolysis
B	iron	reduction using carbon
C	lead	electrolysis
D	potassium	reduction using carbon

- 17** Which hydrocarbon is a member of the alkane series?

A C₅H₁₀

B C₆H₆

C C₈H₁₈

D C₁₀H₂₀

- 18** Methane and chlorine react together in the presence of sunlight.
Which chemical equation represents the reaction that takes place?

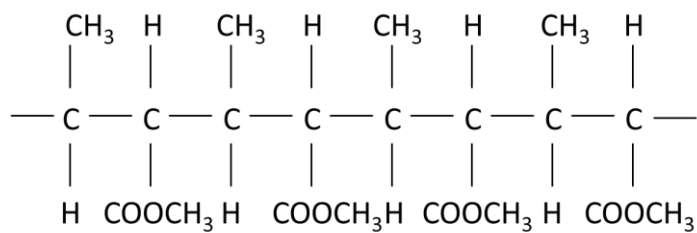
A CH₄ + 2Cl → CH₃Cl + HCl

B CH₄ + Cl₂ → CH₃Cl + HCl

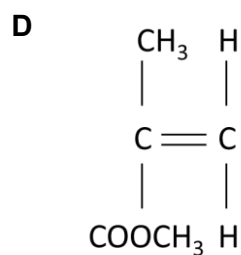
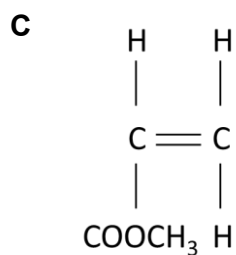
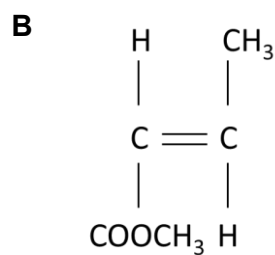
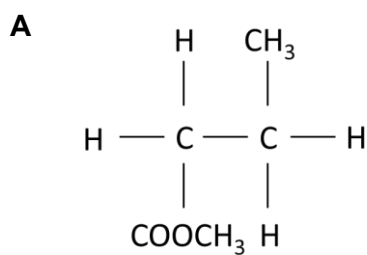
C CH₄ + 2Cl → CH₄Cl₂

D CH₄ + Cl₂ → CH₄Cl₂

- 19 The diagram shows part of the structure of a polymer.



Which monomer is used to manufacture the polymer?



- 20 Which statements about the pollutant carbon monoxide are correct?

- 1 It reacts with haemoglobin in the blood.
- 2 It is a colourless, odourless gas.
- 3 It is formed by incomplete combustion of fossil fuels.

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

End of Paper 3

The Periodic Table of Elements

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K potassium 39	Ca calcium 40	Sc scandium 45	Ti titanium 48	V vanadium 51	Cr chromium 52	Mn manganese 55	Fe iron 56	Co cobalt 59	Ni nickel 59	Cu copper 64	Zn zinc 65	Ga gallium 70	Ge germanium 73	As arsenic 75	Se selenium 79	Br bromine 80	Kr krypton 84			85	86	87	88																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Rb rubidium 85	Sr strontium 88	Y yttrium 89	Zr zirconium 91	Nb niobium 93	Mo molybdenum 96	Tc technetium —	Ru ruthenium 101	Rh rhodium 103	Pd palladium 106	Ag silver 108	Cd cadmium 112	In indium 115	Sn tin 119	Sb antimony 122	Te tellurium 128	I iodine 127	Xe xenon 131			132	133	134	135																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Cs caesium 133	Ba barium 137	89–103 actinoids		Rf rutherfordium —	Db dubnium —	Sg seaborgium —	Bh bohrium —	Hs hassium —	Ds darmstadtium —	Rg roentgenium —	Cn copernicium —	Nh nihonium —	Fl flerovium —	Mc moscovium —	Lv livermorium —	Ts tennessine —	Og oganeson —			118	119	120	121																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).
The Avogadro constant, $L = 6.02 \times 10^{23} \text{ mol}^{-1}$.

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2025 Science Chemistry Prelim Paper 3 MCQ Answer

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