Write your name here

Surname	Other names

Scholarship Paper 2026

Subject: Chemistry

Time: 1 Hour

You must have:
Ruler
Calculator

Total Marks
50

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name.
- Answer the questions in the answer sheets provided**.**
  - *there may be more space than you need*.

Information

- The total mark for this paper is **50**
- The marks for **each** question are shown in brackets
  - *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	45 **Sc** scandium 21	48 **Ti** titanium 22	51 **V** vanadium 23	52 **Cr** chromium 24	55 **Mn** manganese 25	56 **Fe** iron 26	59 **Co** cobalt 27	59 **Ni** nickel 28	63.5 **Cu** copper 29	65 **Zn** zinc 30	70 **Ga** gallium 31	73 **Ge** germanium 32	75 **As** arsenic 33	79 **Se** selenium 34	80 **Br** bromine 35	84 **Kr** krypton 36
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	101 **Ru** ruthenium 44	103 **Rh** rhodium 45	106 **Pd** paladium 46	108 **Ag** silver 47	112 **Cd** cadmium 48	115 **In** indium 49	119 **Sn** tin 50	122 **Sb** antimony 51	128 **Te** tellurium 52	127 **I** iodine 53	131 **Xe** xenon 54
133 **Cs** caesium 55	137 **Ba** barium 56	139 **La*** lanthanum 57	178 **Hf** hafnium 72	181 **Ta** tantalum 73	184 **W** tungsten 74	186 **Re** rhenium 75	190 **Os** osmium 76	192 **Ir** iridium 77	195 **Pt** platinum 78	197 **Au** gold 79	201 **Hg** mercury 80	204 **Tl** thallium 81	207 **Pb** lead 82	209 **Bi** bismuth 83	[209] **Po** polonium 84	[210] **At** astatine 85	[222] **Rn** radon 86
[223] **Fr** francium 87	[226] **Ra** radium 88	[227] **Ac*** actinium 89	[261] **Rf** rutherfordium 104	[262] **Db** dubnium 105	[266] **Sg** seaborgium 106	[264] **Bh** bohrium 107	[277] **Hs** hassium 108	[268] **Mt** meitnerium 109	[271] **Ds** darmstadtium 110	[272] **Rg** roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.*

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.

1. This question is about mixtures and compounds.

(a) The table shows some methods used in the separation of mixtures.

Place one tick (✓) in each row to show the best method for each separation.

(2)

	Method			
Separation	**Crystallisation**	**Filtration**	**Fractional distillation**	**Simple distillation**
kerosene from crude oil				
water from potassium nitrate solution				

(b) Rock salt is a mixture of sand and salt.

Salt is soluble in water.
Describe a method to separate the sand and the salt from a sample of rock salt.

(3)

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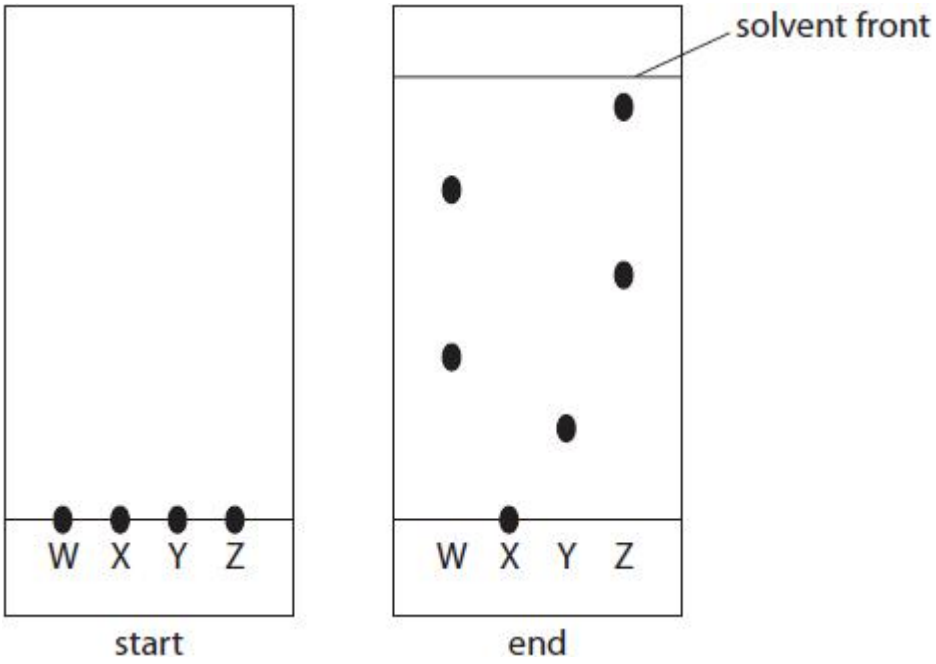
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(c) A student uses paper chromatography to separate the dyes contained in food colourings.

The student places spots of four known food colourings, W, X, Y and Z, on the chromatography paper.
The diagram shows the chromatography paper at the start and at the end of the experiment.



(i) Describe how the student should complete the experiment after placing the four spots on the paper.

(3)

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(ii) Describe how the student could determine the R_f value for food dye Y.
Do not include any calculations.

(2)

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(iii) Give a reason why food colouring X does not move during the experiment.

(1)

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(d) A compound has the formula $Al_2(SO_4)_3$

(i) How many different elements are in $Al_2(SO_4)_3$?

(1)

- ☒ **A** 3
- ☒ **B** 4
- ☒ **C** 5
- ☒ **D** 9

(ii) How many atoms are in the formula $Al_2(SO_4)_3$?

(1)

- ☒ **A** 3
- ☒ **B** 10
- ☒ **C** 17
- ☒ **D** 21

(Total for question = 13 marks)

2. This question is about the three states of matter, solid, liquid and gas.

(a) The diagram shows how particles of a substance are arranged in two of these states.



solid liquid gas

(i) Complete the diagram to show how particles are arranged in the liquid state.

(1)

(ii) Identify the state of matter that contains particles with the least energy.

(1)

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(b) The table shows two changes of state.

Complete the table by giving the name of each change of state.

(2)

Change of state	Name
solid to liquid	
solid to gas	

(c) Explain why hot water evaporates more quickly than cold water.

(2)

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(Total for question = 6 marks)

3. A student investigates the effect of temperature on the rate of reaction between two solutions, A and B. When the reaction occurs, the mixture turns from colourless to blue.

This is the student's method.

- pour 25 cm^3 of solution A into a conical flask
- add solution B and measure the temperature of the mixture
- record the time taken for the mixture to turn blue

The student repeats this method at different temperatures.

(a) Give two variables that the student needs to keep constant in this investigation.

(2)

1 .....

2 .....

(b) The table shows the student's results.

Temperature in °C	15	20	25	35	45	65
Time taken in seconds	178	156	132	130	122	113

(i) Plot the student's results on the grid.

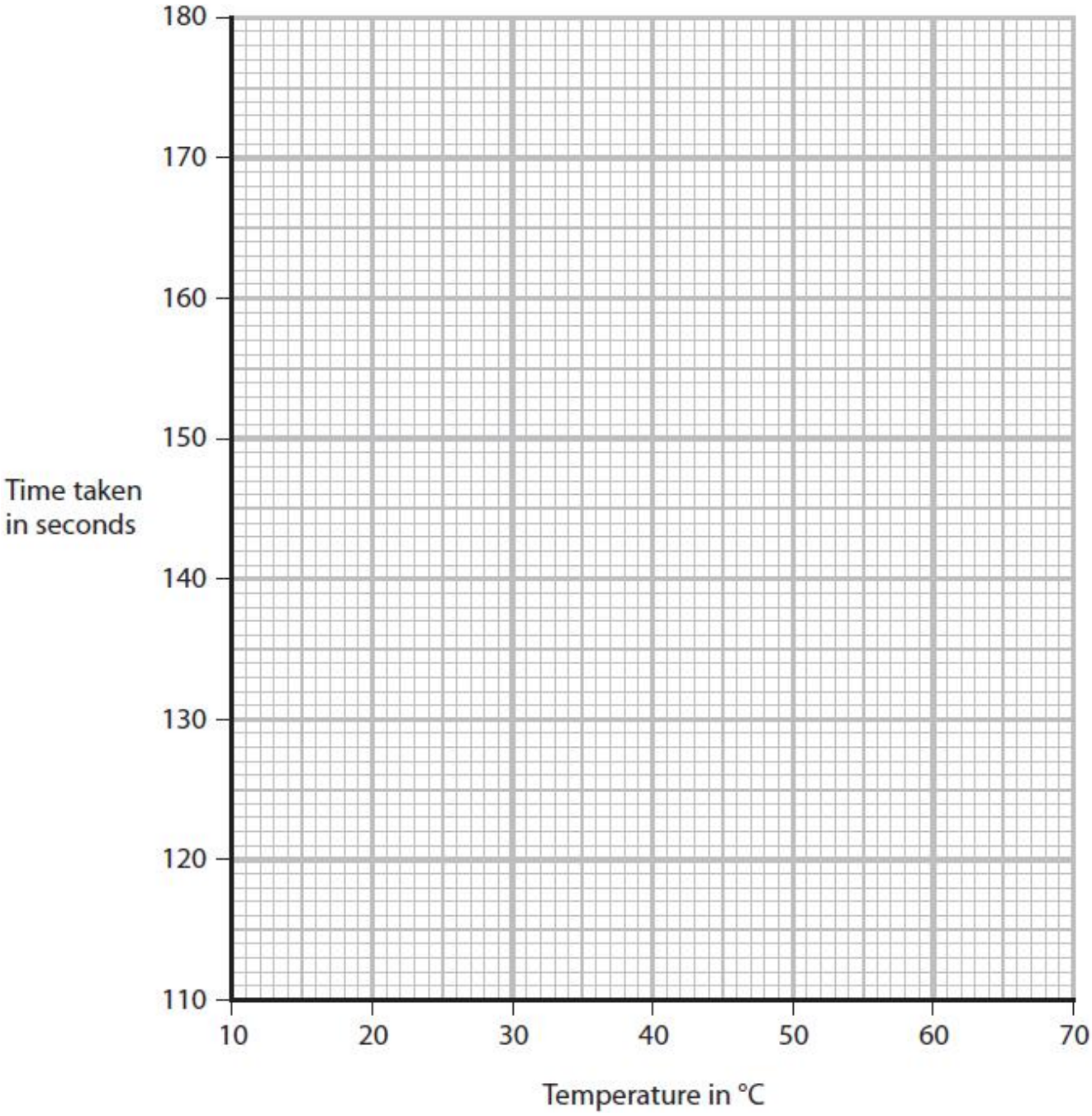
(1)

(ii) Draw a circle around the anomalous result.

(1)

(iii) Draw a curve of best fit.

(1)



(iv) Give a reason for the anomalous result.

(1)

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(v) Use your graph to determine the time taken for the mixture to turn blue at 55 °C.
Show your working on the graph.

(2)

time taken = ... s

(c) Use information from the table to calculate the mean rate of reaction at 20 °C.

Use the expression

$$\text{mean rate} = \frac{1}{\text{time in seconds}}$$

Give your answer in standard form.

(2)

mean rate = ... s^{-1}

(d) Explain how increasing the temperature affects the rate of a reaction.

Refer to particle collision theory in your answer.

(3)

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(Total for question = 13 marks)

4. This question is about the reactions of iron.

(a) Iron rusts when exposed to water and oxygen.

(i) Give the chemical name of the compound that forms when iron rusts.

(1)

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(ii) What type of reaction occurs when iron rusts?

(1)

- ☒ **A** combustion
- ☒ **B** decomposition
- ☒ **C** neutralisation
- ☒ **D** oxidation

(iii) Galvanising is a method used to prevent iron from rusting.
Give the name of the metal used to galvanise iron.

(1)

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(b) When iron reacts with dilute sulfuric acid, the products are iron(II) sulfate and hydrogen.

(i) Give a chemical equation for the reaction between iron and sulfuric acid.

(1)

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(ii) Give a test for hydrogen.

(1)

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(c) An excess of iron is added to copper(II) sulfate solution.

(i) Name the type of reaction that occurs.

(1)

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(ii) State the appearance of the solid that forms in the reaction.

(1)

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(d) Give the reason why no reaction occurs when iron is added to magnesium sulfate solution.

(1)

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(Total for question = 8 marks)

5. This question is about gases in the atmosphere.

The box gives the names of some gases.

argon	carbon dioxide	hydrogen
nitrogen	oxygen	water vapour

(a) Choose gases from the box to answer these questions.

(i) Identify the least reactive gas in the atmosphere.

(1)

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(ii) Identify the most abundant gas in the atmosphere.

(1)

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(iii) Identify the gas that is not normally found in the atmosphere.

(1)

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(b) State an environmental problem caused by increasing amounts of carbon dioxide in the atmosphere.

(1)

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(c) Describe a test for carbon dioxide.

(2)

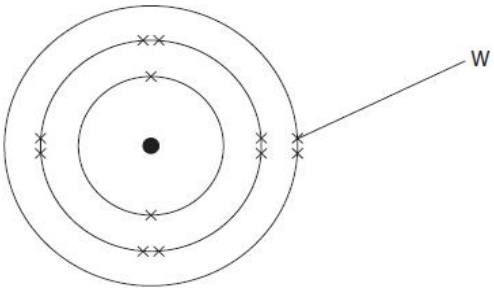
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(Total for question = 6 marks)

6. (a) The diagram represents an atom of an element.



(i) What is the particle labelled W?

(1)

- ☒ **A** electron
- ☒ **B** neutron
- ☒ **C** nucleus
- ☒ **D** proton

(ii) An atom of this element contains 13 neutrons.
What is the mass number of this element?

(1)

- ☒ **A** 12
- ☒ **B** 13
- ☒ **C** 25
- ☒ **D** 49

(iii) State why atoms have no overall charge.

(1)

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(iv) What is the charge on the ion usually formed from this element?

(1)

- ☒ **A** 1+
- ☒ **B** 2+
- ☒ **C** 1-
- ☒ **D** 2-

(Total for question = 4 marks)