

H

National Qualifications

2026

Chemistry

Paper 1 — Multiple choice

Tuesday, 12 May

Instructions to Candidates

Candidates should enter their surname, forename(s), date of birth, Scottish candidate number and the name and level of the subject at the top of their first answer sheet.

Total marks — 25

Attempt ALL questions

The answer to each question is either A, B, C or D. There is only one correct answer to each question. Decide what your answer is, then write the question number and the letter eg 1. D, 2. A.

Sample Question

1. To show that the ink in a ball-pen consists of a mixture of dyes, the method of separation would be

- A. fractional distillation
- B. chromatography
- C. fractional crystallisation
- D. filtration.

[Braille page 2] The correct answer is B — chromatography. You write Question 1.
B

If you decide to change your answer, cancel your first answer by brailleing it out and write the answer you want.

An ow in the margin indicates a new question.

Questions marked with an asterisk differ in some respect from those in the printed paper.

You must clearly identify the question number you are attempting on your answer sheet.

Marks are shown in square brackets at the end of each question or part question.

Tactile diagrams are produced in a separately bound booklet.

[Braille page 3] Total marks — 25

Attempt ALL questions

ow 1. The bonding and structure in fullerenes is

- A. ionic lattice
- B. metallic lattice
- C. covalent network
- D. covalent molecular.

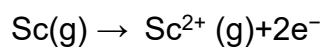
ow 2. The two hydrogen atoms in a molecule of hydrogen are held together by a

- A. hydrogen bond
- B. polar covalent bond
- C. pure covalent bond
- D. van der Waals force.

ow 3. Which of the following statements is true?

- A. The oxygen atom is larger than the oxide ion.
- B. The magnesium atom is larger than the magnesium ion.
- C. The sulfide ion is smaller than the sulfur atom.
- D. The calcium ion is larger than the calcium atom.

[Braille page 4] ow 4. What is the enthalpy change, in kJ mol^{-1} , for the following reaction?



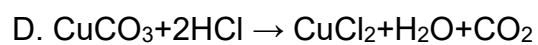
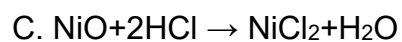
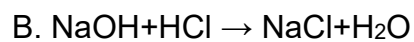
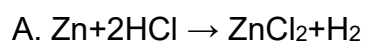
A. 633

B. 1235

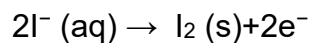
C. 1868

D. 2470

ow 5. Which of the following is a redox reaction?



ow 6. Iodide ions can be oxidised to iodine.



[Braille page 5] Which of the following ions could be used to oxidise iodide ions to iodine?

- A. SO_3^{2-} (aq)
- B. SO_4^{2-} (aq)
- C. Cr^{3+} (aq)
- D. $\text{Cr}_2\text{O}_7^{2-}$ (aq)

ow 7. Oil molecules are more likely to react with oxygen in the air than fat molecules.

During the reaction the oil molecules

- A. are reduced
- B. form rancid products
- C. are hydrolysed
- D. become unsaturated.

ow 8. Refer to the diagrams for Question 8. A student was given samples of ethanol, propan-1-ol, methanoic acid and ethanoic acid.

Which of the shown esters could not be made from these chemicals?

ow 9. A compound with the formula CH_2O_2 must be

- A. an ester

B. an alcohol

C. an aldehyde

D. a carboxylic acid.

[Braille page 6] ow 10. Which process is used to convert ethanoic acid to ethanal?

A. Addition

B. Condensation

C. Hydrolysis

D. Reduction

ow 11. Refer to the diagram for Question 11. Olestra is a calorie free fat made by reacting carboxylic acids with sucrose.

The structure of a sucrose molecule can be represented as shown.

How many carboxylic acid molecules can react with one molecule of sucrose?

A. 3

B. 5

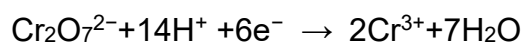
C. 8

D. 11

ow 12. Fats have higher melting points than oils because

- A. fats are more saturated
- B. oils are more saturated
- C. fats are less closely packed
- D. oils are more closely packed.

[Braille page 7] ow 13. Propanal, $\text{C}_3\text{H}_6\text{O}$, can be converted to propanoic acid by heating with acidified dichromate solution.



How many moles of $\text{Cr}_2\text{O}_7^{2-}$ would react with one mole of propanal?

- A. 13
- B. 23
- C. 1
- D. 3

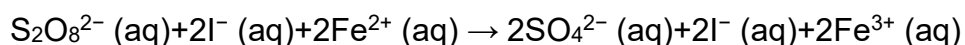
[Braille page 8] ow 14. Which of the following is an isomer of 2,2-dimethylpentan-1-ol?

- A $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_2\text{OH}$
- B $(\text{CH}_3)_3\text{CCH}(\text{CH}_3)\text{CH}_2\text{OH}$
- C $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- D $(\text{CH}_3)_2\text{CHC}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{OH}$

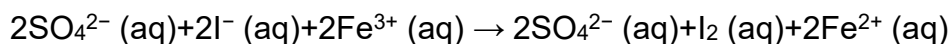
ow 15. Refer to the diagrams for Question 15. Which of the diagrams could be made by reacting edible oils with glycerol?

ow 16. A two-step reaction is shown.

Step 1



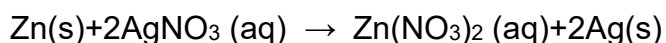
[Braille page 9] Step 2



The ion that is the catalyst in the overall reaction is

- A. $\text{S}_2\text{O}_8^{2-}(\text{aq})$
- B. $\text{I}^-(\text{aq})$
- C. $\text{Fe}^{2+}(\text{aq})$
- D. $\text{SO}_4^{2-}(\text{aq})$

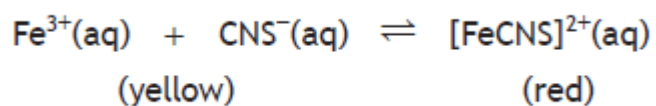
ow 17. A student added 0.1 mol of zinc to a solution containing 0.05 mol of silver(I) nitrate.



[Braille page 10] Which of the following statements about the experiment is correct?

- A. 0.05 mol of zinc reacts.
- B. 0.05 mol of silver is produced.
- C. Silver nitrate is in excess.
- D. All of the zinc reacts.

ow 18. The following equilibrium exists as an orange solution.



Addition of X causes the reaction mixture to become red.

X could be

- A. FeCl_3
- B. $[\text{FeCNS}]\text{Cl}_2$
- C. NaCl
- D. FeCl_2

[Braille page 11] ow 19. Which of the following is not a factor that affects the rate of a reaction?

- A. Activation energy

B. Kinetic energies of reactant molecules

C. Concentration of reactants

D. Enthalpy change of reaction

ow 20. Chromatography separates substances by making use of their differences in size and

A. boiling point

B. polarity

C. reactivity

D. colour.

ow 21. Refer to the diagrams for Question 21. A chemist is attempting to make a fragrance compound by the following chemical reaction.

compound X+compound Y $\rightarrow$ fragrance compound

Compounds X and Y are mixed in a flask. After some time, a sample is removed from the flask and compared with pure samples of compounds X and Y using chromatography.

Which of the four chromatograms shows that a pure sample of the fragrance compound has been produced?

[Braille page 12] ow * 22. The vitamin C content of a carton of orange juice was determined by four students.

Each student carried out the experiment three times.

The table below shows the concentrations of vitamin C (mg/100 cm³) recorded in the experiments.

	experiment	experiment	experiment
	1	2	3
			
student a	28.0	24.0	23.0
student b	21.4	21.6	21.8
student c	21.9	22.0	21.9
student d	22.0	21.5	21.9

The most reproducible results were obtained by

- A. student a
- B. student b
- C. student c
- D. student d.

[Braille page 13] ow 23. Which of the following is the most appropriate apparatus to accurately prepare a 0.10 mol l^{-1} solution from a 1.0 mol l^{-1} solution?

- A. 1 cm^3 dropper and a 10 cm^3 measuring cylinder.
- B. 10 cm^3 volumetric flask and a 100 cm^3 conical flask.
- C. 25 cm^3 pipette and a 250 cm^3 volumetric flask.
- D. 50 cm^3 burette and a 500 cm^3 measuring cylinder.

ow 24. The octane number is a measure of how easily hydrocarbons ignite.

	Hydrocarbon	Octane number
		
1	3-methylpentane	74.5
2	pentane	61.7
3	butane	93.6
4	2-methylpentane	73.4
5	hexane	24.8
6	methylcyclopentane	91.3

A student predicted that as the chain length of a hydrocarbon increases, the octane number decreases.

Which set of three hydrocarbons should have their octane numbers compared to provide **[Braille page 14]** the best test of this prediction?

A. 1, 4, 6

B. 1, 2, 4

C. 3, 4, 5

D. 2, 3, 5

ow 25. Refer to the diagram for Question 25. The type of forces between molecules can affect the viscosity of a liquid.

A steel ball will fall at different speeds through different liquids.

The more viscous a liquid the more slowly the ball falls through the liquid.

Which of the following shows the correct order for the speed of the steel balls falling through the liquids from the fastest to the slowest?

A. Y, X then Z

B. X, Z then Y

C. Y, Z then X

D. Z, Y then X

[END OF QUESTION PAPER]