

END TERM 3 2026

GRADE 10 — CHEMISTRY

MARKING SCHEME & TEACHER'S GUIDE

Scope used for this assessment

The assessment samples the later Grade 10 Chemistry content in the supplied KICD Curriculum Design: Inorganic Chemistry — 1.5 Periodicity, and Physical Chemistry — 2.1 Acids and Bases and 2.2 Introduction to Salts. The curriculum document identifies trends in groups/periods, chemical properties of selected groups, acids/bases, indicators, pH, strength, applications, salt classification, solubility, preparation methods, behaviour on exposure to air, and applications of salts. See the relevant curriculum pages 25–35 of the supplied document. □ filecite □ turn1 file0 □ L26-L36 □

Marking codes

M = method/formula mark; A = accuracy/correct answer; C = concept/curriculum point. Accept equivalent scientifically correct wording unless a specific statement is required.

CURRICULUM TRACEABILITY

Q	Curriculum area	Cognitive emphasis	Marks
1	1.5 Periodicity	Understand / Apply / Analyse	12
2	1.3–1.5; chemical families and properties	Apply / Analyse	12
3	1.5 Periodicity	Apply / Analyse	11
4	2.1 Acids and Bases	Understand / Apply	12
5	2.1 Acids and Bases	Apply / Analyse	12
6	2.1 Acids and Bases	Apply / Analyse	12
7	2.2 Introduction to Salts	Apply / Analyse	10
8	2.2 Introduction to Salts	Understand / Apply	10
9	2.2 Introduction to Salts	Apply / Analyse / Evaluate	10
TOTAL			100

QUESTION 1

- (a) P: 2,8,1; Q: 2,8,7; R: 2,8,8 — 1 mark each. (3)
- (b) Q is Group VII (Group 17), Period 3 — 1 mark each. (2)
- (c) R has a complete outer shell and is chemically stable/inert, whereas P readily loses its outer electron — 2C. (2)
- (d) P forms $P^+ / a +1$ ion — 2C. (2)
- (e) Atomic size generally decreases across a period because nuclear charge increases while electrons are added to the same main energy level, increasing attraction between nucleus and electrons — 3C. (3)

QUESTION 2

- (a) B — it has valency 2 / two electrons in its outer shell and tends to lose them to attain a stable configuration — 2C. (2)
- (b) BC_2 — 2A/C. (2)
- (c) Ionic bonding — 1C. (1)
- (d) In the molten state the ions are free to move and carry electric charge — 3C. (3)
- (e) Group I: e.g. sodium/potassium compounds in manufacture of chemicals or fertilisers; Group VII: e.g. chlorine for water treatment/disinfection — 1 mark each for valid use. (2)
- (f) Any one valid trend, e.g. atomic size increases, electronegativity decreases, melting/boiling points generally change down the group — 2C. (2)

QUESTION 3

- (a) X: Group I, Period 3 — 2C. (2)
- (b) Y: Group VII, Period 3 — 2C. (2)
- (c) X has the larger atomic radius; both are in the same period and X has fewer protons/less effective nuclear attraction across the period — 2C. (2)
- (d) Y forms Y^- / a -1 ion because it gains one electron to complete its outer shell — 2C. (2)
- (e) Group VII elements readily gain electrons/form -1 ions and are reactive non-metals, while Group VIII elements have stable outer shells and are generally unreactive — any three distinct valid points. (3)

QUESTION 4

- (a) A acidic; B basic/alkaline; C neutral — 1 each. (3)
- (b) A: pH below 7; B: pH above 7 — 1 each. (2)
- (c) A substance/indicator mixture that gives different colours over a range of pH values and can therefore estimate acidity/alkalinity — 2C. (2)
- (d) Any two: wear goggles/gloves; add acid to water; avoid direct contact; use suitable quantities; work in ventilated area — 1 each. (2)
- (e) Acid: car batteries/food preservation/industrial manufacture etc.; base: soap manufacture/neutralising acidic soils/cleaning agents etc. — 1 each plus appropriate explanation/application. (3)

QUESTION 5

- (a) $Mg + 2HCl \rightarrow MgCl_2 + H_2$ — M1 balanced equation, A1 formulae, A1 balance. (3)
- (b) $2HCl + Na_2CO_3 \rightarrow 2NaCl + H_2O + CO_2$ — 3. (3)
- (c) Effervescence/fizzing; gas evolved — 2. (2)
- (d) Neutralisation — 1. (1)
- (e) $CuO + 2HCl \rightarrow CuCl_2 + H_2O$ — 3. (3)

QUESTION 6

- (a) Graphite/carbon electrodes — 2. (2)
- (b) Strong acid ionises/dissociates more completely, producing a higher concentration of mobile ions, so it conducts more effectively — 3C. (3)
- (c) Any two: concentration, volume, temperature, electrode separation, electrode area/type — 1 each. (2)
- (d) Neutralise appropriately before disposal / follow laboratory waste-disposal procedure and avoid release to drains/environment — 2. (2)
- (e) Electric current in solution is carried by charged particles; measurable conductivity therefore indicates mobile ions are present — 3C. (3)

QUESTION 7

- (a) To ensure all sulfuric acid reacts / acid is the limiting reagent and no acid remains in the product — 2C. (2)
- (b) Filter the mixture to retain the unreacted solid copper(II) oxide and collect the filtrate — 2. (2)
- (c) Gently evaporate some water to concentrate; allow solution to cool so crystals form; filter crystals; wash with a little cold distilled water and dry — 1 mark each for four valid stages. (4)
- (d) Heat gently and avoid boiling to dryness/splashing; use appropriate heat protection — 2. (2)

QUESTION 8

- (a) A reaction in which two soluble substances react in solution to form an insoluble solid precipitate — 2C. (2)

- (b) To separate the insoluble precipitate from the liquid/filtrate — 2. (2)
- (c) $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$ — 3. (3)
- (d) Collect and label waste appropriately; avoid releasing heavy-metal-containing waste into drains; follow approved disposal procedure — any three valid points. (3)

QUESTION 9

- (a) Fertilisers/crop nutrition; soil amendments; any other curriculum-supported agricultural use — 1 each. (2)
- (b) Nutrient runoff can cause eutrophication; contamination of water; soil/water quality degradation; any one explained effect. (3)
- (c) Soluble salt dissolves in water to form a solution; insoluble salt does not dissolve appreciably and remains as solid — 2. (2)
- (d) No visible solid remains after stirring/allowing sufficient time; filter a portion and observe whether residue remains; clear filtrate/no residue supports complete dissolution — 3. (3)

TOTAL-MARK VERIFICATION

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	TOTAL
12	12	11	12	12	12	10	10	10	100

TEACHER / EXAMINER GUIDANCE

Accept scientifically correct alternatives that express the same curriculum concept.

Do not penalise a candidate twice for the same error where a consequential marking approach is appropriate.

For chemical equations, award marks according to the stated scheme; minor state-symbol omissions should not automatically lose a mark unless state symbols are specifically being assessed.

Where a candidate gives more responses than requested, mark the first required number unless the paper's local assessment policy specifies otherwise.

Diagram prompts in the Question Paper are intended to guide production of the corresponding examination visuals and should be replaced by the final approved line-art diagrams before administration.