



**Paper 2: Alternative to Practical
Marking Scheme**

Sample Paper

1 hour 30 minutes

Mark Scheme Criteria

Examiners must apply positive marking only. Do not deduct any marks for incorrect responses. Provide marks in line with this scheme only.

Response(s) must be in line with prescribed marking indicators shown below. Variation is permissible only with prior acknowledgment from Chief Examiner.

Text shown below, in the majority of instances, is a text perfect response. Learners do not have to provide a text perfect response in order to qualify for a mark; their response must be in line with the text shown within the response, but the wording can vary.

For single mark questions, learner response must meet the stated characteristics as indicated in this mark scheme. Where more than one option is shown, learners can deviate from the prescribed responses, as long as they meet the general theme of the response.

For multiple mark questions, learner responses must meet the stated characteristics as indicated in this mark scheme. However, where the examiner feels a learner has demonstrated more than a basic response, and which meets the minimum stated characteristics, additional marks may be awarded. Where this occurs, the examiner must flag this response for enhanced moderation by the Chief Examiner.

Whilst indicative responses are shown below, and particularly for multiple mark responses, where 2 or more marks are permissible (as shown for each question), where learner responses do not align with the suggested response, examiners can use best judgement. Where this occurs, the examiner must flag this response for enhanced moderation by the Chief Examiner

Part A: Biology Section (20 Marks)

Question 1 (6 Marks)

a) i) Gas: Oxygen (1 mark)

ii) Measure the rate of photosynthesis by:

- Counting the number of bubbles released per minute. (1 mark)
- Using a gas syringe to collect and measure the volume of gas over a fixed time. (1 mark)

iii) Controlled variables:

- Keep the temperature constant using a water bath. (1 mark)
- Use the same species and size of the plant for all tests. (1 mark)

iv) To make light intensity lower:

- Increase the distance between the lamp and the plant or use a dimmer switch. (1 mark)
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Question 2 (7 Marks)

a) Graph:

- Correct axes with appropriate labels: X-axis (Temperature in °C), Y-axis (Time in minutes). (1 mark)
- Accurate plotting of points. (1 mark)
- Smooth curve joining points. (1 mark)

b) Trend:

- As temperature increases, time decreases initially due to faster enzyme activity. (1 mark)
- At high temperatures, time increases due to enzyme denaturation. (1 mark)

c) At 50°C, enzyme denatures, reducing reaction efficiency. (1 mark)

d) Improvement: Repeat experiments to calculate an average for each temperature. (1 mark)

Question 3 (7 Marks)

a) Safety precautions:

- Use gloves to avoid irritation from plant sap. (1 mark)
- Handle sharp tools carefully to prevent injuries. (1 mark)

b) Tools:

- Scalpel for precise cuts. (1 mark)
- Tweezers to handle delicate parts of the flower. (1 mark)

c) Diagram labeling:

- Correctly identify ovary, anther, and petal. (3 marks)

Part B: Chemistry Section (20 Marks)

Question 4 (6 Marks)

a) Word equation:

Copper(II) carbonate → Copper(II) oxide + Carbon dioxide (2 marks)

b) Limewater test:

i) Result: Limewater turns cloudy. (1 mark)

ii) Procedure: Bubble gas through limewater using a delivery tube. Observe for cloudiness. (2 marks)

iii) Solid residue: Copper(II) oxide. (1 mark)

Question 5 (7 Marks)

a) To identify Solution A:

- Add a carbonate; effervescence confirms acid. (2 marks)

b) Identify Solution D:

- Add silver nitrate solution; a white precipitate indicates chloride ions. (2 marks)

c) Explanation for Solution C:

- Distilled water is neutral and does not react. (2 marks)

d) Importance of clean apparatus:

- Prevent contamination that could alter results. (1 mark)

Question 6 (7 Marks)

a) Products of electrolysis:

i) Cathode: Lead. (1 mark)

ii) Anode: Bromine. (1 mark)

b) Molten state required for ion mobility. (2 marks)

c) Suitable electrode material:

- Graphite, because it is inert and does not react with products. (2 marks)

d) Safety precaution: Conduct experiment in a well-ventilated area to avoid inhaling bromine vapors. (1 mark)

Part C: Physics Section (20 Marks)

Question 7 (6 Marks)

a) Measure time period:

- Use a stopwatch to time multiple oscillations. (1 mark)
- Divide total time by the number of oscillations. (1 mark)
- Ensure the pendulum swings through small angles for accuracy. (1 mark)

b) Factors:

- Length of the string. (1 mark)
- Gravitational acceleration. (1 mark)

c) Fan affects results by causing air resistance, altering oscillations. (1 mark)

Question 8 (10 Marks)

a) Function of the resistor:

- Limits the current flow. (1 mark)

b) Ammeter usage:

i) Correct placement in series. (1 mark)

ii) Ensure tight connections and observe readings without parallax error. (2 marks)

c) Calculations:

i) $I = VR = 10/5 = 2$ A. (2 marks)

ii) Unit of current: Ampere (A). (1 mark)

Question 9 (4 Marks)

c) Speed in glass:

$v = c/n = 3.0 \times 10^8 / 1.5 = 2.0 \times 10^8$ m/s (2 marks)

d) Precaution: Ensure accurate angle measurement with a protractor. (1 mark)

e) Using a laser: Produces a narrow, precise beam for clearer refraction paths. (1 mark)