**KENYA JUNIOR SCHOOL EDUCATION ASSESSMENT (KJSEA)**

**GRADE 8: INTEGRATED SCIENCE PP2**
**CODE: 010 YEAR: 2025**
**MARKING SCHEMES**

**PRACTICAL GUIDE AND CONFIDENTIAL**

**TASK 1: Chemistry Experiment – Preparation and Collection of Oxygen Gas (20 Marks)**

**Apparatus and Materials**

* Hydrogen peroxide (H₂O₂) solution – reagent
* Manganese (IV) oxide (MnO₂) – catalyst
* Test tube
* Delivery tube
* Trough of water
* Gas jar
* Glowing splint
* Beaker
* Safety goggles, gloves

**Procedure**

1. Place a small amount of MnO₂ in a clean test tube.
2. Add hydrogen peroxide solution carefully.
3. Fit the delivery tube to the test tube, leading into a gas jar filled by water in a trough (collection over water).
4. Collect oxygen gas in the gas jar as it displaces water.
5. Test the collected gas with a glowing splint.

**Expected Answers & Marking Scheme**

|  |  |  |
| --- | --- | --- |
| **Question** | **Expected Answer** | **Marks** |
| a | 2 H₂O₂ (aq) → 2 H₂O (l) + O₂ (g) | 3 |
| b | MnO₂ acts as a catalyst; it speeds up the decomposition of H₂O₂ without being consumed. | 2 |
| c | Glowing splint relights or bursts into flame. | 2 |
| d | Physical properties of oxygen: • Colourless • Odourless • Tasteless • Slightly soluble in water | 2 |
| e | Use: • Supports respiration • Medical oxygen therapy • Combustion | 1 |
| f | Rate of production = Volume / Time = 60 cm³ / 30 s = 2 cm³/s | 3 |
| g | Precautions: • Wear safety goggles and gloves • Handle H₂O₂ carefully (caustic) • Avoid spilling gas • Ensure water seal is maintained | 2 |
| h | Oxygen is collected over water because: • It is insoluble in water • Displacement of air would mix with atmospheric gases, giving impure oxygen | 3 |

**Sub-total:** 20 Marks

**TASK 2: Biology Experiment – Osmosis Using Potato (10 Marks)**

**Apparatus and Materials**

* Two potato tubers
* Distilled water
* Concentrated sugar solution
* Two beakers
* Knife / peeler
* Ruler
* Paper towels

**Procedure**

1. Peel and cut potato tubers into equal cylinders.
2. Measure initial lengths with a ruler.
3. Place one cylinder in distilled water and the other in concentrated sugar solution.
4. Leave for 30 minutes.
5. Remove, dry, and measure final lengths.

**Expected Answers & Marking Scheme**

|  |  |  |
| --- | --- | --- |
| **Question** | **Expected Answer** | **Marks** |
| a | Independent variable: type of solution (distilled water vs sugar solution) | 1 |
| b | Expected change: • In distilled water: potato length increases (turgid) • In sugar solution: potato length decreases (plasmolysis) | 2 |
| c | Explanation: • Distilled water: water moves into potato cells by osmosis → cells swell → increase in length • Sugar solution: water moves out of potato cells → cells shrink → decrease in length | 3 |
| d | Factors affecting osmosis: • Concentration gradient of solute • Temperature • Surface area of potato • Time | 2 |
| e | Applications of osmosis: • Preservation of food (e.g., salting vegetables) • Water absorption by plants • Rehydration therapy • Water purification | 2 |

**Sub-total:** 10 Marks

**TOTAL MARKS: 30**

**Additional Teacher Notes**

* Ensure **students follow safety rules** in chemistry (gloves, goggles).
* Check **accuracy of measurements** (volume and lengths).
* For chemistry, accept **correctly balanced equations** with slight variations in formatting.
* For biology, accept **observed changes that align with osmosis principles**, even if volumes or lengths are approximate.
* **Practical skills and neatness** in handling apparatus may be noted in remarks.

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