KENYA NATIONAL EXAMINATION AND ASSESSMENT PREDICTION SERIES

ENDTERM 2 ASSESSMENT 2025

GRADE 8

INTEGRATED SCIENCE PAPER 1

MARKING SCHEME

SECTION A (30 marks)

- 1. D. History
- 2. C. By providing them with a comprehensive understanding of interconnected environmental, health, and energy solutions.
- 3. B. Chimney.
- 4. B. (Corrosive symbol)
- 5. C. Chloroplast.
- 6. B. Elevate the injured limb.
- 7. C. Running the burned area under cool running water for at least 10 minutes.
- 8. D. Eye injuries from chemical splashes
- 9. C. Measuring cylinder
- 10. D. Measuring and Observing
- 11. C. (Microscope)
- 12. C. Short, pale blue flame
- 13. C. Heterogeneous
- 14. C. Chromatography
- 15. B. Simple distillation
- 16. C. An acid
- 17. C. calcium hydroxide
- 18. B. (Sweat gland)
- 19. A. Ureter
- 20. C. Kidney stones
- 21. D. Electrical energy
- 22. B. Closed, and the bulb will light.
- 23. C. Always ensuring your hands are dry before touching electrical switches or plugs.
- 24. B. Magnetic materials.
- 25. D. Directive property.
- 26. B. 10
- 27. A. Hydrogen H
- 28. C. A physical change and is temporary.
- 29. C. Remove other flammable materials nearby.
- 30. C. Cytoplasm

SECTION B (40 marks)

- 31. During a science lesson, learners were asked to identify different parts of the human skin.
- (a) Name the parts of the human skin. (2 marks)
- U: Hair.
- V: Sweat pore.

(b) State the primary function of the sweat glands in the human skin. (1 mark)

The primary function of sweat glands is to **regulate body temperature** through the secretion of sweat, which cools the body as it evaporates.

32. A group of learners is tasked with separating a mixture of sand, salt, and iron filings.

(a) Describe how the learners can separate the iron filings from the mixture. (2 marks)

The learners can separate the **iron filings** from the mixture by using a **magnet**. Since iron is a magnetic material, the magnet will attract only the iron filings, leaving the sand and salt behind.

(b) After removing the iron filings, describe a step-by-step procedure to obtain pure salt from the remaining mixture of sand and salt. (4 marks)

- i. **Dissolving:** Add water to the mixture of sand and salt in a beaker and stir thoroughly. The salt will dissolve in the water, forming a salt solution, while the sand will not dissolve.
- ii. **Filtration:** Pour the mixture through a filter funnel lined with filter paper into another beaker. The insoluble sand will be retained on the filter paper (residue), and the salt solution (filtrate) will pass through.
- iii. **Evaporation/Crystallization:** Gently heat the salt solution in an evaporating dish. The water will evaporate, leaving behind the pure solid salt crystals. Avoid strong heating to prevent splattering.
- iv. **Drying (Optional but good for purity):** Allow the remaining salt crystals to cool and dry completely, perhaps in a desiccator or by pressing gently between filter papers.

(c) State one difference between a homogeneous mixture and a heterogeneous mixture. (1 mark)

In a **homogeneous mixture**, the components are uniformly distributed throughout, appearing as a single phase (e.g., salt dissolved in water), while in a **heterogeneous mixture**, the components are not uniformly distributed and can be easily distinguished as separate phases (e.g., sand and salt mixture).

33. (a) A farmer tested his soil and found it was too acidic for optimal crop growth. He decided to add a basic substance to neutralize the soil.

(i) State one characteristic physical property of acids that makes them dangerous. (1 mark)

Acids are **corrosive**, meaning they can cause severe burns and damage to skin, eyes, and materials.

(ii) Explain the purpose of adding a basic substance to acidic soil. (2 marks)

Adding a basic substance to acidic soil is done to **neutralize the excess acid** in the soil. This raises the soil's pH towards a more neutral range, creating a more suitable environment for optimal plant growth. Many crops thrive in slightly acidic to neutral soil, and extreme acidity can inhibit nutrient uptake.

(b) Describe how you would prepare a natural acid-base indicator using hibiscus flower petals. (3 marks)

- i. Collection: Collect fresh, vibrant hibiscus flower petals.
- ii. **Extraction:** Place the petals in a beaker or mortar and pestle. Add a small amount of hot water (or ethanol) and crush or steep the petals.
- iii. **Filtration:** Filter the mixture (e.g., using filter paper or a fine cloth) to separate the colored liquid (extract) from the solid petals. This colored extract is your natural acid-base indicator.

34. (a) A learner prepared a temporary slide of a plant cell and observed it under a light microscope.

(i) Name two major differences a plant cell has compared to an animal cell when viewed under a light microscope. (2 marks)

- i. Cell Wall: Plant cells have a rigid cell wall outside the cell membrane, which is absent in animal cells.
- ii. **Chloroplasts:** Plant cells typically contain **chloroplasts** (responsible for photosynthesis), which are absent in animal cells.
- iii. Permanent central vacuole in plant cells vs. small or absent vacuoles in animal cells
- iv. Regular, fixed shape in plant cells due to cell wall vs. irregular shape in animal cells.
- v. Here's a comprehensive comparison:

Feature	Plant Cell	Animal Cell
Cell Wall	Present, rigid, outside the cell membrane. Composed	Absent. Only has a cell membrane.
	primarily of cellulose. Provides structural support,	
	protection, and maintains cell shape.	
Chloroplasts	Present (in green parts of plants), containing	Absent. Animals are heterotrophic and cannot
	chlorophyll. Site of photosynthesis.	perform photosynthesis.
Vacuole	Usually one large, central vacuole that can occupy up	Usually small and numerous, or absent. If present,
	to 90% of the cell volume. Stores water, nutrients, waste	they are temporary and involved in storage or
	products, and maintains turgor pressure.	transport.
Shape	Generally fixed, regular, rectangular or square due to	Generally irregular or round due due to the lack of a
	the rigid cell wall.	cell wall.
Centrioles	Absent (except in lower plant forms like some algae and	Present in most animal cells. Involved in cell division
	fungi).	(forming spindle fibers).
Lysosomes	Generally absent or very rare. Vacuoles often perform	Present. Contain digestive enzymes to break down
	digestive functions.	waste materials and cellular debris.
Cilia/Flagella	Absent in most plant cells (present in some lower plant	Present in some animal cells (e.g., sperm, cells lining
	gametes).	respiratory tract) for movement or sweeping.
Plasmodesmata	Present. Channels that connect adjacent plant cells,	Absent. Animal cells have different types of cell
	allowing for direct cell-to-cell communication and	junctions (e.g., gap junctions, tight junctions,
	transport of substances.	desmosomes) for communication and adhesion.
Food Storage	Primarily stores food as starch .	Primarily stores food as glycogen and fats.

(ii) If the eyepiece lens of the microscope is 10x and the objective lens is 40x, calculate the total magnification of the cell. (1 mark)

Total Magnification = Eyepiece Magnification \times Objective Lens Magnification Total Magnification = $10x \times 40x = 400x$

(b) A tea bag is placed in a cup of hot water. After some time, the colour from the tea bag spreads throughout the water.

(i) Name the process responsible for the spreading of the tea colour in water. (1 mark)

The process responsible for the spreading of the tea colour in water is **diffusion**.

(ii) Explain how increasing the temperature of the water would affect the rate of this process. (2 marks)

Increasing the temperature of the water would **increase the rate of diffusion**. This is because higher temperatures cause the water molecules (and tea particles) to gain more kinetic energy, making them move faster and collide more frequently, thus spreading the tea color more rapidly throughout the water.

35. (a) During a reproductive education lesson, learners learned about the male reproductive system and its functions.

- (i) Name the parts labelled X, Y and Z. (3 marks)
- X: Vas Deferens (or sperm duct)
- Y: Cowper's gland
- Z: Epidydimis

(ii) A person experiences painful urination and urges to urinate frequently. Name a common kidney disorder that could cause these symptoms. (1 mark)

A common kidney disorder that could cause these symptoms is a Urinary Tract Infection (UTI).

(Other possibilities for broader symptoms: Kidney stones, but UTI is more directly linked to painful/frequent urination.)

(b) A health worker visited a school to talk about adolescence and reproductive health.

(i) State two challenges that adolescent girls may face during menstruation. (2 marks)

- i. Menstrual Pain (Dysmenorrhea): Experiencing cramps, abdominal pain, or discomfort.
- ii. **Emotional Changes:** Mood swings, irritability, or increased sensitivity due to hormonal fluctuations. (*Other valid answers: inconvenience of managing hygiene, fatigue, anxiety about leakage, stigma/taboos in some communities, lack of access to sanitary products, etc.*)

(ii) Explain the process of fertilization in human beings. (2 marks)

Fertilization in human beings is the process where a **male gamete (sperm) fuses with a female gamete (egg/ovum)**, typically occurring in the fallopian tube. This fusion results in the formation of a **zygote**, which marks the beginning of embryonic development.

36. (a) A small fire started in a classroom due to flammable liquids catching fire.

(i) State the class of fire and suggest one appropriate method to extinguish it, other than water. (2 marks)

Class of fire: Class B fire (fires involving flammable liquids).

Appropriate method to extinguish it (other than water): Using a foam extinguisher or a CO2 extinguisher.

(Other valid answers: dry chemical powder extinguisher, fire blanket.)

(ii) Explain one danger associated with using water to extinguish a fire caused by flammable liquids. (1 mark) Using water on flammable liquid fires is dangerous because flammable liquids are generally less dense than water and do not mix with it. Pouring water can cause the burning liquid to spread and float on top of the water, spreading the fire further, or it can cause the liquid to splash, potentially burning people or objects.

(b) During a fire safety drill, learners were taught about the fire triangle.

Name the three components of the fire triangle. (3 marks)

- i. Heat
- ii. **Fuel**
- iii. Oxygen

37. (a) A learner is setting up a simple electric circuit to light a bulb using a dry cell.

(i) Name the source of electricity in this circuit. (1 mark)

The source of electricity in this circuit is the **dry cell** (or battery).

(ii) State one electrical safety measure the learner should observe while working with electrical circuits. (1 mark) One safety measure is to ensure hands are dry when handling electrical components to prevent electric shock.

Do not touch exposed wires, use insulated wires, do not overload circuits, and switch off power before making connections.

(b) Describe how magnets are used in everyday life. (2 marks)

- i. **In electronic devices:** Magnets are found in speakers, headphones, computer hard drives, and credit cards for data storage.
- ii. **For fastening/holding:** They are used in refrigerator doors, cabinet latches, magnetic closures on bags, and to hold notes on metallic surfaces. (*Other valid answers: in electric motors/generators, compasses for navigation, medical imaging (MRI), recycling sorting.*)

38. A curious learner observed that when a piece of ice is placed in water, it floats, but when salt is added to the water, the ice melts faster.

(a) Name the physical change that occurs when ice turns into water. (1 mark)

The physical change that occurs when ice turns into water is **melting**.

(b) Explain the effect of impurities on the melting point of water. (2 marks)

Adding impurities (like salt) to water **lowers the melting point** of the water. This means that the ice will melt at a temperature below 0°C, causing it to melt faster in the presence of salt, especially if the ambient temperature is at or slightly above 0°C. Impurities disrupt the regular lattice structure of water molecules, requiring less energy to break the bonds and initiate melting.

(c) An atom of Neon has an atomic number of 10 and a mass number of 20. How many neutrons does this atom have? (1 mark)

Number of neutrons = Mass number - Atomic number Number of neutrons = 20 - 10 = 10 neutrons.

39. (a) A learner is learning about elements and compounds.

(i) Write a word equation for the reaction between Hydrogen gas and Oxygen gas to form Water. (1 mark) Hydrogen + Oxygen \rightarrow Water

(ii) Name two uses of the element Carbon. (2 marks)

- i. Fuel: Carbon in forms like coal, charcoal, or natural gas is used as fuel for heating and generating electricity.
- ii. **Structural Material:** In its allotropes, carbon is used in materials like graphite (in pencils, lubricants) and diamonds (in jewelry, cutting tools).
- iii. component of organic compounds/living things,
- iv. *in activated charcoal for filtration*
- v. as electrodes.

(b) Differentiate between a physical change and a chemical change in matter, giving one example for each. (2 marks)

A **physical change** alters the form or appearance of a substance but does not change its chemical composition (e.g., **melting ice** into water, where it's still H₂O). A **chemical change** results in the formation of new substances with different chemical properties (e.g., **burning wood** to produce ash, smoke, and gases, which are new substances).

40. (a) A learner wanted to measure the mass of a substance. Name the SI unit for mass. (1 mark)

The SI unit for mass is the kilogram (kg).

(b) Name the apparatus shown below. (2 marks)

- M: **burette**
- N: wash bottle

(c) During a field trip, learners were asked to classify animals based on their modes of nutrition. They identified an animal that feeds on both plants and animals. What is the mode of nutrition for this animal? (1 mark)

The mode of nutrition for this animal is **omnivorous** (or omnivore).

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