INTEGRATED SCIENCE 2

1. GENERAL COMMENTS

The standard of the paper was the same as that of previous years. Each major question tested various concepts in all the sciences viz Chemistry, Biology, Physics and Agriculture. However, the performance of the candidates was average.

2. SUMMARY OF CANDIDATES' STRENGTHS

   (1) Orderly presentation of answers.
   (2) Handwriting of most candidates was legible.
   (3) Adherence to the rubrics of the paper.

3. SUMMARY OF CANDIDATES' WEAKNESSES

   (1) Wrong spelling of scientific terms.
   (2) Lack of practical experience.
   (3) Lack of understanding of scientific concepts.
   (4) Inability to write balanced chemical equations.

4 SUGGESTED REMEDIES

   (1) Teachers should engage their students in regular drills in scientific terms during lessons.
   (2) Teachers should endeavour to take their students to the nearest science resource centres to expose them to laboratory equipment used in experiments.
   (3) Teachers should use real life situations to explain scientific conceptsrather than the theoretical approach.
   (4) Teachers must assist their students to write balanced chemical equations frequently during science lessons.

5. DETAILED COMMENTS

Question 1

(a)   The diagrams below represent the stages in the life cycle of a mosquito.
        Study the diagrams carefully and answer the questions that follow.
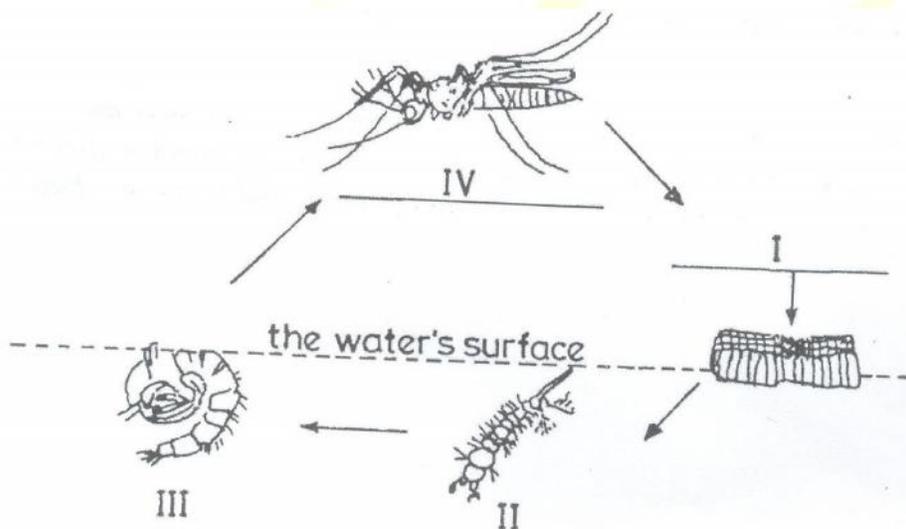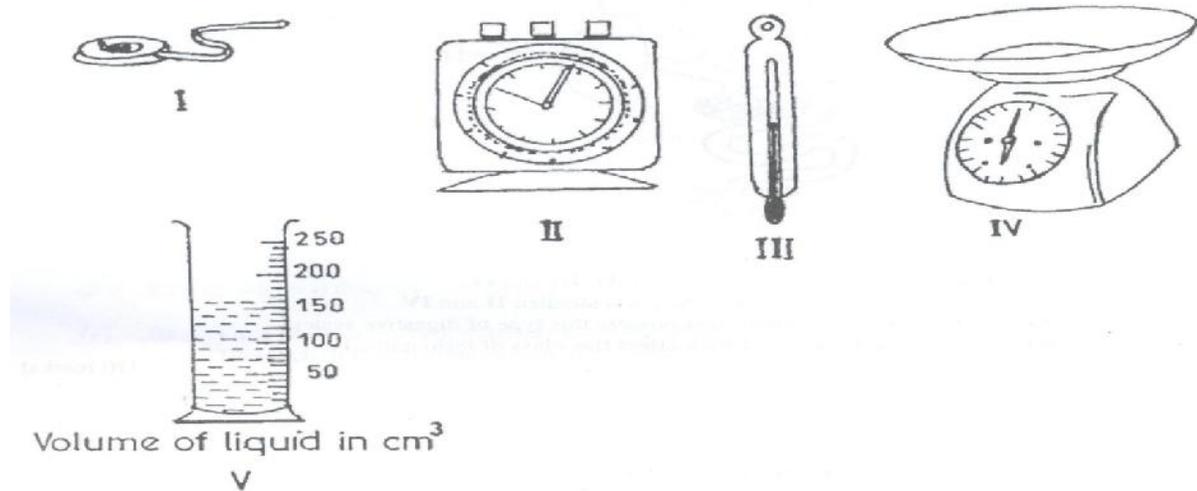

(i)   Name each of the stages labelled I, II, III and IV.
     (ii)   State how stage II obtains oxygen.
     (iii)   State two methods of controlling each of the stages labelled III and IV.

(b)   The diagrams below are different laboratory set-ups used in the separation of
        mixtures.
   *Study the diagrams carefully and answer the questions that follow.*
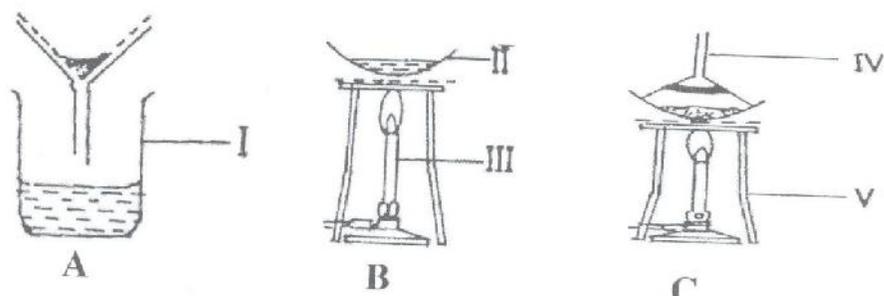
(i)   Name each of the parts labelled I, II, III, IV and V.
     (ii)   Name the separation method represented by each diagram.

(iii)   Which of the set-ups is used to obtain clear water from muddy water?

(iv)   Which of the set-ups is used to obtain salt from salt solution

(c)   The diagrams below show some instruments used in the laboratory.
Study the diagrams carefully and answer the questions that follow.

(i)   Identify each of the instruments labelled I, II, III, IV and V.

(ii)   State one use of each of the instruments labelled I, II, III and IV.

(iii)   Read and record the volume of the liquid in the instrument labeled V.

(d)   The diagram below shows the digestive system of a class of farm animals.
Study the diagram carefully and answer the questions that follows.
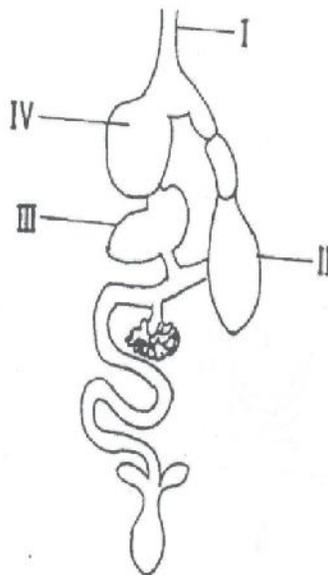
(i)   Name two farm animals that possess this type of digestive system.

(ii)   Mention two diseases which affect this class of farm animals.

(a)   Majority of the candidates were able to name each of the stages of thelife cycle of a mosquito labelled 1, II,III and IV as eggs, larva, pupa and adult mosquito. However, the spellings of these stages was difficult for them. For examples, "lava" for "larva" and "pupu" for "pupa". Many candidates could not state how the stage labelled II/ larvae obtains oxygen. They must note that the larva moves to the water surface to take in atmospheric oxygen using a tube. On the methods of controlling each of the stages labelled III and IV, candidates must note that adult mosquito does not live in water so the following methods cannot control it:

-    Using biological method/ Introducing fish in the stagnant water;
-    Pouring kerosene/oil on water surface;
-    Draining of stagnant water.

The above control methods are for larva. It is also important for candidates to note that modern methods of controlling the adult mosquito are as follows:

-    Use of special electric bulbs;
-    Use of special paints/ Inesfly;
-    Use of treated mosquito nets.

(b)   The naming of the parts of the laboratory set-ups were correctly done by the majority of the candidates. However, some candidates wrote "Retort stand" instead of "Tripod stand". Also, many candidates were able to name the separation method represented by each diagram. Again, spelling of these methods was difficult for some of them.For examples, "filteration" and "evapouartion" for " filtration" and "evaporation" respectively.

(c)   This sub-question was well answered by most candidates. They correctly identified each of the instrument labelled I, II and III. However, they must note that instrument labelled IV was a weighing scale/ balance and not a chemical/ beam balance. Also, candidates were able to state one use of each of the instrument. On the other hand, many candidates displayed poor practical skills as they found it difficult to read the volume of the liquid as 160 cm^3 from the mensicus.

(d)   This sub-question was well answered by majority of the candidates. They were able to write the correct names of the monogastrics or ruminants. However, they could not match them with the diseases they mentioned. Expected answers indicated below:

<div align="center">Monogastrics</div>

- Coccidiosis
- Newcastle
- Gumboro
- Fowl cholera

- Pullorum
- Fowl pox
- Bacillary diarrhea
- Chronic respiratory diseas

<div align="center">Ruminants</div>

- Foot & mouth
- Anthrax
- Rinderpest
- Pneumonia
- Tuberculosis

- Cero pox/ Vaccinna
- Goat pox
- Trypanosomiasis
- etc

Question 2

(a) (i) **Name the two elements that combine to form water.**

(ii) **Write a balanced chemical equation to show how the water is formed from the named elements.**

(b) **State two ways of maintaining a balance in an ecosystem.**

(c) (i) **What is a fertile soil?**

(ii) **Classify the following items as magnetic or non-magnetic substance: wood steel blade, rubber and glass jar.**

(a) The first part of this sub-question was well answered by many candidates as they correctly named the two elements that combine to form water. However, they could not write a balanced chemical equation to show how water is formed from the two elements. The expected answer is indicated below:

$$2H_2 + O_2 \rightarrow 2H_2O$$
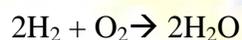
(b) Majority of the candidates responded appropriately to this sub-question.

(c) This sub-question was well answered by many candidates. They were able to explain what a fertile soil was. They were able to state the factors that could result in the loss of soil fertility. Some of their correct answers included leaching, bush burning, soil erosion, deforestation and overgrazing.

(d) Majority of the candidates were able to classify the items given as magnetic or non-magnetic substances.

Question 3

(a) (i) **What is germination of seed?**

(ii)   State two conditions necessary for the germination of seed.

(b)   State four methods used in identifying farm animals.

(c)   Explain why it is easier to cut a piece of yam with a sharp knife than with a blunt knife.

(d)   State three differences between a metal and a non-metal.

(a)   This sub-question was well answered by many candidates as they correctly explained the term "germination" of seed. They were also able to state the conditions necessary for germination of seed.

(b)   Many candidates were able to state the methods used in identifying farm animals. However, candidates must note that they were not expected to describe the methods. For example, the ear of the animal is tied with a piece of cloth. They could just state "ear tagging". Other methods of identifying farm animals included tattooing, branding, dyeing, clipping and ear notching/ punching.

(c)   This sub-question was poorly handled by the most candidates. They mixed the concepts on sharp knife cutting more easily than a blunt knife. They were expected to express the inverse proportionality between surface area and pressure. Therefore, sharp knife has smaller surface area of contact with the yam hence greater pressure(with the same force) made cutting easier.

(d)   This sub-question was well answered by most candidates as they stated correctly the differences between a metal and a non-metal.

Question 4

(a)   **(i)**   What is debeaking?

        (ii)   Give two reasons why debeaking in poultry birds is important.

(b)   **(i)**   A steel needle carefully placed on the surface of water floats. What type of force made the steel needle to float?

        (ii)   Name three substances that could be added to the water to make the steel needle to sink.

(c)   **(i)**   Explain why gold is preferred to iron in the making of jewelleries.

        (ii)   State one way of preventing rusting.

(d)   **(i)**   State two elements of climate.

(ii)   Name the equipment used to measure each of the elements stated in (i) above.

(a)   Majority of the candidates were unable to define the term "debeaking". They failed to

express fact that debeaking was partial removal/ trimming of the beak of poultry/ domestic bird. However, they were able to give correct reasons why debeaking in poultry bird was important.

(b)   This sub-question was well answered by most candidates. They did well by identifying surface tension as the force that made steel needle to float. However, some candidates were not able to name the substances when added to the water could make the steel needle to sink. The expected answers included kerosene, oil, soap, diesel and petrol.

(c)   Explanation of why gold was preferred to iron for making jewellery was difficult for many candidates. It is important for candidates to note that gold is used to make jewelleries because it lustres/ shines and does not corrode. However, they were able to state ways of preventing rusting.

(d)   This sub-question was fairly well answered by most candidates. They were able to mention the elements of climate. The difficulty they had has to do with the naming of the equipment used to measure each of the elements they stated. Candidates had to specify some aspects to wind to get the corresponding instrument used to measure. For example, wind direction and wind speed need wind vane and anemometer respectively. Also, the correct spelling of the instrument used to measure rainfall is rain gauge and not rain guage.

Question 5

(a)   (i)   **What is refraction of light?**
        (ii)   **Sketch a diagram to show the path of a light ray when it travels from air to glass.**
(b)   **Explain why it is difficult to separate iron and sulphur mixture after strong heating.**
(c)   (i)   **Give two examples of digestive enzymes produced in humans.**
        (ii)   **For each of the enzymes given in (i), name the part of the human body where the enzyme is produced.**
(d)   **List four methods of applying fertilizers to crops.**

(a)   Majority of the candidates could not state what refraction of light was.Refraction is the bending/ change in direction/ change in velocity of light as it travels from one medium to another. Also, sketching a diagram to show the path of a light ray when it travels from air to glass was difficult for the candidates. They must note that the diagram had to show the following features: normal to air-glass media, incident ray with arrow and refracted ray closer to the normal.

(b)   This sub-question was well answered by most candidates as they explained why it was difficult to separate iron and sulphur mixture after strong heating.

(c)   Majority of the candidates were able to give examples of the digestive enzymes as well as name the parts of the human body where the enzymes were produced.

(d)   Many candidates responded appropriately to this sub-question.

Question 6

(a)   Consider the substances listed below: carbon dioxide, gold, bronze, iron, oxygen and ink.From the list, select the substance that:
   (i)   supports burning;
   (ii)   is used as jewellery;
   (iii)   is used for making statues.
(b)   (i)   Name two diseases associated with the circulatory system of humans.
   (ii)   State one way of preventing each of the diseases named in (i).
(c)   Give two examples of each of:
   (i)   major plant nutrients;
   (ii)   minor plant nutrients.
(d)   (i)   State two properties of a good thermometric liquid.
   (ii)   Give two examples of a good thermometric liquid.

(a)   This sub-question was fairly well answered by most candidates. However, some of them misunderstood the question in that they selected, for example, two substances that support burning instead one as required.

(b)   This sub-question was fairly well answered by many candidates. Some of the diseases of the circulatory system named by the candidates included arteriosclerosis, hypertension and leukaemia.

(c)   Many candidates were able give examples major plant nutrients and minor plant nutrients. However, few candidates could not classify the nutrients they named as major or minor. Examples of major plant nutrients included nitrogen, phosphorus, calcium and magnesium. Minor plant nutrients included copper, iron, zinc and magnesium.

(d)   Majority of the candidates responded appropriately to this sub-question.