

# **INTEGRATED SCIENCE 2**

## **1. STANDARD OF THE PAPER**

The Chief Examiner for Integrated Science reported that the standard of the paper compared favourably with that of previous years.

## **2. PERFORMANCE OF CANDIDATES**

The Chief Examiner for Integrated Science 2 also reported that the performance of candidates was generally better than last year.

## **3. SUMMARY OF CANDIDATES' STRENGTHS**

### **(1) Mastery of Subject Matter**

The Chief Examiner commended some candidates for articulating their ideas in vivid manner that showed good mastery of the subject.

### **(2) Adherence to Rubrics of the Paper**

The Chief Examiner reported that majority of candidates adhered to the rubrics of the paper by not answering more than the required number of questions. They were able to respond to new questions on fresh pages and numbered them appropriately.

### **(3) Usage of Appropriate Scientific Terms**

The Chief Examiner observed that majority of candidates used the appropriate scientific terms in their responses.

## **4. SUMMARY OF CANDIDATES' WEAKNESSES**

### **(1) Wrong Spelling of Scientific Terms**

The Chief Examiner expressed concern over the wrong spelling of scientific terms by many candidates.

### **(2) Provision of Irrelevant Answers**

It was noted by the Chief Examiner for Integrated Science 2 that many candidates could not provide precise and concise answers.

## **5. SUGGESTED REMEDIES**

The following suggestions were made by the Chief Examiner to curtail the weaknesses of candidates:

- (1) Teaching and learning facilities should be improved in schools.

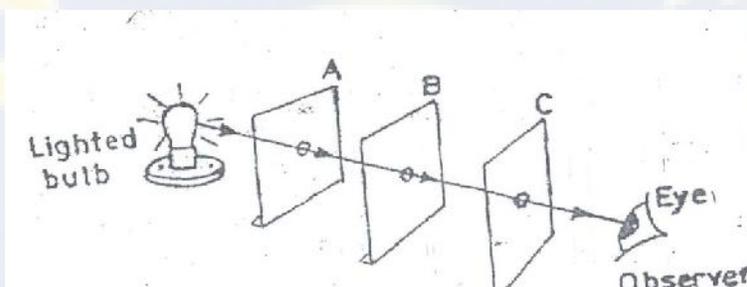
- (2) Teachers should give adequate tutorials to their students on how to provide concise and precise answers.
- (3) Teachers should take their students through spelling drills of scientific terms.

## 6. DETAILED COMMENTS

### Question 1

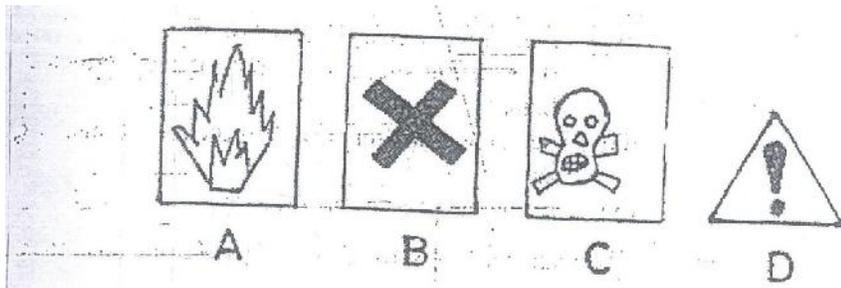
(a) In an experiment to demonstrate a property of light, three cardboards, A, B, and C with holes in their centres are arranged in a straight line between a lighted bulb and an observer as shown in the illustration below.

*Study the illustration carefully and use it to answer the question that follow:*



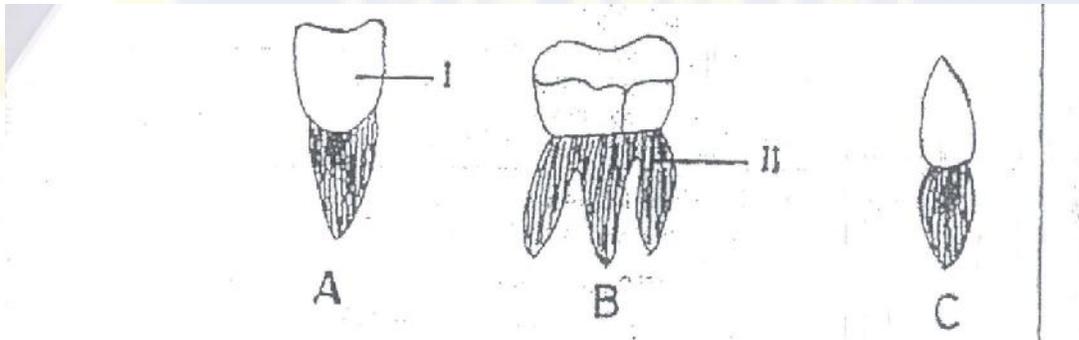
- (i) What would be the observer see from the position shown?
  - (ii) What would the observer see when cardboard B is slightly displaced from the line?
  - (iii) Explain the observation made in (a) (ii) above.
  - (iv) What would be observed when the cardboard B is brought back to its original position?
  - (v) What property of light is being demonstrated in this experiment?
  - (vi) Mention ( ) two natural occurrences that could be explained by the property of light demonstrated. ( ) one device that works on the property of light demonstrated.
- (b) The diagrams below are illustrations of hazards symbols found in everyday life

*Study them carefully and use them to answer the questions that follow:*



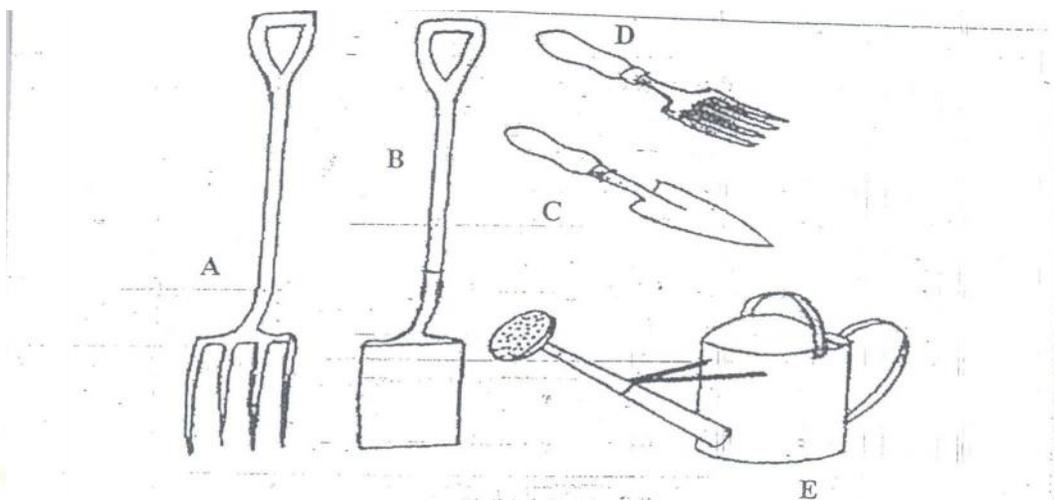
- (i) What does each symbol A, B, C and D represent?
  - (ii) Name one substance each that is associated with each of the symbols A, B and C.
  - (iii) Name one place where the symbols D can be found.
  - (iv) State two advantages of hazard symbols.
- (c) The diagrams below are illustrations of the different types of teeth in humans.

*Study them carefully and use them to answer the questions that follow:*



- (i) Identify each type of teeth labelled A, B and C.
  - (ii) Describe the shape of each of the teeth labeled A, B and C.
  - (iii) State one function of each of the teeth labeled A, B and C.
  - (iv) Name the parts of the teeth labeled I and II.
- (d) The diagrams below are illustrations of some farm tools.

*Study them carefully and use them to answer the questions that follow:*



- (i) Identify each of the following labeled A, B, C, D and E.  
 (ii) Mention one use of each of the tools labeled A, B, C, D and E.

(a) This sub-question was not satisfactorily answered by majority of the candidates. The answers they provided were not precise and concise. The correct responses were as follows:

- (i) Light/lighted bulb/light ray (s).  
 (ii) No light would be seen/part of the cardboard B.  
 (iii) Light travels in a straight line and because cardboard B is shifted out of the straight line the light is not seen again.  
 (iv) The lighted bulb/light/light rays (s).  
 (v) Linear/rectilinear propagation of light/light travels in a straight line.

The omission of the underlined words by most candidates resulted in wrong answers.

( ) Two natural occurrences related to the rectilinear propagation of light are eclipse and shadow.

( ) Devices that work on the principles of rectilinear propagation of light are: pinhole camera/periscope/touchlight/hunter's lamp/parabolic mirror/car lamps/optical fibre/laser

(b) This sub-question was not satisfactorily answered. Candidates mixed up the representation of the hazards symbols. Expected responses were:

- A - highly inflammable/flammable-petrol, kerosene/gas etc;  
 B - harmful or irritant –sodium hydroxide/H<sub>2</sub>SO<sub>4</sub>/HNO<sub>3</sub>/aluminum sulphate etc;  
 C - toxic – cyanide/DDT/mercury/lead compounds.

Candidates must note that places where symbol D could be found were highways/high voltage equipment, laboratories and construction sites. Also, most of the candidates wrote that the hazard symbols actually warn us of danger and prevent accidents or damage of property.

- (c) Identification of the different types of teeth in humans was difficult for most candidates. The main problems were the wrong spelling of identified tooth and stating of the incorrect functions. Candidates must also note that incisor not “incisor”, molar not “moler” and canine not “canine”. The function of each of the teeth is as follows:

A	-	cutting/biting
B	-	grinding
C	-	tearing

However, most candidates were able to describe the shape of each of the teeth.

- (d) Majority of the candidates were able to identify the farm tools but could not mention the use of the tools on the farm. Some candidates stated the following uses which are wrong. For examples, spade used for masonry work and hand trowel for plastering wall during construction of buildings. It should be noted that hand trowel is used for transplanting seedlings/earthing up vegetable crops. Hand fork-stirring/loosing soil not turning soil and spade for tuning/loosing soil not turning soil. Again, candidates should be specific with what type of fork they mention, that is, the fork must be qualified.

A	-	Garden/digging/foot fork
B	-	Hand fork

## Question 2

- (a) (i) **What are ruminants?**  
(ii) **Give two examples of ruminants.**
- (b) (i) **What is force?**  
(ii) **State two effects of forces on the body.**
- (c) (i) **Mention two ways in which the carbon cycle can be maintained.**  
(ii) **State one environmental effect when the carbon cycle is disrupted.**
- (d) (i) **Mention the three sub-atomic particles.**  
(ii) **State the relative charge on each of the three sub-atomic particles mentioned in (d) (i) above.**  
(iii) **Name the particle formed when an atom loses an electron.**

(a) Majority of the candidates could not answer this sub-question satisfactorily. It should be noted that ruminants are animals/mammals with four-chambered stomachs not four stomachs or animals that chew the cud. Examples included goats, sheep, cattle, and

camel excluding pigs, hippopotamus and rabbit.

- (b) This sub-question was well answered by majority of the candidates. They were able to state what force was and they also stated two effects of a force.
- (c) This sub-question was difficult for most candidates. The ways of maintaining the carbon cycle included photosynthesis, decay and decomposition, respiration, burning and animals feeding on plants. Again, the environmental effects resulting from the disruption of the carbon cycle were greenhouse effect and global warming.
- (d) Most candidates were able to mention the three sub-atomic particles and gave their relative charges.

### **Question 3**

- (a) (i) **What is a mixture?**  
(ii) **Explain why some mixtures are thoroughly stirred before they are used.**
- (b) (i) **What is reflection of light?**  
(ii) **State two characteristics of the images formed by plane mirrors.**
- (c) (i) **What is a fertilizer?**  
(ii) **Give one example of an inorganic fertilizer.**
- (d) (i) **What is indiscriminate sex?**  
(ii) **State two dangers of indiscriminate sex on humans.**

(a) Majority of candidates were able to answer this sub-question satisfactorily. The weaknesses exhibited were their inability to explain the reason for stirring a mixture before use. Many of the candidates stated “to ensure the dissolution of solute” instead of “to bring about uniform mixing or mixture”.

- (b) Many candidates could not give the characteristics of the image formed by a plane mirror. The characteristics of the image formed by a plane mirror were:
- erect;
  - laterally inverted;
  - same distance behind mirror as object is in front of mirror;
  - same size as mirror.

(c) Most candidates are able to state what a fertilizer was and gave appropriate examples.

(a) Majority of the candidates were able to state that indiscriminate was having sexual intercourse with different /many partners. Few candidates, however, stated that having sexual intercourse several times which was wrong. Some of the effects of

indiscriminate sex correctly stated by the candidates included occurrence of sexually transmitted diseases, undesirable/unwanted pregnancy and abortion

#### **Question 4**

- (a) (i) **What is a simple machine?**  
(ii) **Give two examples of a simple machine?**
- (b) (i) **What is rusting?**  
(ii) **State two effects of rusting.**
- (c) (i) **What are food nutrients?**  
(ii) **Classify the following food items as carbohydrate, fats and oil or protein:  
Beans, palm fruits, meat, margarine, bread and maize.**
- (d) (i) **State two effects of malnutrition in farm animals.**  
(ii) **Mention one disease of farm animals caused by virus.**

- (a) Many candidates were able to state that a simple machine was a device that makes work easier/faster or a device which enables a small force (effort) to overcome a large force (load). They also gave appropriate examples of a simple machine.
- (b) This sub-question on rusting and its effects were not satisfactorily answered. Candidates must note that of all metals only iron rusts. Therefore rusting is the reaction of iron and not a metal/metals with water/moisture and air to form an oxide of iron. They could not also state the effects of rusting. The expected answers included loss of its strength/structure resulting in accident, collapse of building and bridges resulting in maintenance cost
- (c) Most candidates were able to state that food nutrients were substances which when taken in by living things to help in performing of life activities/the essential materials/substances present in food.
- (d) Majority of the candidates were able to state two effects of malnutrition in farm animals and then mentioned one disease of farm animals caused by virus.

#### **Question 5**

- (a) (i) **What is soil erosion?**  
(ii) **Name two methods of controlling soil erosion.**
- (b) (i) **Explain each of the following terms as used in ecology:**  
( ) **Adaptation;**  
( ) **Endangered species.**
- (c) (i) **Give one example of hard water.**

- (ii) **Explain why it is advisable to drink water which is hard.**
- (d) (i) **What is magnetic field?**  
(ii) **State two methods of making magnets.**
- (a) Most candidates were able to state that soil erosion was the washing away/removal of the top soil of water/wind. Also, they were able to state the methods of controlling soil erosion. Some of their correct responses included terracing, strip cropping, contour ploughing, wind breaks/afforestation/tree planting, mulching and cover cropping.
- (b) The ecological terms was not satisfactorily explained by most candidates. It is important for the candidates to note that adaptation is ability of an organism to survive in a given environment using special features while endangered species are plants and animals facing extinction/number are decreasing.
- (c) Majority of the candidates were able to give examples of hard water and explained satisfactorily why it is advisable to drink water which is hard.
- (d) Most candidates were able to that state magnetic field was the area around a magnet where the effect of the force of a magnet can be felt/experienced. The methods of making magnets was satisfactorily given by most candidates. Some the methods stated by them included hammering/strong heating in the earth's magnetic field, stroking, electrical and induction.

### **Question 6**

- (a) (i) **Define each of the following terms:**  
( ) **solvent;**  
( ) **solute.**  
(ii) **Name one common solvent used in the home.**
- (b) (i) **Explain the following terms as used in animal production:**  
( ) **ration;**  
( ) **dehorning.**
- (c) (i) **What is an element?**  
(ii) **Write down the symbol of each of the following chemical substances:**  
( ) **Potassium;**  
( ) **Sulphur.**
- (d) **Explain each of the following terms:**  
( ) **Mixed farming;**  
( ) **Mixed cropping.**
- (a) This sub- question was satisfactorily answered by most candidates.
- (b) Majority of the candidates appeared not to be familiar with the terms ration and

dehorning as used in animal production. Ration is the quantity of food allowing an animal for a specific period of time but not food given to animals while dehorning is the removal of the horns of animals but not cutting of the horns of animals.

- (c) Many of the candidates were able to define the term element and then provided the appropriate symbols for potassium and sulphur as K and S respectively.

Many of the candidates could not explain the terms mixed farming and mixed cropping. It is important for the candidates to note that mixed farming involved the production of animals and plants on the same piece of land at the same time but not animals and plants produced on the same land. Mixed cropping on the other hand is the cultivation of more than one type of crop on the same piece of land at the same time but not production of different types of crops on the same land.