

INTEGRATED SCIENCE

1. GENERAL COMMENTS

The standard of the paper was comparable to that of the previous year's. Most of the questions were very clear and straight forward. The performance of most of the candidates was quite good.

2. SUMMARY OF CANDIDATES' STRENGTHS

- (1) Most candidates were able to understand the requirements in every question and supplied the appropriate responses.
- (2) Majority of candidates showed good knowledge of scientific principles and their applications.
- (3) There was general improvement in the spelling of scientific words and correct labelling of equipment.

3. SUMMARY OF WEAKNESSES

- (1) Some candidates did not number their answers
- (2) Lack of adequate preparation was evident in the work of some candidates.
- (3) Few candidates could not identify the set-up for filtration and so could not label the parts of the diagram correctly.

4. SUGGESTED REMEDIES

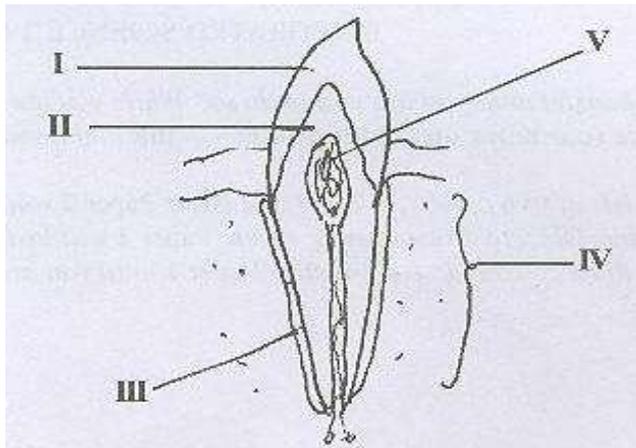
- (1) Candidates should be advised to pay serious attention to their studies and not rely on external assistance during examinations.
- (2) Teachers should conduct more practical activities to enable candidates understand the various concepts in the syllabus.
- (3) Candidates should be advised to read their textbooks to enable them know much about equipment and apparatus they use in the laboratory.

5. DETAILED COMMENTS

Question 1

- (a) **The diagram below is an illustration of a longitudinal section of a canine tooth in humans.**

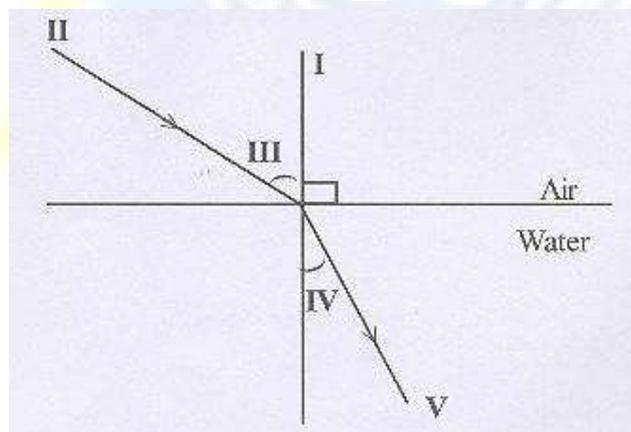
Study the diagram carefully and answer the questions that follow.



- (i) Name each of the parts labelled I, II, III, IV and V.
- (ii) What is the function of each of the parts labelled I and III?
- (iii) Which of the labelled parts could be affected by tooth decay?
- (iv) State three ways by which tooth decay may be prevented.

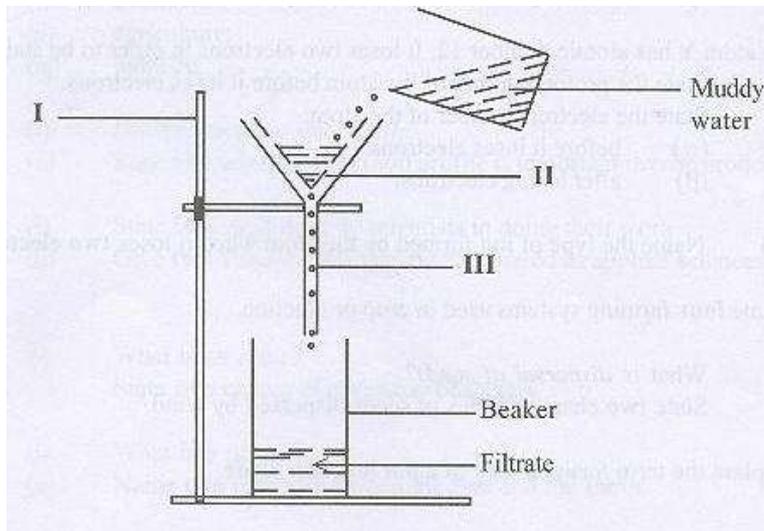
(b) The diagram below is an illustration of a scientific phenomenon which occurs in nature.

Study the diagram carefully and answer the questions that follow.



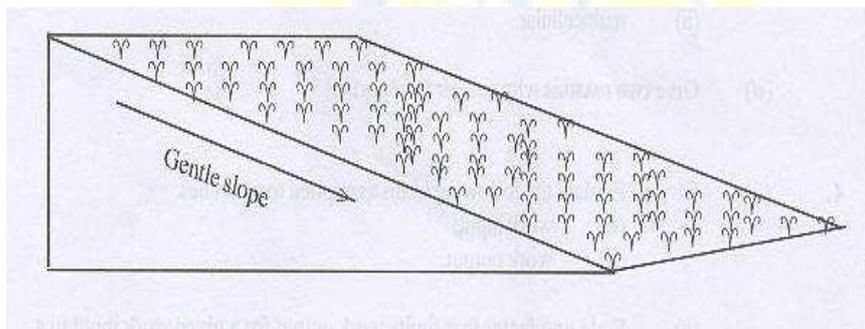
- (i) What phenomenon does the diagram illustrate?
 - (ii) Identify each of the parts labelled I, II, III, IV and V.
 - (iii) Explain why an object at the bottom of a pond appears closer to the surface than it actually is.
- (c) The diagram below is an illustration of an experiment performed to separate the components of muddy water.

Study the diagrams and answer the questions that follow.



- (i) Name each of the parts labelled I, II and III.
- (ii) State the function of the part labelled II.
- (iii) Name the substance obtained as the filtrate.
- (iv) State three physical properties of the filtrate.
- (v) Name two other materials that could be used in place of the part labelled II.

- (d) The diagram below illustrates a farmland on a slopy area.
Study the diagram carefully and answer the questions that follow.



- (i) What process is likely to occur on the farmland when it rains heavily?
- (ii) State two farming practices that can also lead to the process mentioned in (i).
- (iii) List four farming practices that could be used to control the process mentioned in (i).

(iv) Mention three soil resources that would be depleted from the farmland when it rains heavily.

- (a) This question was well answered by majority of candidates. They labelled the parts correctly and gave the right functions of the parts. They mentioned the three ways by which tooth decay can be prevented.
- (b) Most students mentioned the phenomenon as refraction of light and identified the parts labelled correctly. As to why an object at the bottom of a pond appears closer to the surface, almost all could not state that, rays from the object at the bottom are bent away from the normal as they come out of the water, and in a straight line, these rays appear to come from a point above the bottom.
- (c) Majority of candidates answered these questions correctly. However a few candidates had difficulty in getting the correct spelling of 'retort stand' of the set-up e.g. 'restort stand' / 'retord stand'.
- (d) Most candidates stated 'erosion' as likely to occur and mentioned the farm practices that could lead to erosion on a farmland.

Question 2

- (a) An atom Y has atomic number 12. It loses two electrons in order to be stable.**
 - (i) State the proton number of the atom before it loses electrons.**
 - (ii) State the electron number of the atom:**
 - (α) before it loses electrons.**
 - (β) after losing electrons.**
 - (iii) Name the type of ion formed by the atom when it loses two electrons.**

(b) Name four farming systems used in crop production.

(c) (i) What is dispersal of seeds?

(ii) State two characteristics of seeds dispersed by wind.

(d) Explain the term forward bias of a *p-n* junction diode.

- (a) Satisfactorily answered by most candidates.
- (b) A few candidates mentioned 'Pastoral farming' which is not crop production.
- (c) 'Dispersal of seeds' was well stated and the characteristics of such seeds correctly mentioned
- (d) Majority of candidates could not explain the term forward bias of a *p-n* junction diode as, 'when the positive terminal of an electric source is connected to the *p*-type of the diode and the negative terminal is connected to the *n*-type of the diode.

Question 3

- (a) (i) **What is an acid?**
(ii) **Give two differences between an acid and a base, in terms of taste and feel.**
- (b) (i) **Define pressure.**
(ii) **A force of 200 N is exerted on an area of 50 m². Calculate the pressure exerted by the force.**
- (c) **Explain the following terms as associated with living organisms:**
(i) **unicellular;**
(ii) **multicellular.**
- (d) **Give two reasons why soil air is important.**

- (a) Some candidates wrongly defined an acid as a substance that turns blue litmus paper red. Few candidates also stated the effect of acids and bases on red/blue litmus papers which has nothing to do with taste and feel.
- (b) Most candidates gave the correct definition for pressure and went on to calculate the pressure exerted by the force.
- (c) The terms unicellular and multicellular were well explained by the candidates.
- (d) From the large number of reasons, most candidates (perhaps all) candidates limited themselves to the same two reasons i.e. soil air is required to decompose organic matter; plant roots need soil air for growth. Other reasons not considered include the following. Soil air is needed for absorption of nutrients and water by roots; for seed germination, for respiration in roots and soil organism etc.

Question 4

- (a) (i) **Explain the following terms as applied to machines:**
(α) **work input;**
(β) **work output.**
(ii) **State one factor that limits work output for a given work input in a simple machine.**
- (b) (i) **What is chloroplast?**
(ii) **Differentiate between aerobic respiration and anaerobic respiration.**

- (c) (i) **State the colour change that would occur when blue litmus paper is dipped into a solution of:**
(α) **vinegar;**
(β) **wood ash.**
- (ii) **Name the products formed when hydrochloric acid reacts with sodium hydroxide.**
- (d) **List two benefits of vegetables to humans.**

- (a) This question was most poorly done (most candidates described work-input as “work done by machine, and work output as force applied to a machine) instead of
(α) work input as the total energy/work applied to a machine for it to be able to work
(β) work output as the total energy/work obtained by using machine to do work
- (b) Similarly, they could not state that ‘chloroplast’ is an organelle/structure found in cells and contains chlorophyll/green pigment.
- (c) Majority however stated the colour changes that would occur when blue litmus paper was dipped into the two solutions.
- (d) Benefits of vegetable to humans were listed correctly.

Question 5

- (a) (i) **Differentiate between egestion and digestion in nutrition.**
(ii) **What is the end-product of digestion?**
- (b) **Give one example of a chemical compound used in:**
(i) **medicine;**
(ii) **agriculture;**
(iii) **industry.**
- (c) (i) **Define the term soil profile.**
(ii) **State two ways in which soil profile is important in crop production.**
- (d) (i) **State two steps used by scientist in doing their work.**
(ii) **Give two subjects that may be considered as applied sciences.**
- (a) (i) Most candidates could rightly differentiate between egestion and digestion.
(ii) The differences between the two processes were satisfactorily explained by most candidates. However, majority of them did not know the end product of digestion. Many named the product faeces. End products are glucose, amino acids, fatty acids and glycerol.

- (b) This question was satisfactorily answered by candidates
- (c) 'Soil profile' was satisfactorily defined by most candidates
- (d) The steps used by scientists were correctly stated. However, a few students wrongly gave Chemistry, Biology and Physics as applied sciences.

Question 6

- (a)
 - (i) **What is an alloy?**
 - (ii) **State two causes of corrosion of metals.**

 - (b)
 - (i) **What is a planet?**
 - (ii) **Name two planets between the Sun and the Earth.**
 - (c) **State four functions of the circulatory system in humans.**
 - (d)
 - (i) **Define the term crop rotation.**
 - (ii) **Give one example of a chemical method of controlling pests on crop farms.**
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- (a) Some candidates omitted the word 'uniform' in the definition of an alloy. They however stated the cause of corrosion of metals instead.
 - (b) Most candidates correctly described a planet. A few of them wrongly described it as a "combination of sun and the eight planets". While most candidates named mercury and venus as planets between the sun and earth, many others lost marks for wrongly spelling the names of the planets.
 - (c) Major function of the system is transportation of blood through the body. The transportation involves various materials such as blood cells, oxygen, carbon dioxide, absorbed food, hormones, heat.
 - (d) The definition for crop rotation was a problem for most candidates. 'is a system of farming where different crops are grown on the same piece of land but on different plots in a definite sequence or cycle from season to season.