KENYA NATIONAL EXAMINATION COUNCIL
KCSE, 2014

GENERAL SCIENCE PAPER 2 ANALYSIS

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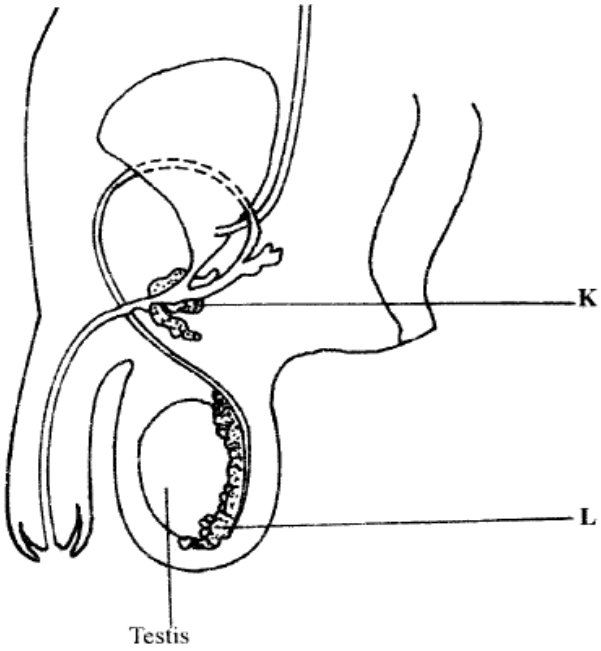
3.6.2 General Science Paper 2 (237/2)

SECTION A: BIOLOGY

Questions that were most challenging to the candidates are numbers 3, 7 and 9 which are briefly discussed below.

Question 3

The diagram below represents the human male reproductive system.



(a) (i) Name the parts labelled **K** and **L**.

K; (1 mark)

L. (1 mark)

(ii) State the role of the hormone produced by the testis. (1 mark)

(b) What is meant by the term mitosis? (1 mark)

Candidates were given a drawing of human male reproductive system and asked to name specific parts and the role of hormone produced by testis. They were also to state meaning of the term mitosis.

Weaknesses

Majority of candidates were not able to name the parts correctly showing lack of knowledge in the area. They also did not know role of the hormone produced by the testis and definition of mitosis.

Expected response

(a) (i) K - Prostate gland; L - Epididymis;

(ii) Controls development of secondary sexual characteristics;
leads to formation of spermatozoa/sperms;

(b) It is a type of cell division giving rise to two identical diploid daughter cells;

Question 7

(a) What is chemical evolution? (2 marks)

(b) State **two** ways in which meiosis is important in sexual reproduction. (2 marks)

Candidates were required to define chemical evolution and state ways in which meiosis is important in sexual reproduction

Weaknesses
Most candidates were not able to give a correct definition chemical evolution. They showed complete lack of knowledge in the area from their responses. They were also not able to say how meiosis is important in sexual reproduction.

Expected response

(a) It is a theory on the origin of life; that suggests that life began from simple elements through complex compounds;

(b) Meiosis leads to the formation of the gametes which are haploid;
Meiosis ensures that the chromosomal constitution of offspring is the same as that of parents;

Question 9

Name **three** structures of the human ear that are involved in balance and posture. (3 marks)

Candidates were expected to name structures of the human ear that are involved in balance and posture. Most candidates did not give the correct structures while others left the question blank without attempting it. A few gave the names of structures with wrong spellings.

Weaknesses
Candidates appeared not to have covered the topic from their responses and since others did not attempt the question. Spelling for a few who had the idea was the issue.

Expected response

Semicircular canals;
Utriculus;
Sacculus;

SECTION B: CHEMISTRY

The following questions challenged the learners: **15, 16, 17** and **18.**

Question 15

(a) Name **one** natural polymer and state its use. (1 mark)

Natural polymer.

Use.

(b) State **one** advantage and **one** disadvantage of synthetic polymers. (1 mark)

Advantage .....

Disadvantage .....

Candidates were required to name natural polymers and their uses, advantages and disadvantages.

Weaknesses

Majority of the candidates were unable to name natural polymers, state their uses, give advantages and disadvantages.

Expected response

(a) Natural polymers
Cellulose / proteins / natural rubber/silk/wool.

Uses
Used for paper manufacturing, textiles
- Rubber used in tyres, tubes
- Proteins / cellulose in textiles.

(b) Advantages of synthetic polymer

- Cheap / long lasting / moulded into many shapes.
- Prevent / safe destruction of plants and animals.
- Some are heat resistant / good insulators / non corrosive to acids / alkalis.

Disadvantage of synthetic polymer

- Pollutants to the environment
- Non-biodegradable
- Costly to recycle
- Burn producing poisonous gases.

Question 16

(a) Iron metal exists naturally in different ores. Other than haematite, name another common ore of iron. (1 mark)

(b) During the extraction of iron metal, one of the reactions in the blast furnace is:

$$Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(l)} + 3CO_{2(g)}$$

(i) Name the raw material that is used to produce carbon (II) oxide. (1 mark)

(ii) Iron metal produced in the reaction is in liquid state. Explain. (1 mark)

(c) State with a reason, **one** use of stainless steel. (2 marks)

Use: .....

Reason: .....

Candidates were required to name another common ore of iron other than haematite, name the raw material used to produce carbon (II) oxide, explain why the iron produced is in liquid state and to state giving reasons the uses of steel.

Weaknesses

Majority of the candidates could not understand the production of iron from Fe_2O_3 by reduction process of They could also not name another ore of iron neither could they explain why the iron produced in the blast furnace is in liquid state.

Expected response

(a) Magnetite / Pyrite. √(1)

OR

$FeCO_3$ / FeS

(b) (i) Coke /Carbon

(ii) Temperatures at the blast furnace are higher than the melting point of iron metal.

(c) Use of stainless steel
- Construction of bridges
- In ships
- Pipes, padlocks
- Nails
- Cutlery.

Reason: Stainless steel does not rust /is resistant to corrosion.

Question 18

When Potassium chloride was dissolved in water, the following change occurred.

$$KCl_{(s)} + H_2O_{(l)} \longrightarrow KCl_{(aq)} \; ; \; \Delta H = +4.97 \text{ kJmol}^{-}$$

(a) (i) State the type of energy change in the above reaction. (1 mark)

(ii) The above experiment was done in a boiling tube. State the observation that was made. (1 mark)

(iii) Name the type of reaction in a(ii) above. (1 mark)

(b) Name **two** factors considered when choosing a fuel. (2 marks)

Candidates were required to identify the type of energy change in a given reaction and the observation made on the boiling tube and hence name the type of reaction represented in the equation.

Weaknesses

Candidates could not identify the type of energy change from the reaction equation, state the observation on the boiling tube and give the name the type of the reaction.

Expected response

(a) (i) Heat / enthalpy of solution.

(ii) The temperature would drop / boiling tube becomes cold.

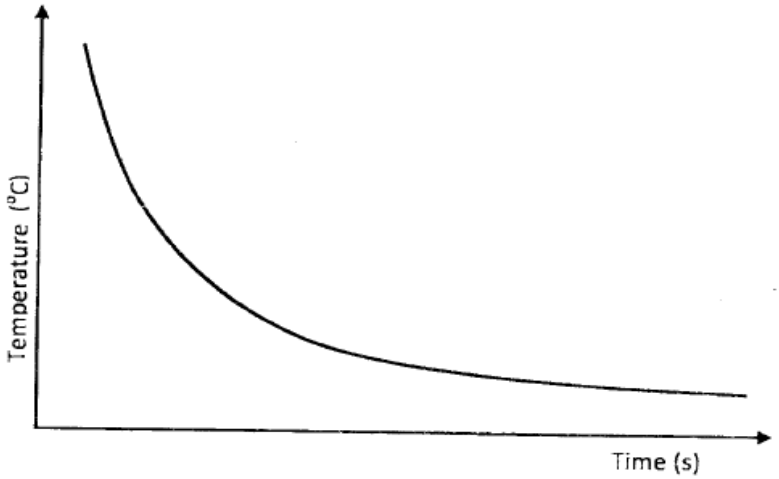
(iii) Endothermic reaction.

(b)

- Heat value
- Cost of fuel
- Availability
- Environmentally friendly/less pollution
- Cost of transporting the fuel/toxicity of fuel

Question 20

0.1M hydrochloric acid was reacted with sodium thiosulphate solution. The time taken for the cross to disappear was recorded at different temperatures as shown on the graph.



(a) Explain the shape of the curve. (1 mark)

(b) What conclusion would be made from the curve? (1 mark)

(c) Sketch another curve on the same axis that would be obtained when the concentration of hydrochloric acid is doubled. (1 mark)

Candidates were required to visualize the effect of temperature change on rate of reaction and effect of doubling concentration on rare of reaction.

Weaknesses

Candidates could not relate temperature with rate of reaction neither could they relate concentration with rate of reaction.

Expected response

(a) As the temperature rises, the time taken for the cross to disappear decreases.

OR

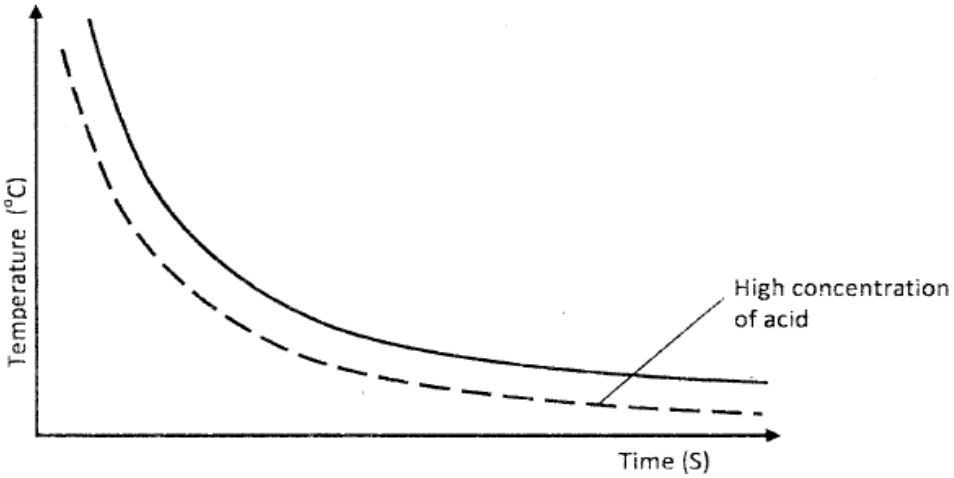
as the temperature decreases, the time taken for the cross to disappear increases.

(b) The rate of reaction increases with rise in temperature.

OR

The rate of reaction decreases with decrease in temperature.

(c) Diagram.



SECTION C: PHYSICS

Question 21

Figure 1, shows an image I formed when an object O is placed infront of a convex mirror.

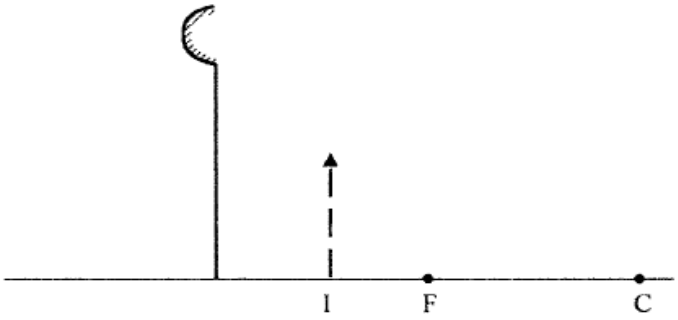


Figure 1

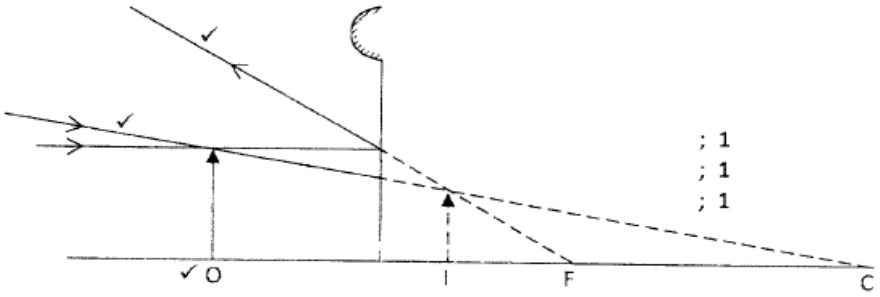
Complete the ray diagram to show the position of object O. (3 marks)

Candidates were expected complete a ray diagram to show the position of an object placed in front of a convex mirror given the position of the image formed.

Weaknesses

Most candidates treated the given image as the object instead of treating it as the image. They failed to trace the rays backwards after reflection to locate the object.

Expected response



Question 28

Figure 4, shows two circuits X and Y in which two identical coils are used to heat two equal amounts of water. The two circuits are switched on at the same time.

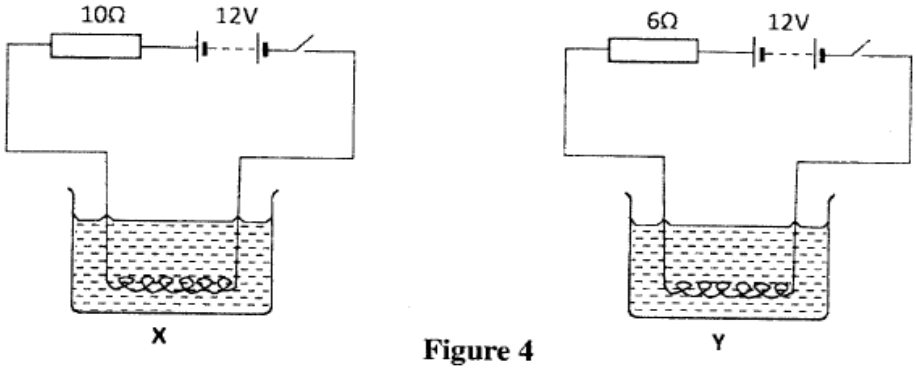


Figure 4

(a) State the circuit in which the water boils first. (1 mark)

(b) Explain the answer in (a) above. (2 marks)

Candidates were expected to explain in which of the circuits the water boiled first.

Weaknesses

Most candidates lacked knowledge of factors affecting the heating effect of current. They failed to explain how resistance depends determines the heating effect.

Expected response

(a) Circuit Y;

(b) More current is flowing due to less;
resistance in the circuit hence a greater heating effect;

Question 34

State **two** ways in which the conductivity of a semiconductor can be increased. (2 marks)

Candidates were expected to state two ways of increasing the conductivity of a semiconductor.

Weaknesses

Most candidates left the question blank sine they lacked knowledge of the topic electronics.

Expected response

- By raising the temperature of the semiconductor;
- By doping the semiconductor ;

Advice to Teachers

Emphasis should be made on:

- Application of knowledge to different situations.
- Proper mastery of content by giving practice.
- Though this is general science, teachers should strive to expose students to many experiments and if this is not possible, carry out demonstrations with them.
- Teachers should strive to ensure that the students grasp the concepts being taught by using creative approaches in presentation of content in class.
- The candidates should seek tuition from practicing teachers as they prepare to sit for examination. This is because majority of candidates taking this paper are private candidates who in most cases don't get qualified teachers to prepare them.