KENYA NATIONAL EXAMINATION COUNCIL
KCSE, 2014

CHEMISTRY PAPER 2
ANALYSIS

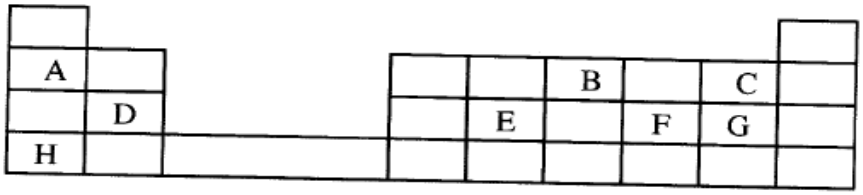
,
Osiligi House, Opposite KCB, Ground Floor
Off Magadi Road, Ongata Rongai | Tel: 0711 88 22 27
E-mail:infosnkenya@gmail.com | Website: www.schoolsnetkenya.com

3.5.2 Chemistry Paper 2 (233/2)

Questions in paper 2 are usually long and test in depth particular areas of the syllabus. They each have between 10 and 15 marks. Analysis of each question performance was carried out and questions 2 and 6 were found to have been poorly done. These two questions are briefly discussed below.

Question 2

(a) The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters are not the actual symbols of the elements.



(i) Select the most reactive metal. Explain. (2 marks)

(ii) Select an element that can form an ion with a charge of 3^-. (1 mark)

(iii) Select an alkaline earth metal. (1 mark)

(iv) Which group 1 element has the highest first ionization energy? Explain. (2 marks)

(v) Element A combines with chlorine to form a chloride of A. State the most likely pH value of a solution of a chloride of A. Explain. (2 marks)

(b) (i) Explain why molten calcium chloride and magnesium chloride conduct electricity while carbon tetrachloride and silicon tetrachloride do not. (2 marks)

(ii) Under the same conditions, gaseous neon was found to diffuse faster than gaseous fluorine. Explain this observation. (F = 19.0; Ne = 20.0) (2 marks)

In this question candidates were required to study the part of the periodic table given and
1 Select an ion whose charge is 3 minus
2 Pick an alkaline metal
3 State a group 1 element with the highest ionization energy
4 State properties of the chlorides of group 1 elements
5 Explain conduction in molten ionic and non conduction in covalent compounds
6 Explain difference in rates of diffusion between mono atomic and diatomic gases.

Weaknesses

Candidates were not able to select accurately an ion with a charge of minus 3, an alkaline earth metal and an element with the highest ionization energy. They could also not explain why conduction occurs in molten Calcium chloride and not in carbon tetrachloride. These weaknesses can only indicate that candidates did not take time to read, understand and interpret the tasks before they began to write their responses. It can also indicate that the topics on chemical families,struture and bonding and the periodic table were not fully covered. It should be stressed that all topics in the syllabus can be tested any time and therefore all should be given adequate coverage and be finalized in good time so that candidates have enough time to revise before they sit for their exams. After each topic is covered, evaluation should be undertaken and remedial teaching provided where necessary.

Expected response

(a) (i) K - Has largest atomic radius / it most readily loses its outermost electron.

(ii) B /N

(iii) D / Mg

(iv) A (1) It has the smallest/smaller atomic radius/ its outermost electron is more/most strongly held by nucleus.(1)

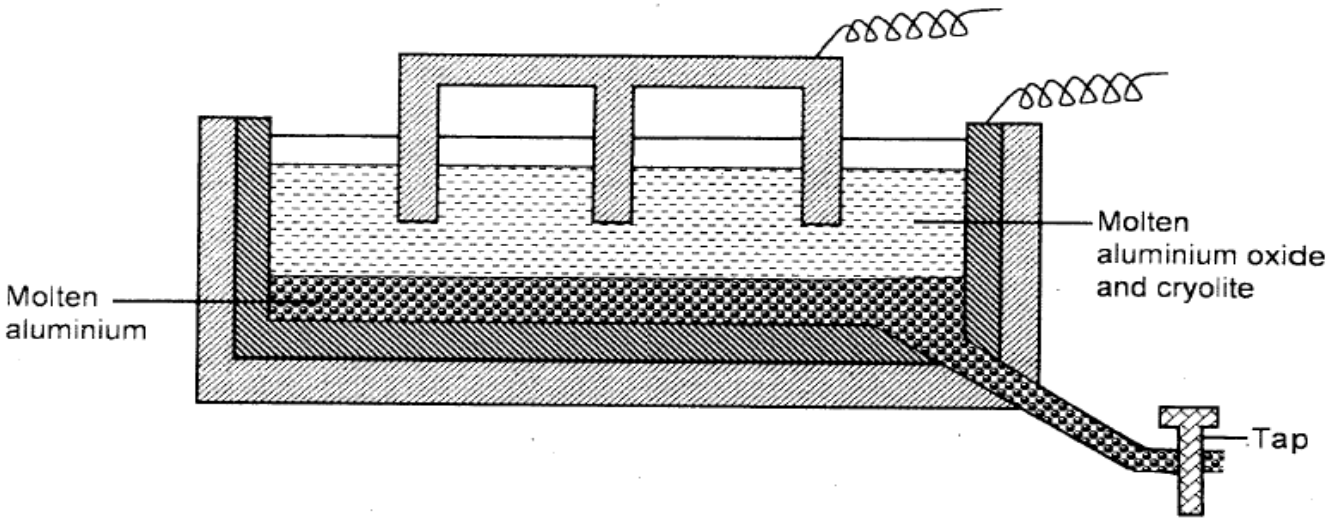
(v) P^H is seven (7). The chlorides of group 1 elements are neutral salts.

(b) (i) Both $CaCl_2$ and $MgCl_2$ have mobile ions in molten state (1) while both CCl_4 and $SiCl_4$ are molecular compounds with no mobile ions (1).

(ii) Neon has molar mass of 20 while Flourine has a molar mass of 38 (1). Therefore Neon diffuses faster. (1) Since it has a lower molecular mass the faster the rate of diffusion.

Question 6

The diagram below represents a set up of an electrolytic cell that can be used in the production of aluminium.



(a) On the diagram, label the anode. (1 mark)

(b) Write the equation for the reaction at the anode. (1 mark)

(c) Give a reason why the electrolytic process is not carried out below 950°C. (1 mark)

(d) Give a reason why the production of aluminium is not carried out using reduction process. (1 mark)

(e) Give **two** reasons why only the aluminium ions are discharged. (2 marks)

(f) State **two** properties of duralumin that makes it suitable for use in aircraft industry. (2 marks)

(g) Name **two** environmental effects caused by extraction of aluminium. (2 marks)

The question required candidates to demonstrate understanding of the processes involved in the industrial production Aluminium. Writing of equations, stating uses of alloys aluminium and stating the problems associated with large production of Aluminium.

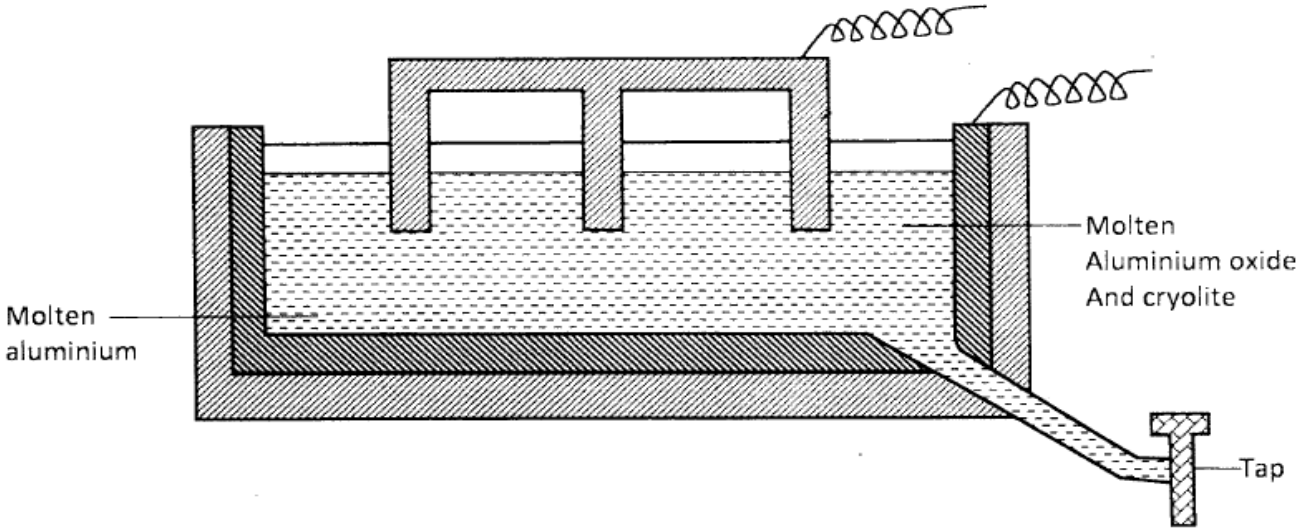
Weaknesses

Candidates did not;

1 Know the anode on the diagram
2 Write equations
3 Know the properties of duralumin
4 Know the problems caused by large scale production of Aluminium.

Chemistry is about production of materials. Students should be taught in detail the processes involved in the large scale production of common metals, fertilizers, detergents etc. This way they see the usefulness of studying chemistry which in turn leads to better understanding hence better performance in the subject. Reasons for each of the processes should be thoroughly articulated. Uses of the material produced should also be articulated. Problems associated with large scale production of goods must well known so that human beings can be able to take care of the themselves. Finally schools should organize trips to industrial plants so that they can see, touch, feel and thus get first hand experience in large scale production.

Expected response



(a) On the diagram

(b) $2O^{2-}_{(l)} \longrightarrow O_{2(g)} + 4e$

(c) Below 950 °C, the electrolyte is not in molten state.

(d) Aluminium is more reactive than carbon (coke) therefore the reduction process is not possible / carbon / carbon (II) oxide / coke cannot reduce Al_2O_3.

(e) - Aluminium is less reactive than Sodium $\therefore$ It is preferentially discharged.

- Al^{3+} ions are in higher concentration than Na^+.

(g) - Global warming due to production of CO_2 / F_2 pollution.

- Creation of gullies during excavation.

(f) - Light

- Strong