
**KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS**

**FRIENDS SCHOOL KAMUSINGA HIGH SCHOOL
CHEMISTRY
PAPER 2
TIME: 2 HOURS**

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**FRIENDS SCHOOL KAMUSINGA KCSE TRIAL AND
AND PRACTICE EXAM 2016
Paper 2**

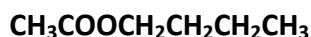
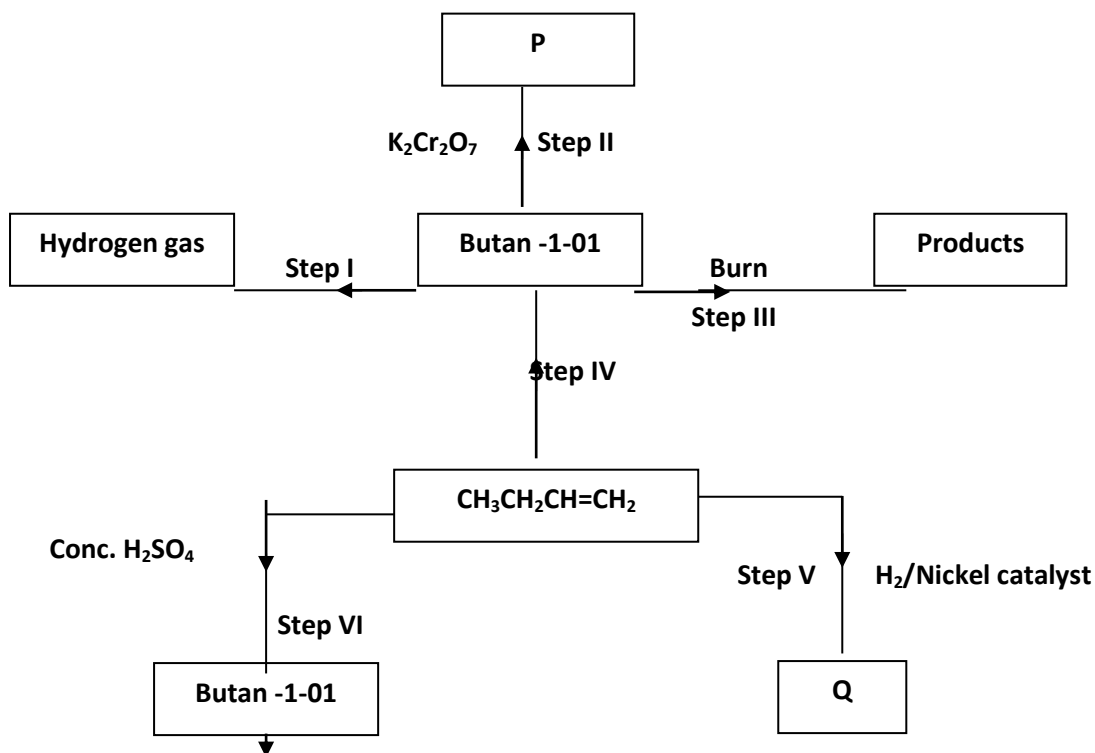
1. a) Study the information given below and answer the questions that follow.

Element	Atomic radius (nm)	Ionic radius (nm)	Formula of oxide	Melting point of oxide (°C)
P	0.364	0.421	A ₂ O	-119
Q	0.830	0.711	BO ₂	837
R	0.592	0.485	E ₂ O ₃	1466
S	0.381	0.446	G ₂ O ₅	242
T	0.762	0.676	JO	1054

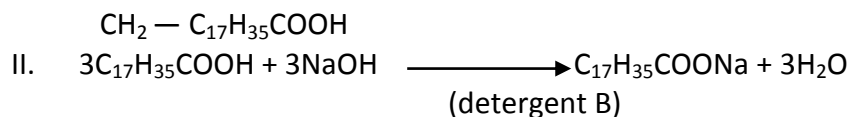
- (i) Which elements are non-metals? Give a reason. (2mks)
- (ii) Explain why the melting point of the oxide of R is higher than that of the oxide of S. (2mks)
- (iii) Give **two** elements that would react vigorously with each other. Explain your answer. (2mks)
- b) Study the information in the table below and answer the questions that follow (The letters do not represent the actual symbols of the elements)

		Ionization Energy_KJ/Mole	
Element	Electronic configuration	1 st I.E	2 nd I.E
A	2.2	900	1800
B	2.8.2	736	1450
C	2.8.8.2	590	1150

- (i) What chemical family do the elements A, B and C belong? (1mk)
- (ii) What is meant by the term ionization energy? (1mk)
- (iii) The 2nd ionization energy is higher than the 1st ionization energy of each. Explain (1mk)
- (iv) When a piece of element C is placed in cold water, it sinks to the bottom and an effervescence of a colourless gas that burns explosively is produced. Use a simple diagram to illustrate how this gas can be collected during this experiment. (3mks)
2. Use the information in the scheme below to answer the questions that follow.



- Name substance P (1mk)
- Give the structure and name of compound Q. (1mk)
- Write the equation for the chemical reaction in steps III (1mk)
- Name the reagents and conditions necessary for the reaction in
 - Step IV
Reagents (1mk)
Conditions (1mk)
 - Step VII
Reagents (1mk)
Conditions (1mk)
- What name is given to the reaction in step VII? (1mk)
- Below are **two** reactions showing how a long chained alkanolic acid can be converted into detergent B.



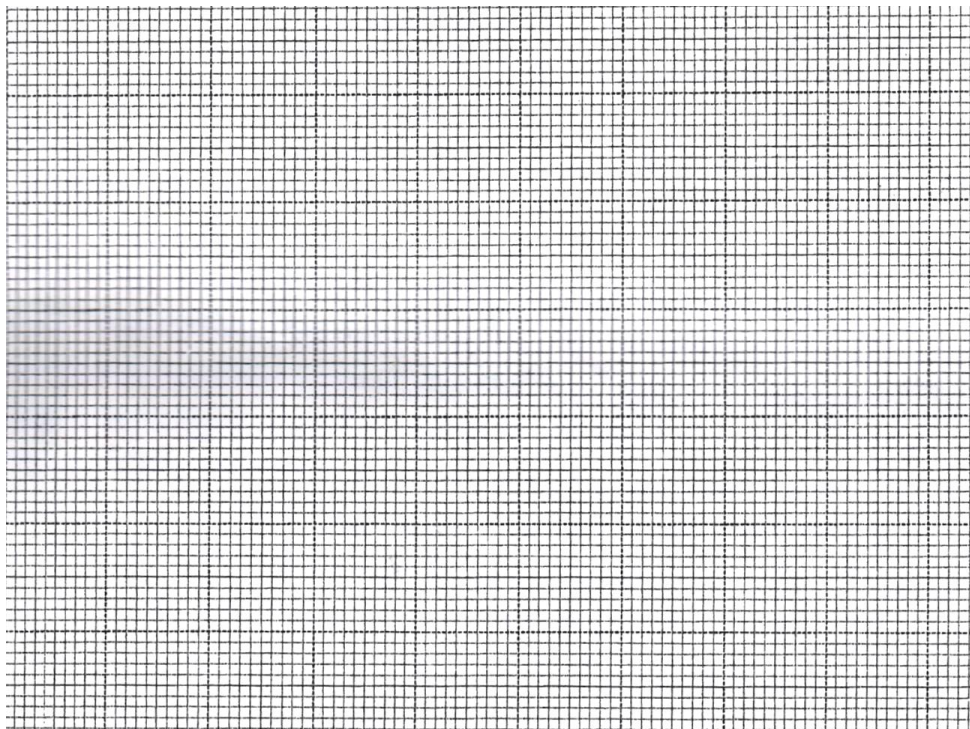
- Name the type of reaction in (2mks)
 - Give **one** disadvantage of using detergent B in washing clothes. (1mk)
3. 2.5g of a metal carbonate, MCO_3 was reacted with excess 2M nitric (v) acid, the volume of carbon (IV) oxide evolved measured and recorded at 10 second intervals. The results were recorded as shown in the table below.

volume of gas (cm ³)	0	90	150	210	280	305	390	450	480	480	480
Time in seconds	0	10	20	30	40	50	60	70	80	90	100

- (i) On the grid provided, plot a graph of volume (vertical axis) against time. Label it

as A

(3mks)

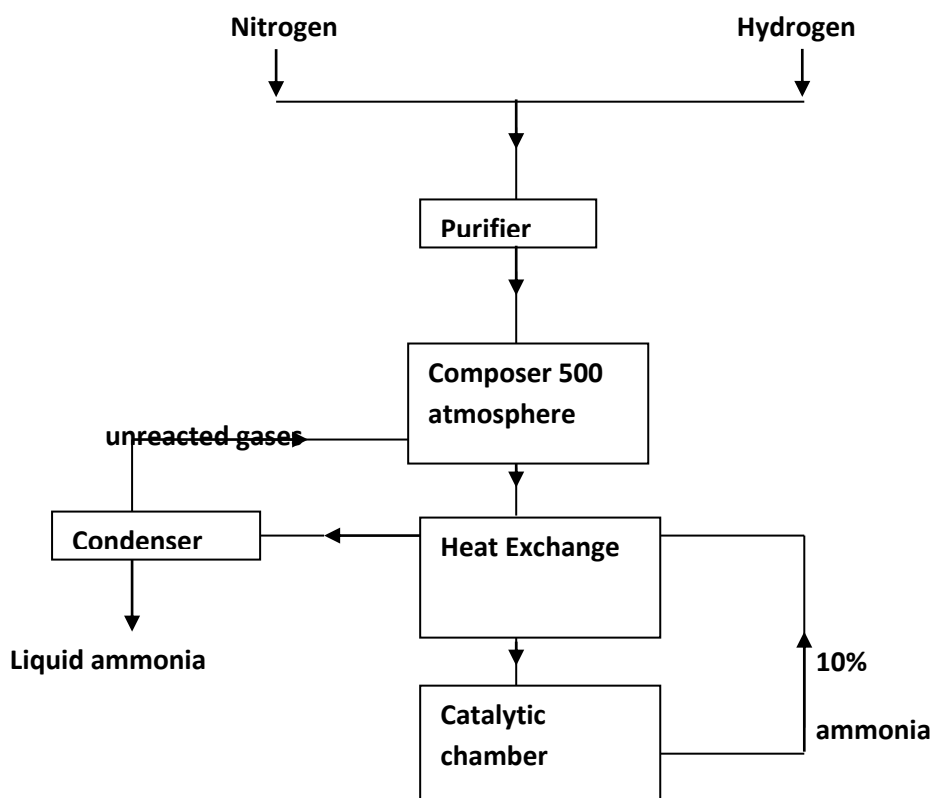


(ii) From your graph, determine the rate of reaction between 25 seconds and 40 seconds. (2 mks)

(iii) On the same grid, sketch a curve that would be obtained if the same experiment was repeated using excess IM Nitric (V) acid. Label it as B. (1 mk)

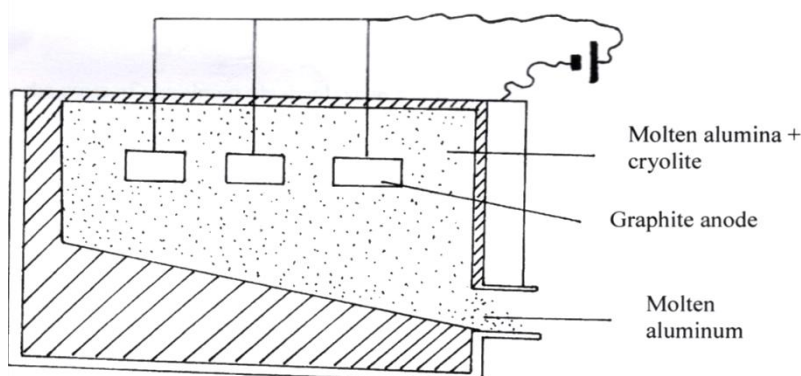
(iv) Given that carbon (IV) oxide was measured at room temperature and pressure, work out the relative atomic mass of metal M. (MGV = 24dm^3 , C 12, O = 16) (3mks)

4. The diagram below represents the Haber's process for the manufacture of ammonia. Study it and answer the questions that follow



- a) Name any **two** impurities removed by the purifier. (2mks)
- b) The catalyst used in the process is finely divided iron. Why iron is finely divided? (1mk)
- c) In the Haber's process the conversion of nitrogen and hydrogen into ammonia is only 10%.
The remaining unreacted gases are recycled. What is the advantage of recycling. (1mk)
- d) A part from iron catalyst and pressure of 500 atmospheres, name any other condition required for this process. (1mk)
- e) Give any **two** uses of ammonia (1mk)
- f) In the manufacture of nitric (V) Acid from ammonia and air of nitric (v) acid from ammonia and air, ammonia is catalytically oxidized to nitrogen (II) oxide
- (i) Name the catalyst used in the reaction (1mk)
- (ii) Write a balanced chemical equation for the reaction between ammonia and air. (1mk)
- (iii) State **one** environmental problem likely to be faced in an area where nitric (v) acid manufacturing plant is located. (1mk)
- g) (i) In the preparation of chlorine gas in a school laboratory, either manganese (IV) oxide or potassium manganate(VII) may be used on concentrated hydrochloric acid. State **one** advantage of potassium manganate (VII) over manganese(IV) oxide in this reaction. (1mk)
- (ii) State and explain what would be observed when dry litmus papers are dipped in a gas jar of chlorine. (2mks)
- (iii) Freshly prepared chlorine water bleaches but chlorine water exposed to sunlight for sometime does not bleach. Explain. (2mks)
- (iv) When preparing hydrogen chloride gas from sodium chloride and sulphuric (VI) acid, two conditions are necessary. State them. (1mk)

5. The diagram below shows industrial extraction of aluminum

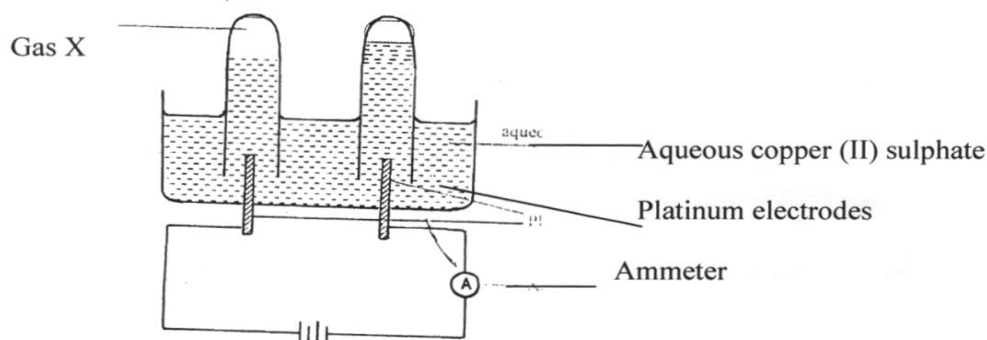


- a) Name and write the formulae of the major ore for this process. (1mk)
Name Formulae
- b) Write the equation of the reaction taking place at the:
- Anode (1mk)
- Cathode (1mk)
- c) Write the formula of the molten alumina. (1mk)
- d) State the role of cryolite added to molten alumina (1mk)
- e) It is cheaper to recycle aluminum other than to extract it. Explain. (1mk)
- f) Explain why graphite anodes must be replaced after some time. (1mk)
- g) State **one** property of aluminum that makes it suitable for wrapping food. (1mk)

h) Aluminum is high in the reactivity series yet it does not react with both acid and air. Explain. (1mk)

i) Calculate the mass of aluminum obtained when a current of 3A is passed through fused aluminum oxide for 4 hour 30 minutes, (Al=27, F=96500C) (2mks)

6. Aqueous copper (II) sulphate was electrolyzed using the set-up represented by the diagram below.



- a) (i) Name the gas X. (1mk)
(ii) Write an ionic equation for the reaction that produces gas X. (1mk)
- b) What happens to the pH of the electrolyte during electrolysis? Explain your answer. (2mks)
- c) If in the above set-up, copper electrodes were used instead of platinum electrodes.
i) Write the electrode half- equations for the reactions at the anode and the cathode. (2mks)

Anode:

Cathode:

- ii) What happens to the color of the electrolyte during electrolysis? Explain your answer. (2mks)
- d) An iron spoon is to be electroplated with silver. Draw a labeled diagram to represent the apparatus that could be used to carry out this process. (3mks)
- e) The table below shows the ammeter reading obtained when two different electrolytes of the same concentration were tested.

Electrolyte	Current (amps)
Copper (II) sulphate solution	4.0
Ethanoic acid	1.2

Why does ethanoic acid give a lower reading? (1mk)

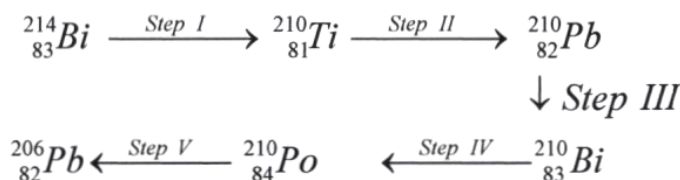
f) Use the information in the table below to answer the questions that follow.

Reaction	E^{\ominus} (volts)
$Zn^{2+}_{(aq)} + 2e^{-} \longrightarrow Zn_{(s)}$	-0.76
$Al^{3+}_{(aq)} + 3e^{-} \longrightarrow Al_{(s)}$	-1.66
$Fe^{3+}_{(aq)} + 3e^{-} \longrightarrow Fe_{(s)}$	-0.44

i) Write the cell representation of the cell made of aluminum and iron half-cells. (1mk)

7. (a) State **two** differences between chemical and nuclear reactions. (2mks)

(b) Below is a radioactive decay series starting from $^{214}_{83}Bi$ and ending at $^{206}_{82}Pb$. Study it and answer the questions that follow;



- (i) Identify the particles emitted in steps III and V (2mks)
- (ii) Write the nuclear equation for the reaction which takes place in Step I. (1mk)
- (c) (i) Define the term half— life. (1mk)
- (ii) 800g of a radioactive isotope decays to 50g in 100 days. Determine the half-life of this isotope. (2mks)
- (d) State **two** medical uses of radioactive isotopes. (1 mk)