

Name: Index No.

School: Candidate's Sign.

Date:

233/1
CHEMISTRY
PAPER 1
JULY/AUGUST-2011
TIME: 2 HOURS

MUMIAS DISTRICT JOINT EVALUATION EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

Chemistry
Paper 1

INSTRUCTIONS TO CANDIDATES:-

- Answer **all** the questions in the spaces provided in the question paper.
- All working **MUST** be clearly shown where necessary.
- KNEC Mathematical tables and electronic calculators may be used

For Examiner's Use Only

Question	Maximum score	Candidate's score
1-30	80	

This paper consists of 13 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

1. Aluminium oxide reacts with acids and alkalis

(a) Write an equation for the reaction between aluminium oxide and

(i) Dilute sulphuric (VI) acid

(1mk)

(ii) Sodium Hydroxide solution.

(1mk)

(iii) What property of aluminium oxide is shown by the reactions in a (i) and a (ii) above. (1mk)

2. Study the information in the table and answer questions that follow:

Isotope	Relative abundance %
${}_{31}^{69}\text{R}$	61.3
${}_{31}^{71}\text{R}$	38.7

(a) Determine the number of neutrons of ${}_{31}^{69}\text{R}$

(1mk)

(b) Calculate the relative atomic mass of element **R**.

(2mks)

3. The table below shows ammeter readings recorded when two equimolar solutions were tested separately.

Electrolyte	Current (A)
Dilute Sulphuric (VI) Acid	7.2
Ethanoic Acid	4.0

Explain the difference in the ammeter readings.

(1mk)

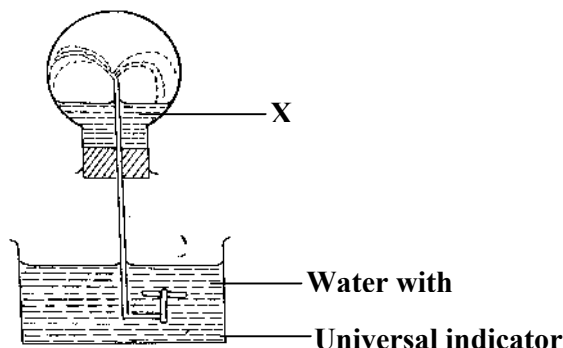
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4. The diagram below shows a fountain experiment using hydrogen chloride gas.



(a) State the property of hydrogen chloride gas that makes this experiment possible? (½ mk)

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(b) What would be observed in the flask X? (1mk)

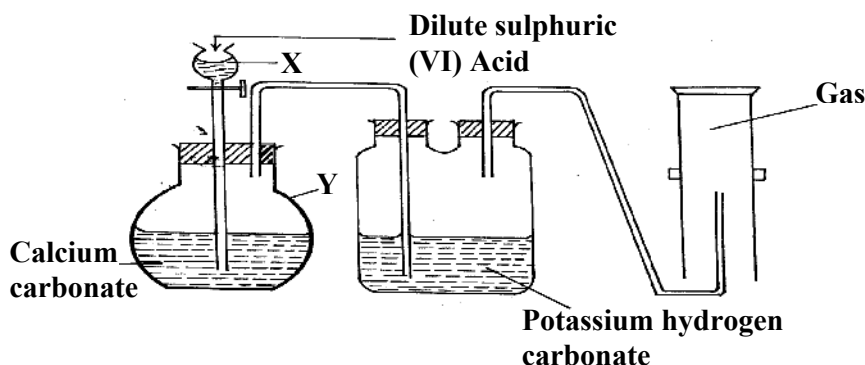
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5. 3.8 g of magnesium chloride was dissolved in distilled water. Lead (II) nitrate was added until in excess. Work out the number of chloride ions precipitated.

(Mg = 24, Cl = 35.5 Avogadro's constant = 6.0×10^{23}). (2mks)

6. A student set up the apparatus for the preparation of carbon (IV) oxide gas as shown below. Study the set up and answer the questions that follow.



(a) Explain using an equation why the reaction in apparatus Y occurs for a very short time then stops. (1mk)

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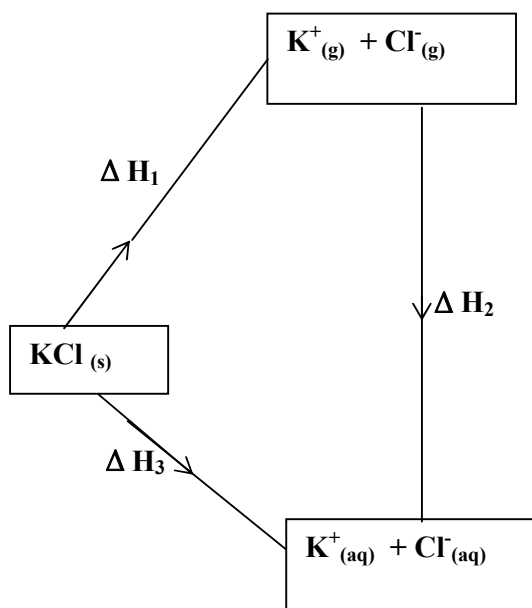
(b) What is the purpose of passing the gas through potassium hydrogen carbonate? (1mk)

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(c) **State and explain** why there is no sample of carbon (IV) oxide gas collected. (1mk)

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Use the information in the energy cycle diagram below and answer the questions that follow:



(i) State Hess's law (1mk)

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.....

(ii) Name the enthalpy changes represented by ΔH_1 and ΔH_3

ΔH_1 (1mk)

ΔH_3 (1mk)

8. The table below gives some experimental results on four samples of water. Use the information to answer the questions that follow:

Sample of water (50cm ³) each	Drops of soap needed to form lather	
	Before boiling	After boiling
A	25	15
B	8	8
C	18	8
D	25	25

- (a) Which sample (s) contains permanent hardness? Explain. (1mk)

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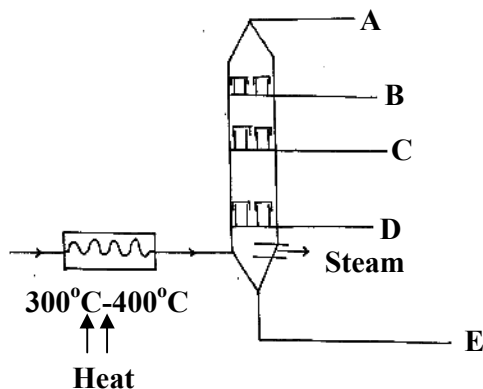
- (b) Which samples are likely to contain calcium hydrogen carbonate. Explain. (1mk)

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9. The diagram below represents the products of industrial fractional distillation of crude oil.



The table below gives major constituents of crude oil. Study it and the diagram above and answer the questions that follow:

Constituents	Boiling point (°C)
Gases	Below 40
Petrol	40-175
Kerosene	175-250
Diesel	350-400
Bitumen	Above 400

(a) Which fraction corresponds to:

(2 ½ mks)

A.....

B.....

C.....

D.....

E.....

(b) Give one use of E

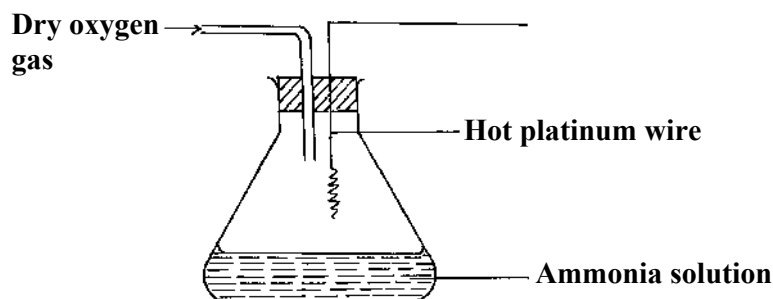
(1mk)

10. 5.27g of 1- chloropropanoic acid, $\text{ClCH}_2\text{CH}_2\text{COOH}$ were dissolved in distilled water to make 500cm^3 of solution. 25cm^3 of the acid solution required 25cm^3 of 0.1M potassium hydroxide solution for complete neutralization.

(i) Write an equation for the reaction between potassium hydroxide solution and 1-chloropropanoic acid (1mk)

(ii) Calculate the concentration of 1-chloropropanoic acid in moles per dm^3 (2mks)

11. A student set up the following apparatus to investigate what happens when a hot platinum wire is dipped into a conical flask containing a concentrated solution of ammonia as shown below:



(a) State the observation made. (1mk)

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(b) Explain why the platinum wire remains hot although there is no heating. (1mk)

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12. (a) What condition is necessary for a dynamic equilibrium to be established. (1mk)

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(b) When lead (II) carbonate is heated the equilibrium shown below is established



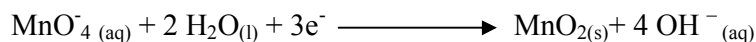
How would the position of the equilibrium be affected if a small amount of dilute nitric (V) acid is added to the equilibrium mixture. Explain. (2mks)

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13. Potassium manganate (VII) reacts with water under alkaline conditions as per the equation below:



(a) What are the oxidation states of manganese before and after the reaction?

Before the reaction (1mk)

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After the reaction (1mk)

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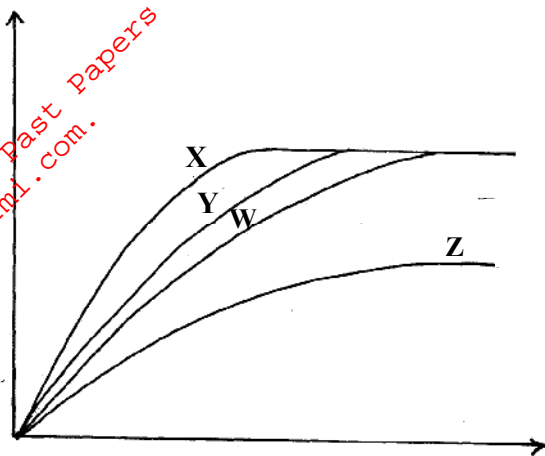
(b) What process has the manganese undergone in this reaction (1mk)

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14. Below is data on some experiments A, B and C. Study the information given carefully then answer the questions that follow:

Experiment	Mass of calcium carbonate (g)	Volume of HCl(aq) Used (cm ³)	Concentration of HCl (mol dm ⁻³)
T	2.0	60	1.0
U	2.0	40	2.0
V	1.5	40	0.5

Graphs of the results.



Which graph corresponds to:

Experiment T

(½ mk)

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Experiment U

(½ mk)

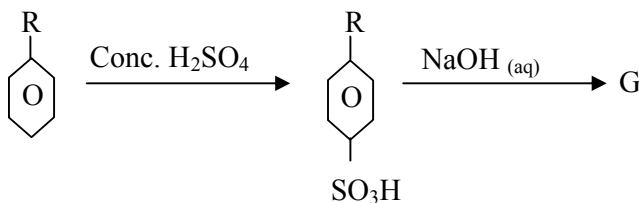
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Experiment V

(½ mk)

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15. The scheme below represents the manufacture of a cleansing agent G



(i) Draw the structure of substance G

(1mk)

(ii) Name the class of cleansing agent to which G belongs.

(1mk)

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(iii) State one advantage of the above cleansing agent.

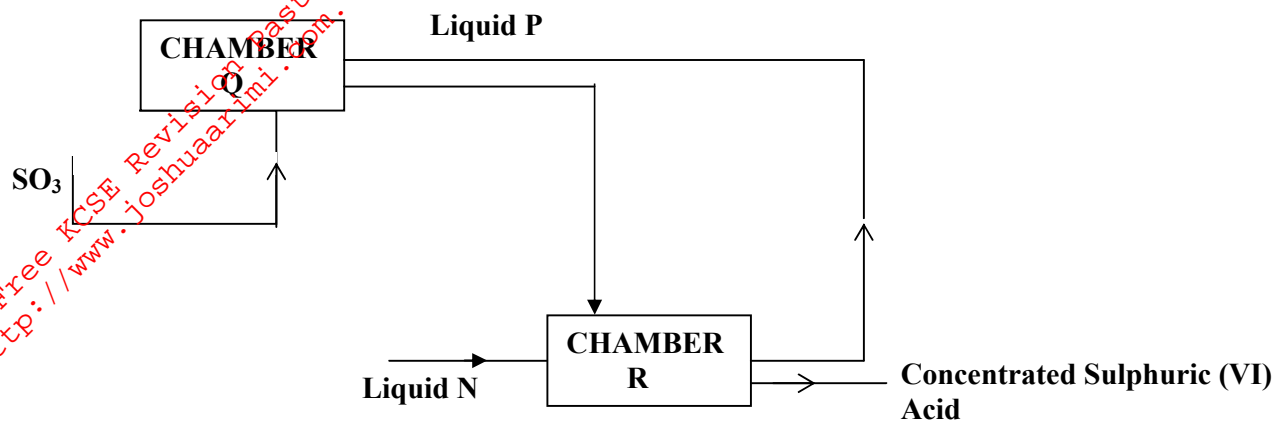
(1mk)

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16. Below is part of the flow diagram of the contact process.



(a) Identify (i) Liquid P (1mk)

(ii) Liquid N (1mk)

(b) Write the equation for the reaction taking place in chamber R. (1mk)

17. The solubility of potassium nitrate is 155g/100g of solvent at 80°C and 38g/100g of solvent at 25°C. What mass of potassium nitrate will crystallize out if 50g of its saturated solution at 80°C was cooled to 25°C. (3mks)

18. Study the information in the table below and answer the questions that follow.

Element	Atomic number	Boiling Point (°C)	Atomic radii (nm)
L	19	1047	0.231
M	13	2743	0.126
N	17	238	0.099
P	11	1163	0.158
Q	16	718	0.104

(a) Identify the elements with similar chemical properties. Explain. (2mks)

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(b) What type of structure is exhibited by the compound formed when elements **N** and **P** react? (1mk)

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19. Gas **B** takes 110 seconds to diffuse through a porous pot, how long will it take for the same amount of ammonia gas to diffuse under the same conditions of temperature and pressure? (2mks)
Relative Molecular mass of **B**= 34, relative molecular mass of Ammonia = 17)

20. (a) What is paper chromatography? (1mk)

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(b) Give **two** application of chromatography. (2mks)

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21. Below are pH values of four types of medicine represented by letters **P**, **Q**, **R** and **S**.

Medicine	pH values
P	7.0
Q	5.0
R	8.0
S	6.0

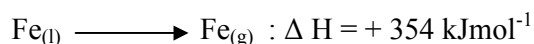
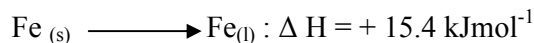
(a) It is not advisable to use **S** when a patient has indigestion. Explain (1mk)

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(b) Give **two** harmful effects of smoking tobacco on the Kenyan youths. (2mks)

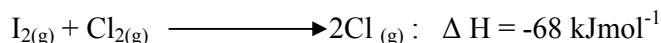
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22. (a) The equation below represents changes in the physical states of Iron Metal.



Calculate the amount of heat energy required to change 10.5kg of solid iron to gaseous iron. (2mks)

(b) Iodine can react with chlorine as shown below;



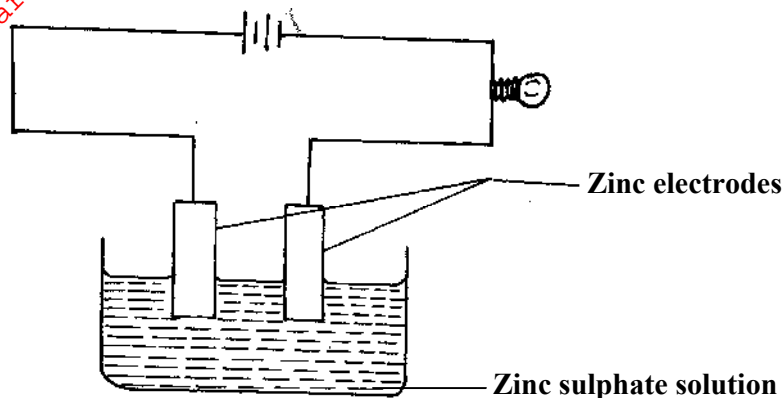
Determine the molar enthalpy change for this reaction.

(1mk)

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23. Study the diagram below and answer the questions that follow:

REDRAW



(a) Write equations for the reactions that occur when the switch S is closed for 30 minutes at; (2mks)

Anode

Cathode

(b) Comment on the concentration of the electrolyte after 30 minutes. (1mk)

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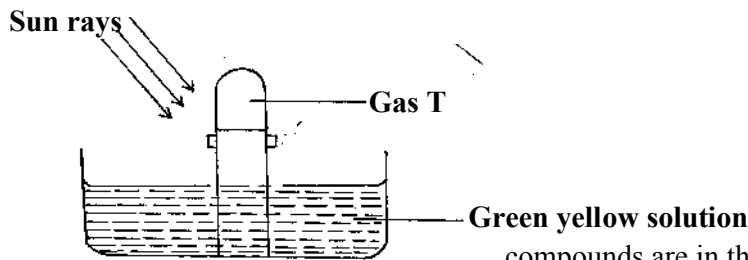
24. 3g of ^{257}Lr whose half-life is 8 seconds remains after undergoing radioactive decay for 32 seconds.

Find the original amount of the substance.

(2mks)

25. Chlorine gas was bubbled through water for sometime. The green yellow solution formed was poured into along glass tube and placed in the sun as shown in the diagram below:

REDRAW



(a) What

compounds are in the yellow solution?

(1mk)

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(b) Write an equation to show how gas T is formed. (1mk)

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(c) Write an ionic equation between chlorine and aqueous Iron (II) Chloride solution. (1mk)

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26. Describe how a pure sample of Lead (II) Chloride can be prepared using the following reagents:
Solid Lead (II) carbonate, dilute hydrochloric acid, Distilled water, Dilute nitric (v) acid. (2mks)

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27. During extraction of copper metal, the ore from which copper is got undergoes processes that include.

(i) Crushing of ore.

(ii) Mixing of crushed ore with oil and water and bubbling air through it.

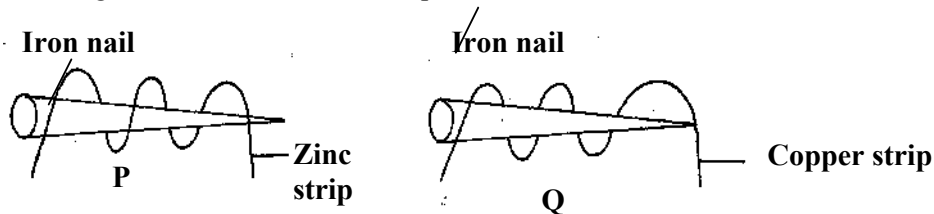
(a) Name the process in (ii) above (1mk)

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(b) What is the purpose of the process (a) above? (1mk)

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(c) Bronze is an alloy of copper and another metal. Identify the other metal and give one use of bronze. (1mk)

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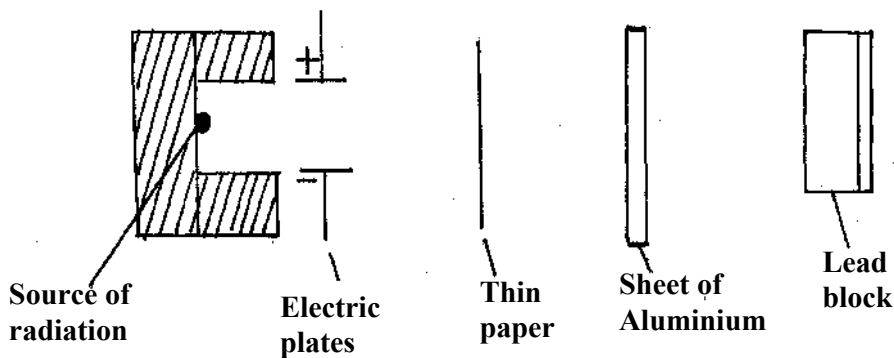
28. Use the diagram below to answer the questions that follow.



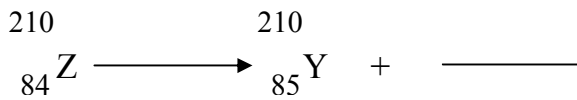
In which set-up will the iron-nail rust? Explain. (2mks)

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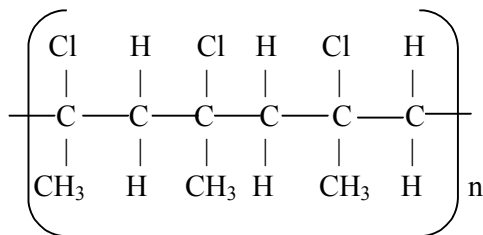
29. (a) Complete the diagram below to show how Alpha(α) particles, beta(β) particles and Gamma (γ) rays are emitted from radioactive source can be distinguished from each other label your diagram clearly. (2mks)



- (b) The following represents a nuclear equation. Balance the equation:



30. The structure below represents a polymer used in the manufacture of toys.



- (i) Draw and name the structure of the monomer. (1mk)

- (ii) Name the type of polymerization that occurs when forming the polymer. (1mk)

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