

Name..... Index Number...../.....

Candidate's Signature.....

233/1
CHEMISTRY
 Paper 1
THEORY
 Oct./Nov. 2012
 2 hours

Date.....



THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
CHEMISTRY
 Paper 1
THEORY
 2 hours

233/1 - Chemistry - P1	
Tuesday	8.00am - 10.00 am
13/11/12	1 st Session

Instructions to candidates

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) Answer all the questions in the spaces provided in the question paper.
- (d) Mathematical tables and silent electronic calculators may be used.
- (e) All working **MUST** be clearly shown where necessary.
- (f) **This paper consists of 16 printed pages.**
- (g) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

For Official Use Only

Questions	Maximum Score	Candidate's Score
1 - 29	80	

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CHEMISTRY
 Paper 1

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1 Charcoal is a fuel that is commonly used for cooking. When it burns it forms two oxides.

(a) Name the **two** oxides. (2 marks)

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.....

(b) State **one** use of any of the two oxides. (1 mark)

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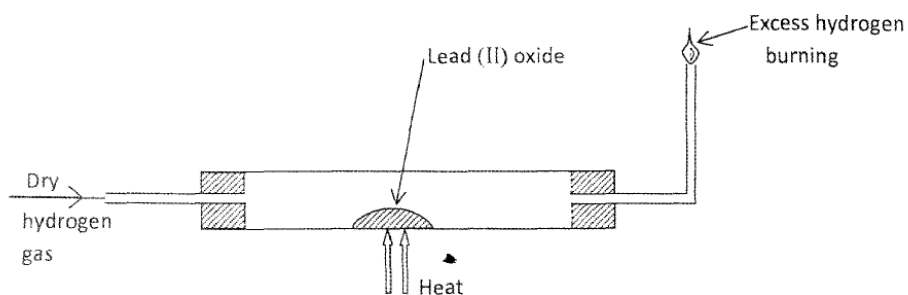
2 Iron (III) oxide was found to be contaminated with copper (II) sulphate. Describe how a pure sample of iron (III) oxide can be obtained. (3 marks)

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3 In an experiment, dry hydrogen gas was passed over heated Lead (II) Oxide as shown in the diagram below.



State and explain the observations made in the combustion tube. (3 marks)

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- 4 The table below shows properties of some elements **A**, **B**, **C** and **D** which belong to the same period of the periodic table. The letters are not the actual symbols of the elements.

Element	A	B	C	D
Mp ($^{\circ}\text{C}$)	1410	98	-101	660
Atomic radii (nm)	0.117	0.186	0.099	0.143
Electrical conductivity	Poor	Good	Non conductor	Good

- (a) Arrange the elements in the order they would appear in the period. Give a reason. (2 marks)

.....

- (b) Select the metallic element which is the better conductor of electricity. Give a reason. (1 mark)

.....

- 5 A sample of water in a beaker was found to boil at 101.5°C at 1 atmospheric pressure. Assuming that the thermometer was not faulty, explain this observation. (1 mark)

.....

- 6 Study the information in the table below and answer the questions that follow:

Salt	Solubility (g/100g water)	
	at 40°C	at 60°C
CuSO ₄	28	38
Pb(NO ₃) ₂	79	98

A mixture containing 35g of CuSO₄ and 78g of Pb(NO₃)₂ in 100g of water at 60°C was cooled to 40°C.

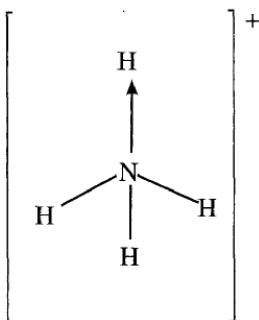
- (a) Which salt crystallised out? Give a reason (2 marks)

.....

- (b) Calculate the mass of the salt that crystallised out. (1 mark)

.....

- 7 Ammonium ion has the following structure:



Label on the structure:

- (a) covalent bond; (1 mark)
- (b) coordinate (dative) bond. (1 mark)

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- 8 10cm^3 of concentrated sulphuric (VI) acid was diluted to 100cm^3 . 10cm^3 of the resulting solution was neutralised by 36cm^3 of 0.1M sodium hydroxide solution. Determine the mass of sulphuric (VI) acid that was in the concentrated acid (S = 32.0; H = 1.0; O = 16.0). (3 marks)

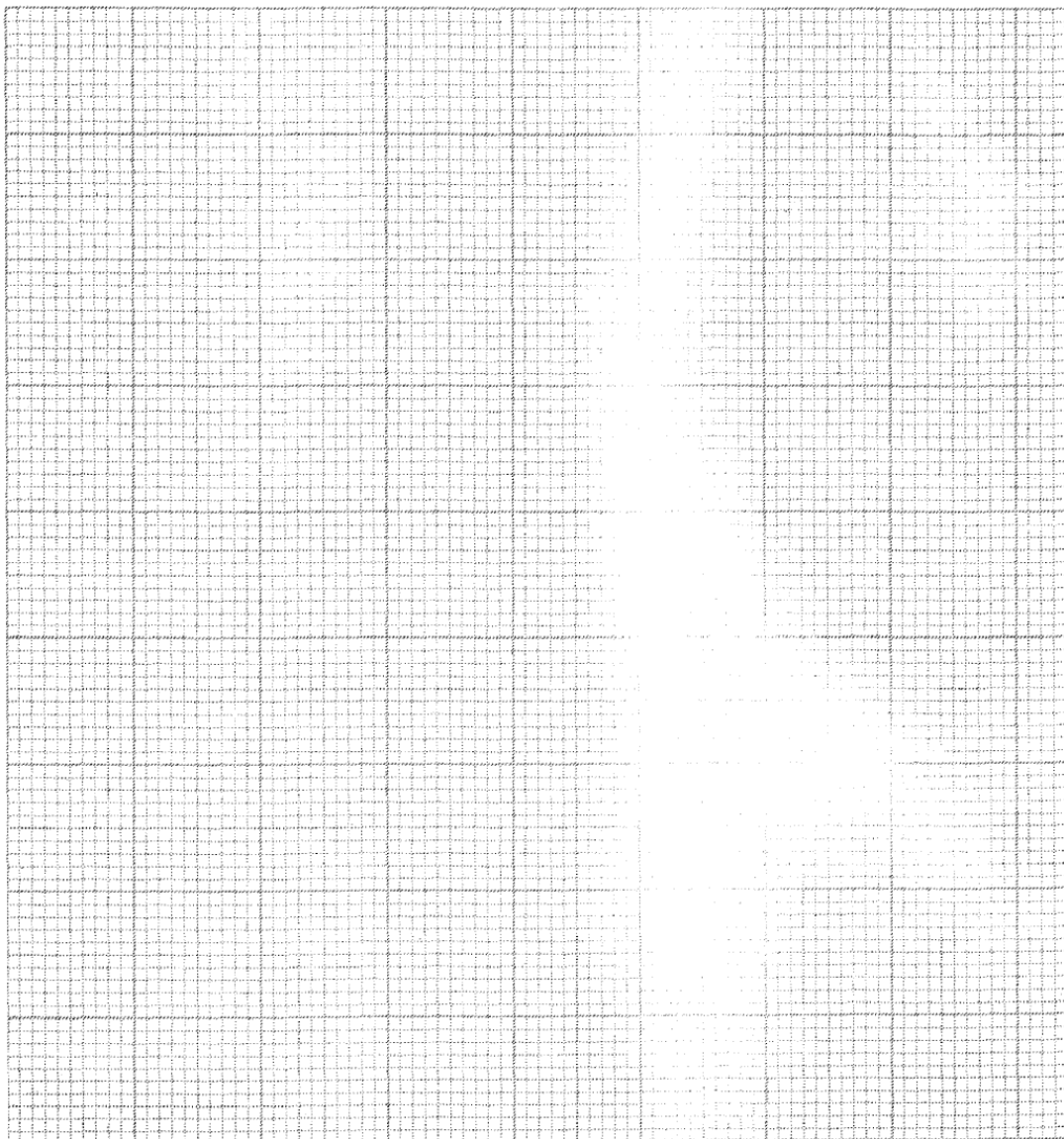
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- 9 120g of iodine - 131 has a half life of 8 days and decays for 32 days. On the grid provided, plot a graph of the mass of iodine - 131 against time. (3 marks)



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- 10 (a) Name **two** cations that are present in hard water. (1 mark)

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- (b) Explain how the ion exchange resin softens hard water. (2 marks)

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- 11 The empirical formula of A is CH_2Br . Given that 0.470g of A occupies a volume of 56cm^3 at 546K and 1 atmospheric pressure, determine its molecular formula.
(H = 1.0, C = 12.0, Br = 80.0, molar gas volume at STP = 22.4 dm^3). (3 marks)

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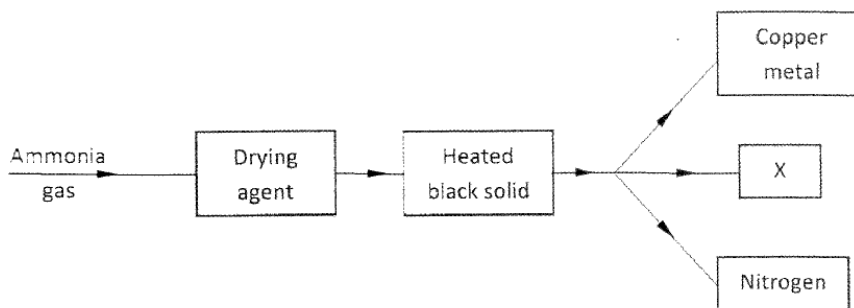
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- 12 Study the flow chart below and answer the questions that follow.



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- (a) Name a suitable drying agent for ammonia. (1 mark)

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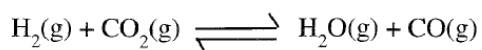
- (b) Describe one chemical test for ammonia. (1 mark)

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.....

- (c) Name X. (1 mark)

.....
.....

- 13 A dynamic equilibrium is established when hydrogen and carbon (IV) oxide react as shown below:



What is the effect of adding powdered iron catalyst on the position of the equilibrium?

Give a reason. (2 marks)

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- 14 Distinguish between ionisation energy and electron affinity of an element. (2 marks)

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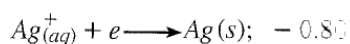
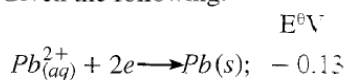
- 15 Below is a representation of an electrochemical cell.



- (a) What does // represent? (1 mark)

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- (b) Given the following:



- Calculate the E.M.F of the electrochemical cell. (2 marks)

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16 Use the following information on substances S, T, V and hydrogen to answer the questions that follow:

- (i) T displaces V from a solution containing V ions.
 (ii) Hydrogen reacts with the heated oxide of S but has no effect on heated oxide of V.

(a) Arrange substances S, T, V and hydrogen in the order of increasing reactivity. (2 marks)

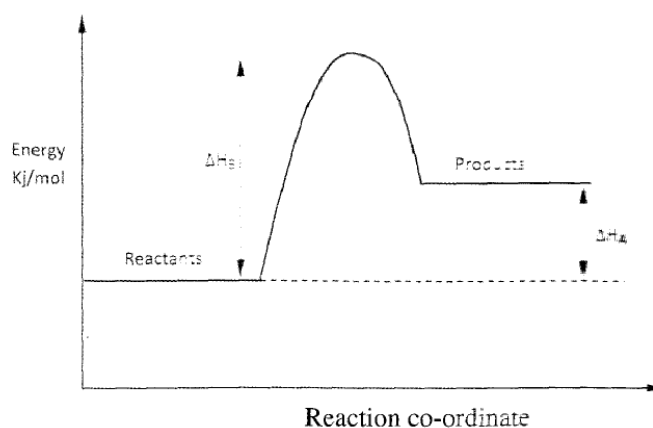
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(b) If T and V are divalent metals, write an ionic equation for the reaction in (i) above. (1 mark)

.....

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17 Study the energy level diagram below and answer the questions that follow.



(a) Give the name of ΔH_A . (1 mark)

.....

(b) How can ΔH_B be reduced? Give a reason. (2 marks)

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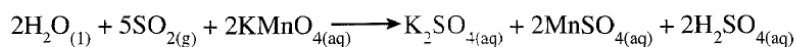
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- 18 Acidified potassium manganate (VII) solution is decolourised when sulphur (IV) oxide is bubbled through it. The equation for the reaction is given below.



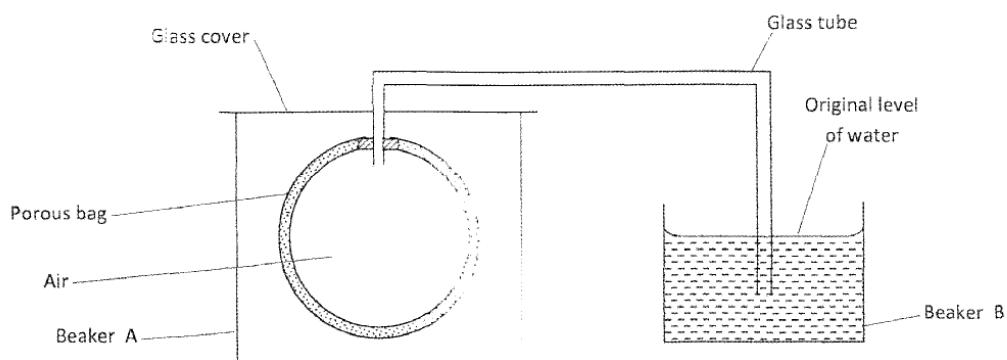
- (a) Which reactant is oxidised? Explain. (2 marks)

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- (b) Other than the manufacture of sulphuric (VI) acid, state one other use of sulphur (IV) oxide. (1 mark)

.....

- 19 The set up shown below was used to investigate a property of hydrogen gas.



- State and explain the observation that would be made in the glass tube if beaker A was filled with hydrogen gas. (3 marks)

.....

20 Draw and name the isomers of pentane. (3 marks)

.....
.....

21 Give **two** uses of the polymer polystyrene. (1 mark)

.....
.....

22 Aluminium is both malleable and ductile.

(a) What is meant by?

(i) malleable; (1 mark)

.....
.....

(ii) ductile. (1 mark)

.....
.....

(b) State **one** use of aluminium based on:

(i) malleability ($\frac{1}{2}$ mark)

.....
.....

(ii) ductility ($\frac{1}{2}$ mark)

.....
.....

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.....
.....

(ii) ductility ($\frac{1}{2}$ mark)

.....
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- 23 Describe how the percentage by mass of copper in copper carbonate can be determined. (3 marks)

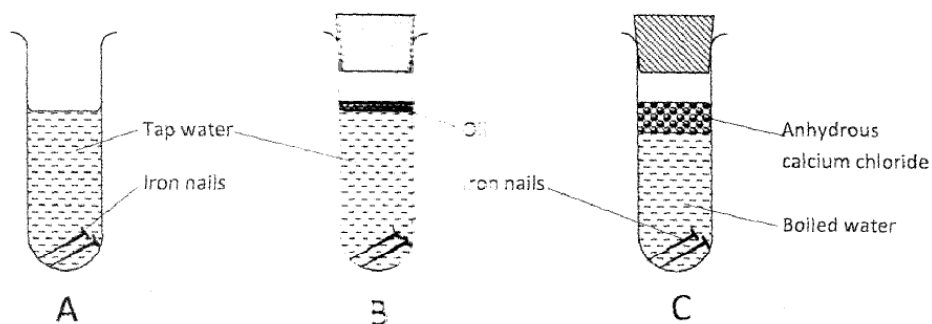
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- 24 The following set up of three test-tubes was used to investigate rusting of iron. Study it and answer the questions that follow.



- a Give a reason why rusting did not occur in test-tube C. (1 mark)

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- (b) Aluminium is used to protect iron sheets from rusting. Explain **two** ways in which aluminium protects iron from rusting. (2 marks)

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- 25 Describe how a solid sample of potassium sulphate can be prepared starting with 200cm³ of 2M potassium hydroxide. (3 marks)

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- 26 Describe **two** chemical tests that can be used to distinguish ethanol from ethanoic acid. (3 marks)

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- 27 (a) The electronic arrangement of the ion of element Q is 2.8.8. If the formula of the ion is Q³⁻, state the group and period to which Q belongs.

Group: (½ mark)

.....

Period: (½ mark)

.....

- (b) Helium, neon and argon belong to group 8 of the periodic table. Give:

(i) the general name of these elements; (1 mark)

.....

(ii) one use of these elements. (1 mark)

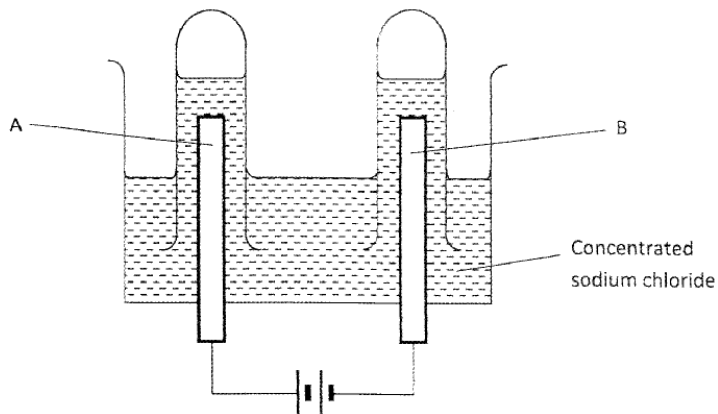
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- 28 The apparatus shown in the diagram below were used to investigate the products formed when concentrated sodium chloride was electrolysed using inert electrodes.



- (a) Write the equation for the reaction that takes place at electrode A. (1 mark)

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- (b) If the concentrated sodium chloride was replaced with dilute sodium chloride, what product would be formed at electrode A? Explain. (2 marks)

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