

Name.....

Index No...../.....

School.....

Candidates Signature.....

Date

233/1

CHEMISTRY

Paper 1

July/August 2009

2 Hours

KIRIMA JOINT EVALUATION TEST - 2009

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

233/1

CHEMISTRY

Paper 1

July/August 2009

2 Hours

Instructions to candidates

- Answer **all** questions in the spaces provided
- Mathematical tables and electronic calculators may be used for calculations
- **All** working must be clearly shown where necessary

FOR EXAMINER'S ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1-26	80	

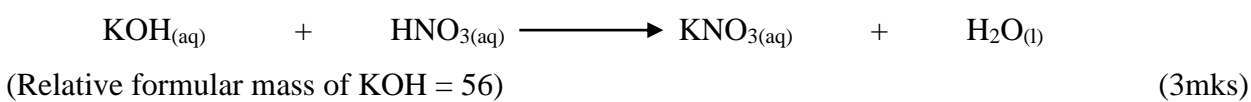
*This paper consists of 12 printed pages .Candidates should check the question paper to
Ensure that all the pages are printed as indicated and no questions are missing*

1. A warm red phosphorus was lowered to a gas jar of chlorine using a deflagrating spoon
- (i) State one observation made in this experiment (1mk)
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- (ii) Identify the substances formed in the above reaction (1mk)
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2. Explain the following observations:
- (a) When Lead (II) carbonate reacts with dilute hydrochloric acid, very little carbon (IV) is produced. (2mks)
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- (b) When hydrogen chloride gas is dissolved in water, the solution formed turns blue litmus paper red but there is no effect on blue litmus paper, when the gas is dissolved in carbon tetra chloride (CCl₄) (2mks)
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3. D grams of potassium hydroxide were dissolved in distilled water to make 100cm³ of solution 50cm³ of the solution required 50cm³ of 2.0M nitric acid for complete neutralization. Calculate the mass D of potassium hydroxide.



4. Element A has atomic mass 23 and element B has atomic mass 7 and also have 12 neutrons and 4 neutrons respectively.

(a) Write the electron arrangement of A and B (2mks)

(b) Which element has higher ionization energy? Explain (2mks)

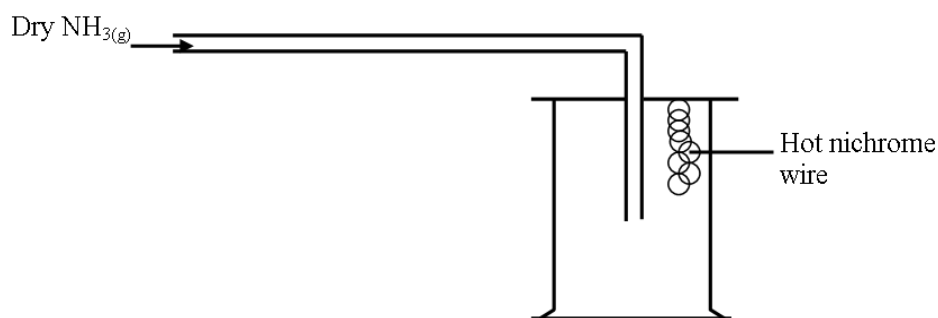
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5. Determine the oxidation number of the underlined elements in the following species

(a) $\underline{\text{Cl}}\text{O}_3^-$ (1mk)

(b) $\underline{\text{S}}_2\text{O}_8^{2-}$ (1mk)

6. The apparatus below was a set – up to show the catalytic oxidation of ammonia. Study the diagram and answer the questions that follow.



(i) Write an equation for the reaction that takes place in the gas jar (1mk)

(ii) Why is it necessary to have a hot nichrome wire in the gas jar (1mk)

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(iii) Write the formula of the complex ion formed when excess ammonia gas is passed through a solution containing Zn^{2+} ions (1mk)

7. (a) Name two chief ores of aluminium metal (2mks)

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(b) Solid aluminium oxide doesn't conduct electricity. Explain how its made to conduct electricity, during the electrolytic extraction of aluminium in Hall process. (1mk)

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8. Use the bond energy value given below for questions that follows

Bond	Bond energy (KJmol ⁻¹)
H – H	432
C = C	610
C – C	346
C – H	413

Determine the enthalpy change for the conversion of butene to butane by hydrogen. (3mks)

9. Study the information below and answer the following questions. A mixture contains three solids A, B and C. The solubility of these solids in different liquids is as shown below

	Water	Alcohol	Ether
A	Soluble	Insoluble	Insoluble
B	Insoluble	Soluble	Very soluble
C	Soluble	Soluble	Insoluble

Explain how you will obtain sample C from the mixture (3mks)

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10.

Sample of water	Volume of soap used before boiling (cm ³)	Volume of soap used after boiling (cm ³)
A	30	10
B	30	30

(a) Name the type of water hardness in sample A. Explain (2mks)

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(b) Name the cations that cause water hardness (1mk)

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11. Name the process which takes place when

(i) Iodine changes directly from solid to gas (1mk)

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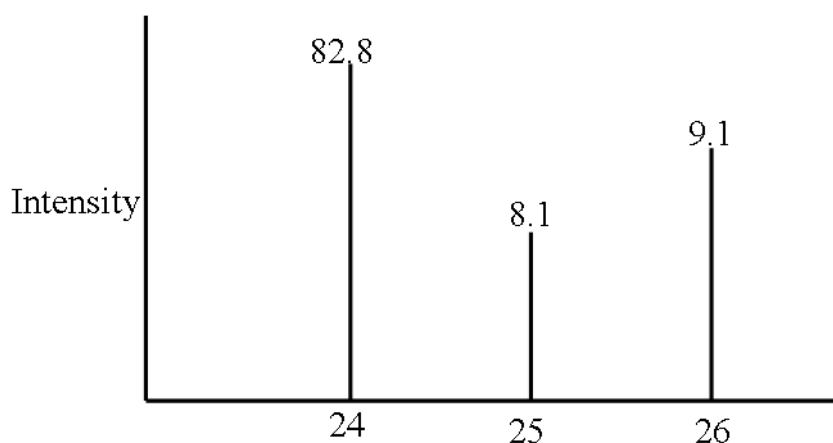
(ii) Fe²⁺_(aq) changes to Fe³⁺_(aq) (1mk)

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(iii) White sugar changes to black solid when mixed with excess concentrated sulphuric acid. (1mk)

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12. The peaks below show the mass spectrum of element Q.



Calculate the relative atomic mass (R.A.M) of Q (3mks)

13. A green solid D was heated until there was no further change. The following observations were made.

- (i) A colourless liquid condensed on the cooler parts of the test tube
- (ii) A colourless gas which turns acidified potassium dichromate (VI) green was formed
- (iii) Red-brown residue S was left

(a) Give the identity of solid D (1mk)

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(b) How can you identify the colourless liquid (1mk)

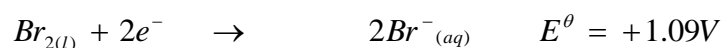
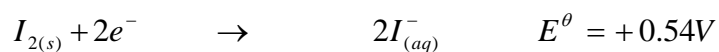
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(c) Name the residue S (1mk)

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14. A sample of unknown compound gas X is shown by analysis to contain sulphur and oxygen. The gas requires 28.3 seconds to diffuse through a small aperture into a vacuum. An identical number of oxygen molecules pass through the same aperture in 20 seconds. Determine the molecular mass of gas X. (O =16, S = 32) (3mks)

15. You are given the following half equations



(a) Write an overall equation for the cell reaction (1mk)

(b) Calculate the E^{θ} value of the cell (1mk)

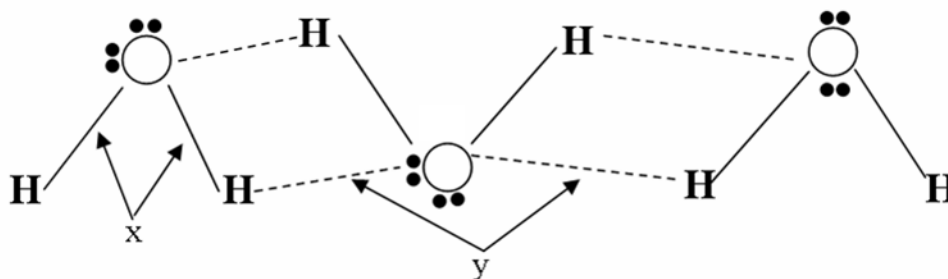
(c) Name the oxidizing agent (1mk)

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(d) What type of reaction takes place above? (1mk)

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16. The diagram below shows a structure of water molecules.



(a) Name the bonds (1mk)

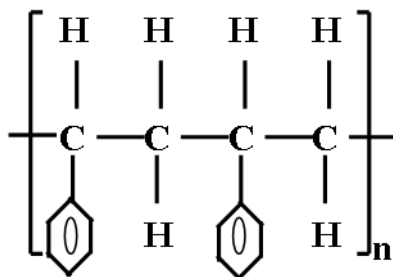
X

Y

(b) Using dot (•) and cross (×) diagram, show the bonding in the compound phosphonium ion

PH_4^+ (P = 15.0, H = 1.0) (2mks)

17. The formula given below represent a portion of a polymer.



(a) Give the name of the polymer (1mk)

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- (b) Draw the structure of the monomer used to manufacture the polymer (1mk)

18. Solutions can be classified as acids, bases or neutral. The table below shows solutions and their pH values.

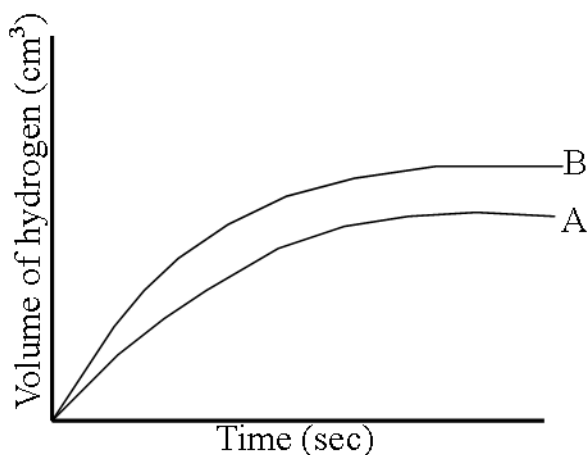
Solutions	pH values
K	1.5
L	7.0
M	14.0

- (i) Select any pair that would react to form a solution of pH 7 (1mk)

- (ii) Identify two solutions that would react with aluminium hydroxide. Explain (2mks)

19. Two experiments were carried out as follows and the volume of hydrogen gas evolved measured at intervals of 10 seconds for 100 seconds

- (i) 8cm of magnesium ribbon was added to 1M hydrochloric acid.
(ii) 8cm of magnesium ribbon was added 0.5M hydrochloric acid.
Graphs of volume of hydrogen evolved against time were plotted.



(a) Which of the graph was obtained for reaction (i)? Explain (2mks)

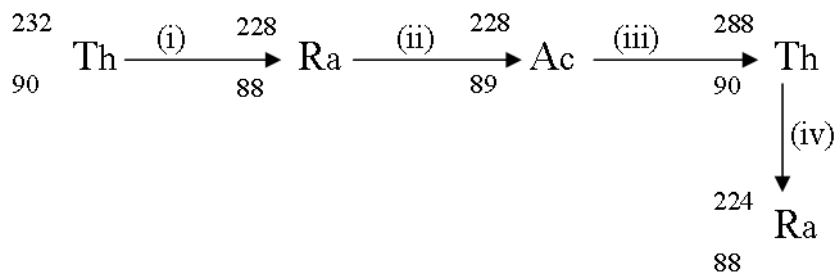
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(b) Explain the general shape of the graphs (1mk)

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20. An element Q has a relative atomic mass of 88. When a current of 0.5 amperes was passed, through the fused chloride of Q for 32 minutes and 10 seconds, 0.44g of Q were deposited at the cathode. Determine the charge on an ion of Q (1 Faraday = 96500) (3mks)

21. Below is part of the Thorium decay series.



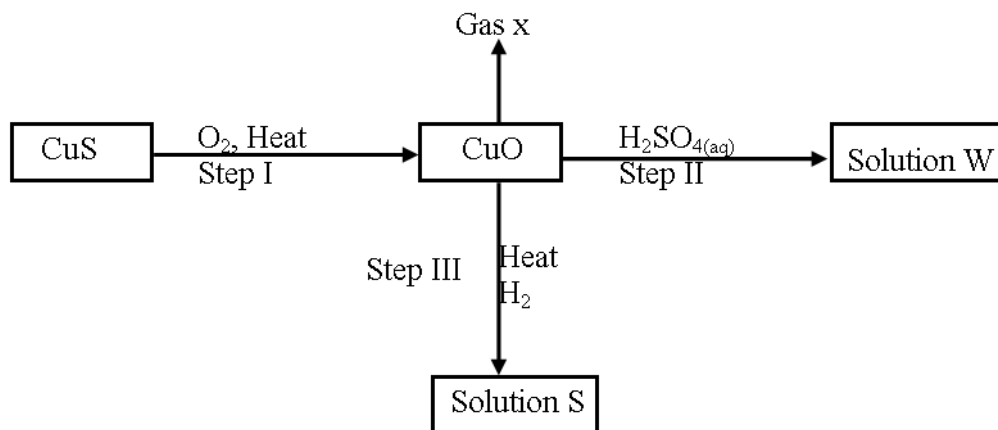
(i) Write an overall nuclear equation for the conversion of ${}^{232}_{90}\text{Th}$ to ${}^{224}_{88}\text{Ra}$ (1mk)

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(ii) Give any two commercial uses of radio isotopes (2mks)

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22. Study the flow chart below and answer the questions that follow



(a) Name

(i) Gas X (1mk)

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(ii) Solution W (1mk)

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(iii) Solid S (1mk)

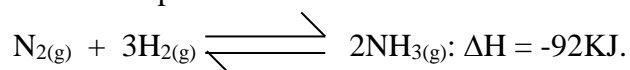
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(b) (i) Name the process that takes place in step III (1mk)

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(ii) Write an ionic equation for the formation of solution W (1mk)

23. Ammonia gas is manufactured by reacting nitrogen and hydrogen under the following conditions; a temperature of 450⁰C, a pressure of 200 atmospheres and finely divided iron catalyst. The reaction that takes place is:



(a) How would the yield be affected by increasing the temperature to 650⁰C? Give a reason (2mks)

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(b) Give two uses of ammonia (2mks)

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24. (a) Starting from Calcium carbonate, describe how solid sample of calcium sulphate can be prepared. (2mks)

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(b) Give one use of calcium sulphate (1mk)

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25. (a) Apart from iron ore (haematite), name two other raw materials fed into the blast furnace in the extraction of iron metal. (2mks)

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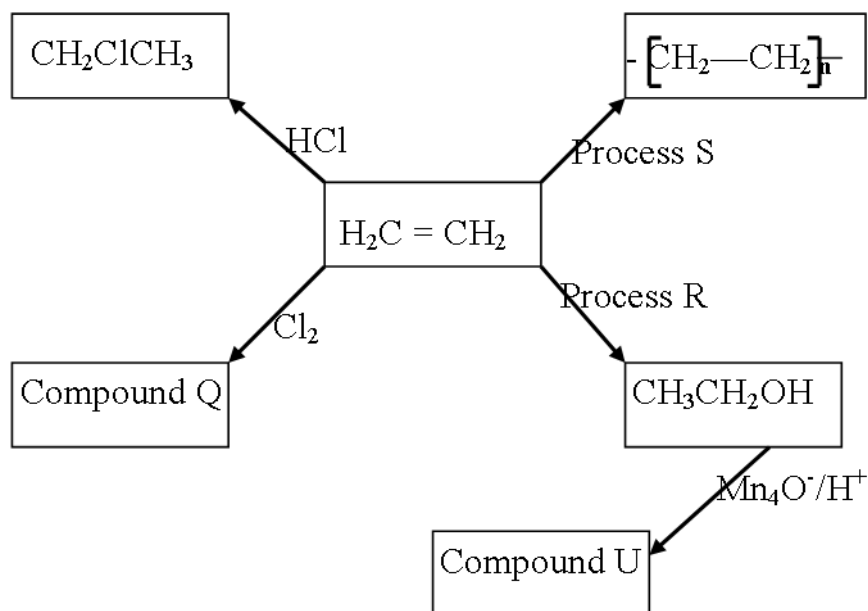
(b) Write an equation to show how the ore is reduced in the blast furnace (1mk)

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(c) Suggest two uses of iron (2mks)

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26. Study the scheme below and answer the questions that follow



State;

(i) The conditions for process R (1mk)

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(ii) The type of the reaction represented by process S (1mk)

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(iii) Name of compound U (1mk)

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