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Index No.....

School.....

Candidate's sign.....

Date.....

233/1

**CHEMISTRY**

**PAPER 1**

**THEORY**

**JULY / AUGUST 2010**

**Time: 2 Hours**

**KWANZA DISTRICT JOINT EVALUATION EXAM – 2010**

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

233/1

**CHEMISTRY**

**PAPER 1**

**(THEORY)**

**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer all the questions in the spaces provided
- Mathematical tables and silent electronic calculators may be used
- All workings must be clearly shown where necessary

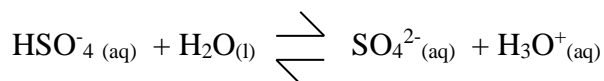
**FOR EXAMINER'S USE ONLY**

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 – 30	80	

*This paper consists of 12 printed pages.*

*Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing*

1. In the equation below identify the reactant that acts as an acid, in the forward reaction. Explain. (2mks)



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2. Study the information below and answer the questions that follow. A mixture contains the three gases Ethene, Hydrogen and Ammonia

	<b>Water</b>	<b>Concentrated sulphuric (VI) acid.</b>	<b>Concentrated sodium hydroxide</b>
Ammonia	Very soluble	Very soluble	Very soluble
Hydrogen	Slightly soluble	Insoluble	Insoluble
Ethene	Slightly soluble	Soluble	Insoluble

- i) Explain how you would obtain a sample of hydrogen gas from a mixture of the three gases. (2mks)

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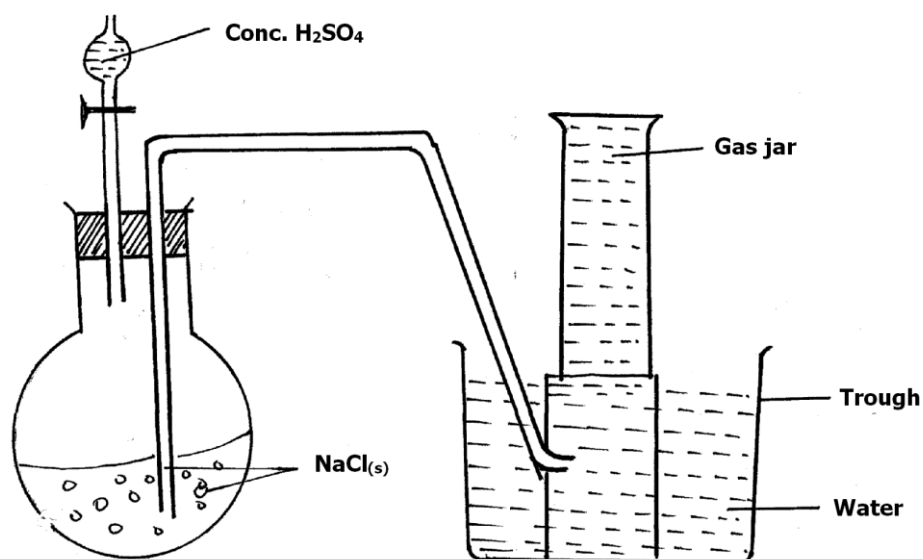
- ii) Write an equation for the reaction between ethene and concentrated sulphuric (VI) acid. (1mk)

3. i) When burning magnesium was lowered in a gas jar full of carbon (IV) Oxide it continued to burn but when burning Zinc was lowered into a gas jar full of carbon (IV) Oxide, it was put off. Explain the above observations. (2mks)

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- ii) Arrange the elements carbon, Zinc and magnesium in correct order of reactivity starting with the least reactive. (1mk)

4. A student set up apparatus to prepare and collect a sample of hydrogen chloride gas as shown in the diagram below. Study the set –up and answer questions that follow.



Identify the two mistakes in the set up represented by the diagram above. (2mks)

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5. Brass is an alloy of copper and Zinc . Explain briefly how you can get a sample of copper metal from powdered brass . (2mks)

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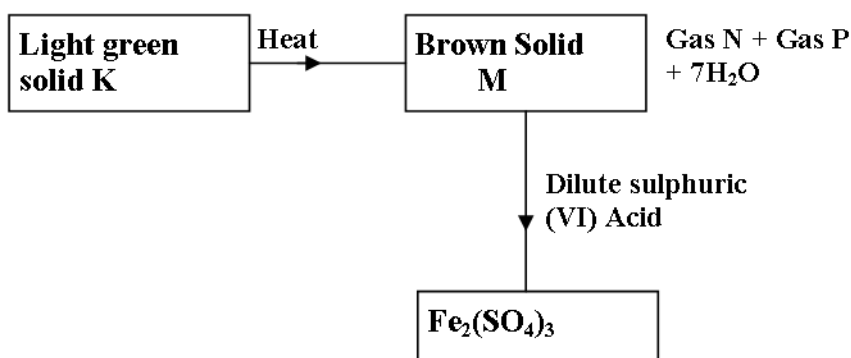
6. When a substance X was reacted with water, it gave off oxygen gas. Substance X gave a yellow flame when burnt in a Bunsen flame.

i) Name substance X . ( ½ mk)

X .....

ii) Write an equation for the reaction between substance X and water . (1mk)

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



i) Name substances. (2mks)

K .....

N .....

ii) Write a balanced equation for the equation that took place when solid K was heated in air. (1mk)

8. Both ions  $X^{2-}$  and  $Y^{2+}$  have an electron configuration  $2 . 8.8$

i) Write the electron arrangement for (½ mk)

X

ii) Draw the structures of atom Y given that it has 20 neutrons. (1mk)

9. State two differences between luminous and non – luminous flame. (2mks)

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10. Calcium hydrogen sulphite is used in the industry to bleach wood pulp during manufacture of paper . Explain with an equation how it bleaches . (2mks)

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11. a) What is hard water?. (1mk)

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b) Using a chemical equation, show how sodium carbonate removes water hardness. (1mk)

12. a) State Graham’s law of diffusion. (1mk)

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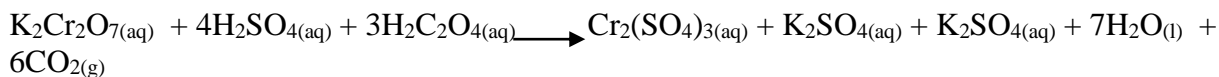
b) A certain volume of gas J takes 180 seconds to diffuse through a porous plug. Molar mass of J is 18g. Equal volume of gas Q takes 240 seconds to diffuse through the same plug.

Calculate the molar mass of Q. (2mks)

13. Provided with Lead (II) Carbonate, dilute nitric (V) acid, distilled water, Sodium Chloride solid. Describe how Lead (II) Chloride can be prepared. (3mks)

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14. Potassium Chromate (VI) solution reacts with oxalic acid in the presence of sulphuric (VI) acid as shown in the redox reaction below.



i) Write an ionic equation for the reaction above. (1mk)

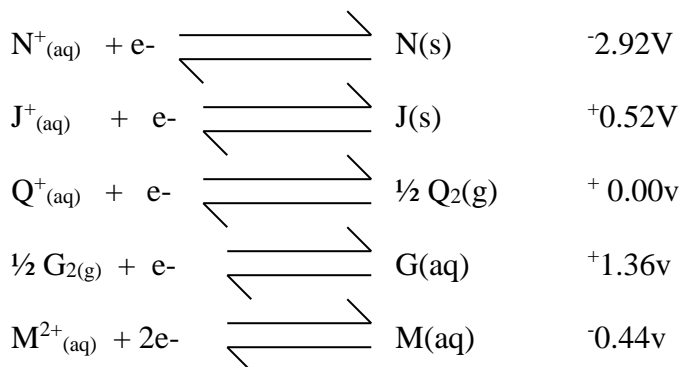
ii) State and explain the observations made by the end of the reaction in 14 (i) above. (2mks)

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15. When 1.675g of hydrated sodium carbonate was reacted with excess hydrochloric acid, the volume of carbonate (IV) Oxide gas obtained at room temperature and pressure was 150cm<sup>3</sup>. Calculate the number of moles of water of crystallization in one mole of hydrated sodium carbonated. (3mks)

(Na = 23, H = 1, C = 12, O = 16, Molar volume of gas at room temperature and pressure 24000 Cm<sup>3</sup>)

16. Study the electrode potentials for the half – cells given below and answer the questions that follow. (The letters do not represents the actual symbols of the elements).



Explain whether a sulphate solution of J ( $J_2SO_{4(aq)}$ ) can be kept in a container made of element M. (2mks)

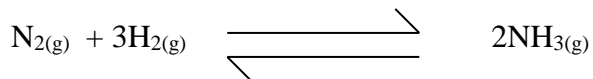
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17. Use the bond enthalpies ; at 298K to draw an energy level diagram for the reaction below.



a) Work out the enthalpy change for the reaction above. (2mks)

Bond	Bond energy kJ / mol
H - H	436
N - H	388
N $\equiv$ H	944

b) Draw an energy level diagram showing the activation energy for the above reaction. (1mk)

18. a) An aqueous solution of silver nitrate was electrolysed using silver electrodes. Write an equation for the reaction that took place at the .

Cathode . (1mk)

Anode (1mk)

- b) Name the product formed at the anode and cathode when the electrolysis in 18 (a) above was carried out using platinum electrodes.

Cathode ( ½ mk)

Anode ( ½ mk)

19. The results of an experiment to determine the solubility of Potassium Chlorate in water at 30°C were as follows

Mass of dish 15.86 g

Mass of dish + saturated solution at 30°C 26.86g

Mass of dish + solid potassium chlorate after evaporation to dryness 16.86g

Calculate the mass of the saturated solution containing 60g of water 30°C. (3mks)

20. When 0.11 mole of a certain organic compound was burnt in oxygen, 19.36g of carbon (IV) oxide and 5.94g of water were formed.

- a) Determine the molecular formula of the hydrocarbon. (3mks)

( C = 12, O = 16, H = 1)



b) In which homologous series does the hydrocarbon belong to explain. (1mk)

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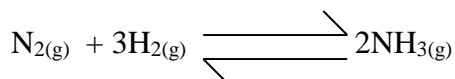
21. i) Magnesium and Aluminium are both members of the third period.  
Magnesium reacts violently with steam but aluminium doesn't at all. Explain (1mk)

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ii) Explain why Aluminium is used as overhead electric cables and not iron. (1mk)

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22. Ammonia gas is manufactured in large scale by reacting nitrogen gas and hydrogen gas as shown in the equations below ;



The above reaction is exothermic. What effect would ;

i) Increase in temperature have on the position of the equilibrium .

**Explain.** ( 1 ½ mk)

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ii) Catalyst have on the position of the equilibrium.

**Explain** ( 1 ½ mk)

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23. State and explain.

a) the observation you would make when Chlorine gas is mixed with hydrogen sulphide gas ( 1 ½ mk)

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b) why chlorine cannot be dried by calcium Oxide. (1 ½ mks)

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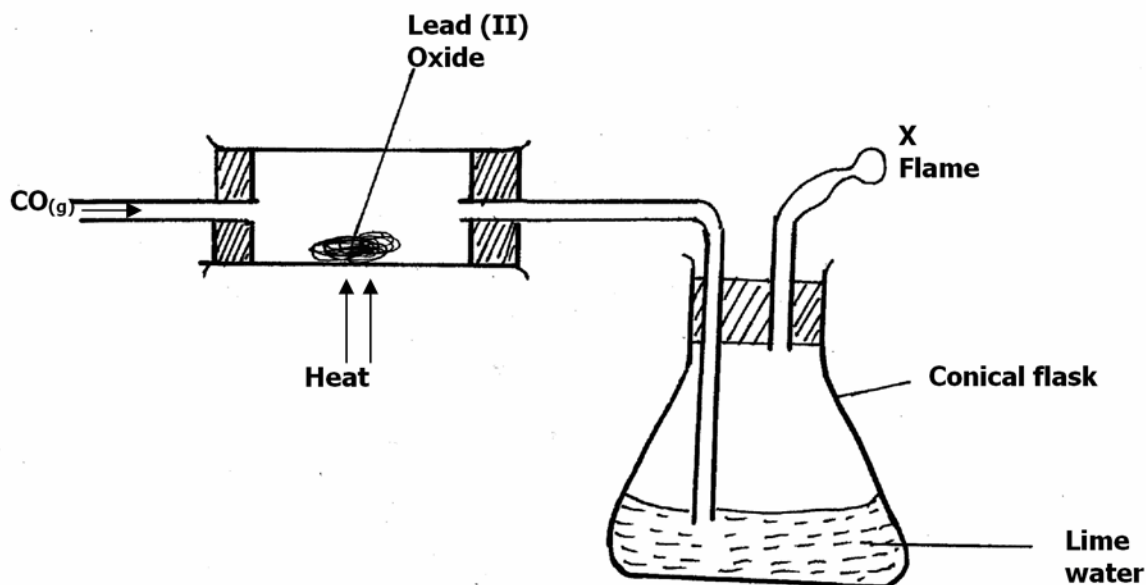
24. The reaction between hot concentrated Sodium Hydroxide and Chlorine produces Sodium Chlorate (V), Sodium Chloride and water.

a) Write the equation for reaction. (1mk)

b) Give one use of Sodium Chlorate (V). (1mk)

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25. Study the set – up below and answer the aqueous that follow.



i) Write a chemical equation for the reaction that takes place in the combustion tube. (1mk)

ii) State the observation made in the conical flask after a short time. (1mk)

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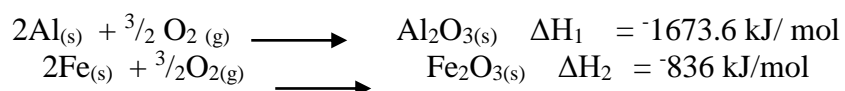
iii) Why is it necessary to burn gas at point X. (1mk)

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26. i) A nitrate solution of a certain metal X was electrolysed. 1.18g of metal X was deposited by a current of 4 A flowing for 16 minutes. Determine the formula of the metal nitrate . (3mks)  
(IF = 96.500C , R.A.M of X = 59)

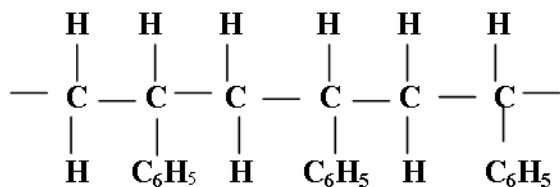
- ii) Determine the mass of silver that would be deposited using the quantity of electricity in 26 (i) above. (2mks)  
Ag = 108)

27. Use the following equations to determine the heat evolved when aluminium metal is reacted with Iron (III) Oxide. (3mks)



28. 80g of a radioactive Isotope decayed to a mass of 2.5g in a time of 2 hrs. Determine the half life of isotope. (2mks)

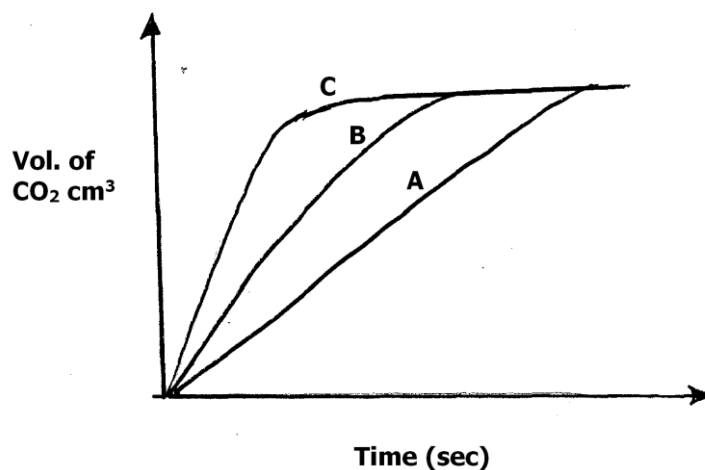
29. a) Name the process used to form the following structure .



.....(1mk)

- b) Draw the structure of the monomer and name it. (2mks)

30. In an experiment calcium carbonate was reacted with dilute hydrochloric acid and graph obtained is shown below.



- i) If the experiment was carried out at 20°C, 25°C and 30°C respectively, which curves represent temperature of 20°C and 30°C. (2mks)
- ii) What else would increase the reaction rate. (1mk)