

Name..... Index No:.....

233/1  
CHEMISTRY  
PAPER 1  
THEORY  
JULY/AUGUST 2014  
TIME: 2 HOURS

Candidate's Signature .....  
Date: .....

# NYAMIRA SUB-COUNTY JOINT EVALUATION EXAM

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

233/1  
Chemistry  
Paper 1  
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.
- Answer **all** the questions in the spaces provided.
- Mathematical table and silent electronic calculators may be used.
- All working **must** be clearly shown where necessary.

## FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate's score
1-28	80	

*This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. Define the following terms: (2mks)

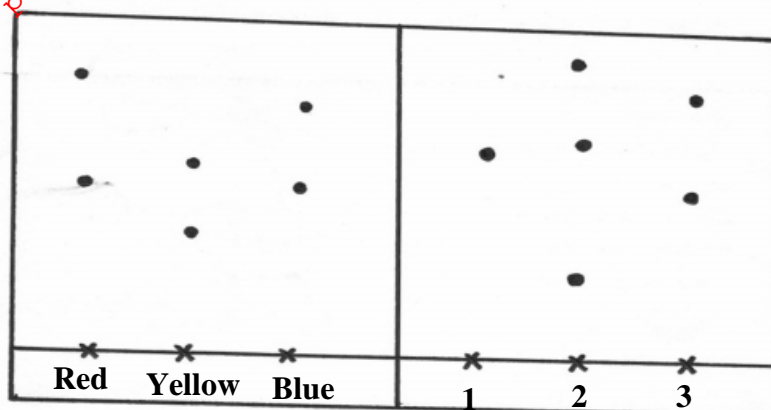
(i) Isotope

.....

(ii) Isobars

.....

2. A chromatogram of three dyes and three inks is shown below. Study it and answer questions that follows



(i) Identify dyes present in ink 3

(1mk)

.....

(ii) Identify the most soluble dye

(1mk)

.....

3. Magnesium burns with a brilliant flame in air forming two main products X and Y, write the equations for the formation of:

(i) X

(1mk)

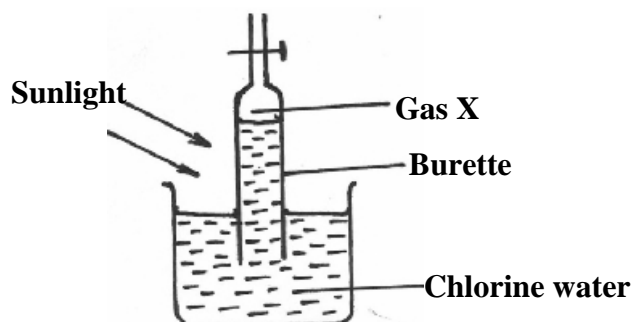
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(ii) Y

(1mk)

.....

4. An experiment was set up using chlorine water as shown below



(i) Identify gas X (1mk)

.....

(ii) Write an equation for the production of gas X (2mks)

.....

.....

5. (a) Explain how Pentane can be differentiated from Pentene (2mks)

.....

.....

(b) Name the following organic compounds

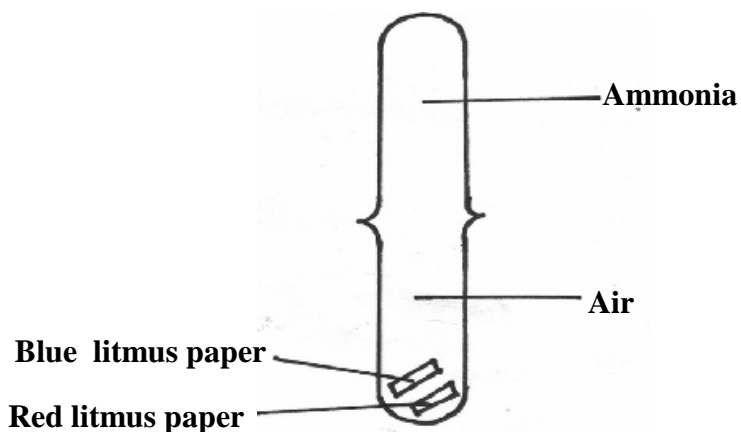
(i)  $\text{CH}_3\text{CHCH}_2$  (1mk)

.....

(ii)  $\text{CH}_2\text{CH}_2\text{CH}_2\overset{\text{O}}{\parallel}\text{C}-\text{OH}$  (1mk)

.....

6. Two test tubes one with ammonia and the other with air were set as shown below



(i) Predict the changes that would be seen in the litmus papers (1mk)

.....

.....

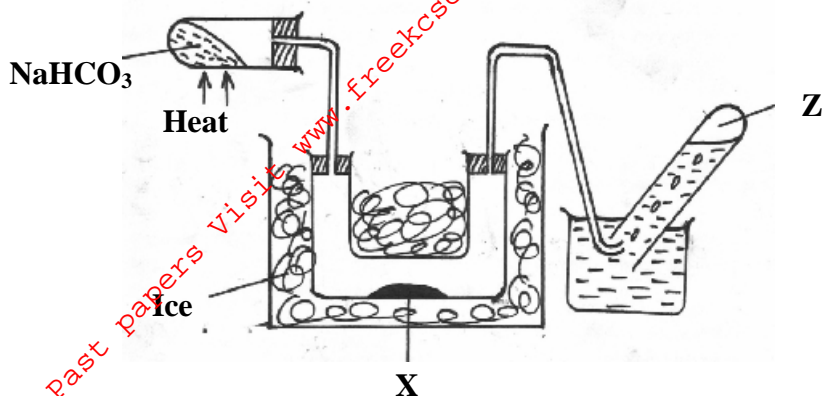
(ii) Explain your answer in (i) above (2mks)

.....

.....

7. The isotopes of an element X-16 and X-18 occur naturally in the ratio of 9:1 respectively. Calculate the relative atomic mass of X (2mks)

8. The diagram below represents the thermal decomposition of sodium hydrogen carbonate



(i) Name X and Z

(1mk)

(ii) Write an equation for the decomposition

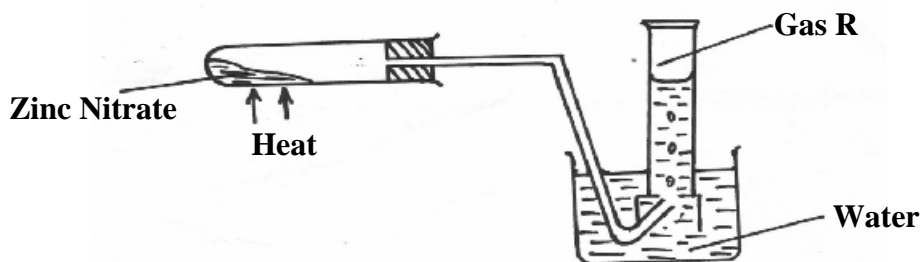
(2mks)

9. Describe how you can distinguish between solutions of Sodium Carbonate and sodium hydrogen carbonate given magnesium chloride solutions (3mks)

10. (a) State Graham's law of diffusion (2mks)

(b) It takes 245 seconds for nitrogen to diffuse through a membrane. How long will it take an equal volume of Carbon (IV) oxide to diffuse through the same membrane? (N=14,C=12,O=16)(2mks)

11. Study the diagram below and use it to answer questions that follows



(i) Identify gas R

(1mk)

(ii) What changes would be reserved in the test-tube

(1mk)

.....  
.....  
(iii) Explain the nature of the solution formed in water after sometimes (2mks)

12. Explain the following observations

(i) electrical conductivity of metals decreases with an increase in temperature (2mks)

(ii) Ionization energy decreases down the group in group I (2mks)

13. The table below gives some physical properties of substances A,B and C. study it and answer the questions that follow

Substance	Colour	M.P (oC)	Solubility in water	Electrical conductivity	
				Solid	Liquid
A	Black	114	Insoluble	Non conductor	Non-conductor
B	Black	1326	Soluble	Non conductor	Decompose
C	Black	3730	Insoluble	Conducts	Conducts

(a) Identify the substance that is

(i) Giant atomic structure (1mk)

(ii) Ionic structure (1mk)

(b) Which substance would dissolve in organic solvent? (2mks)

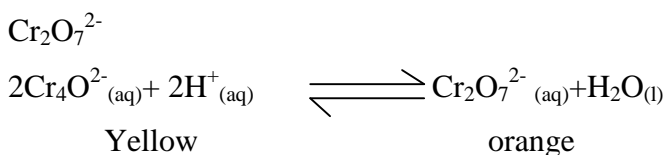
14. The electronic configuration of ions  $X^{2+}$  and  $Y^-$  are 2.8 and 2.8 respectively

(a) State the group and period in which the elements belongs to (2mks)

X.....

Y.....

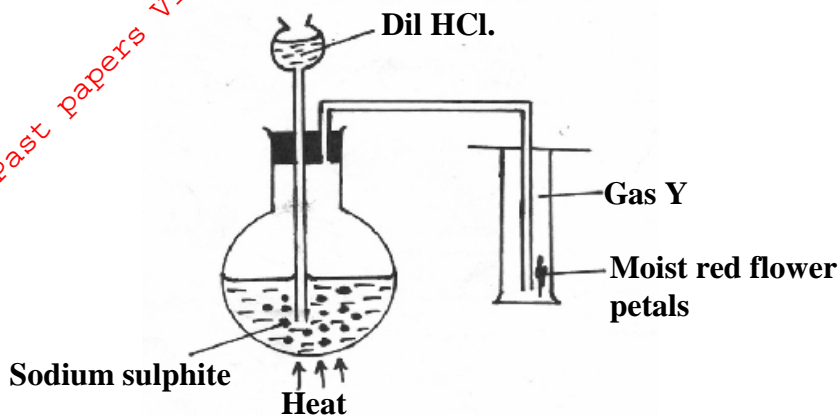
15. The equation below represents an equilibrium between chromate ions  $Cr_4^{2-}$  and dichromate ions



(a) State what would happen to the position of the equilibrium reaction if dilute sulphuric (VI) acid is added to the mixture. Give a reason for your answer (2mks)

.....  
 .....

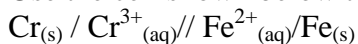
16. Study the diagram below and use it to answer questions that follows



State and explain the observation that was made on the red flow petals (2mks)

.....  
 .....

17. Use the cell shown below to answer questions that follows

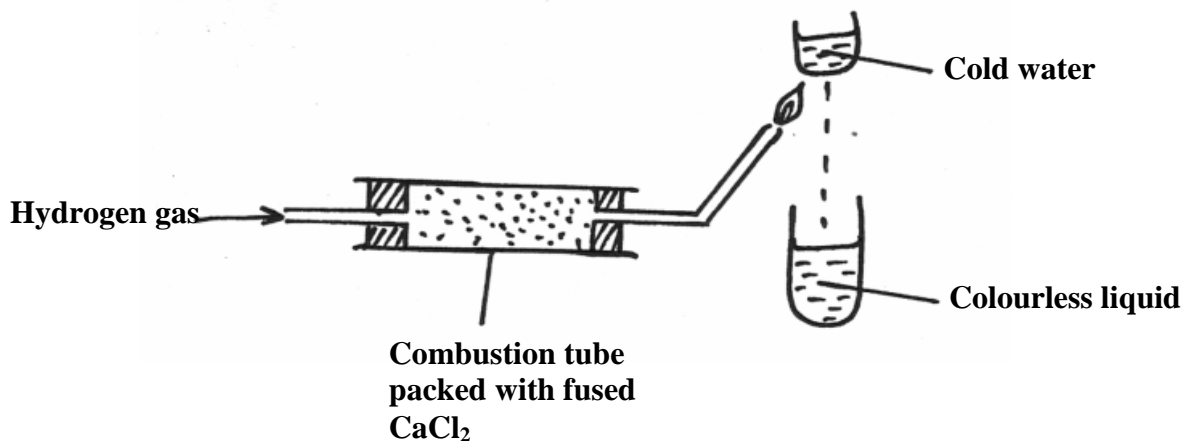


(i) Write down the equation for the reaction that takes place in the cells (1mk)

.....  
 .....

(ii) If the e.m.f of the cell is 0.30volts and E value of  $\text{Fe}^{2+}_{(aq)} / \text{Fe}_{(s)}$  is -0.44 volts, calculate the E value of  $\text{Cu}^{3+}_{(aq)} / \text{Cr}_{(s)}$  (2mks)

18. The diagram below shows set-up used to burn hydrogen and collect the product



(a) State why its necessary to dry the hydrogen gas before igniting it (1mk)

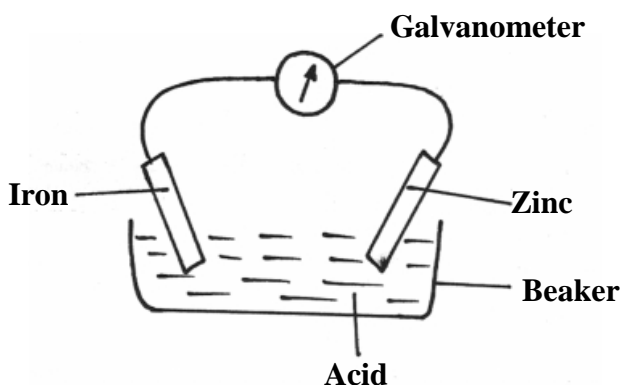
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.....  
(b) (i) State the precaution that must be taken before igniting the hydrogen (1mk)  
.....

.....  
(ii) State two uses of hydrogen gas (1mk)  
.....

.....  
19. 15.22 g of the oxide of metal X was formed when 10.64g of X reacted with excess oxygen. Determine the formula of the metal oxide X. (X=56,O=16) (3mks)

20. The apparatus shown below was set-up to investigate the properties of a simple cell



(a) On the diagram, indicate the direction of flow of electrons (1mk)  
(b) Explain the observation in (a) above (2mks)

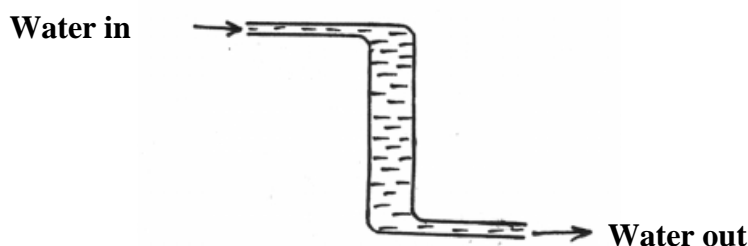
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21. M grams of a radioactive isotope decayed to 5 grams in 100 days. The half-life of the isotope is 25 days.

(i) What is meant by half-life of the isotope is 25 days (1mk)  
.....

.....  
(ii) Calculate the initial mass of the radio active isotope (2mks)

22. Concentrated hydrochloric acid is used for removing oxides form metals (pickling). Explain why concentrated nitric (V) acid cannot be used for the same purpose (2mks)  
.....

23. The diagram shown below illustrate the process of softening hard water using the permutit method



(a) State the cause of the two types of hardness (2mks)

.....  
.....

(b) Using a suitable equation, show how the hardness can be removed (2mks)

.....  
.....

24. (a) Determine the quantity of electricity required to deposit 0.16g of copper metal from copper sulphate solution. (Cu=64, Faraday constant=96500) (2mks)

(b) If 0.16g of copper in (a) above is deposited in one minute, determine the amount of current flowing through the electrolyte (2mks)

25. In the extraction of aluminum, bauxite is dissolved in hot concentrated sodium hydroxide before carbon (IV) oxide is passed through the solution

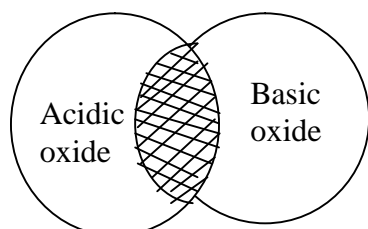
(a) State the role of sodium hydroxide in the process (1mk)

.....  
.....

(b) State the affect of bubbling CO<sub>2</sub> into the solution (1mk)

.....  
.....

26. The diagram below shows acidic and basic oxides fit into the general family of oxides



(i) State the name given to the type of oxides that would be placed in the shaded region (1mk)

.....  
.....

(ii) Give the name of any oxide that could be placed in the shaded region (1mk)

.....  
.....

27. The table below shows the first ionization energies of elements B and C

Element	Ionization energy KJ/mol
B	494
C	736

(i) What is ionization energy (1mk)

.....  
.....



(ii) What do the values suggest about reactivity of B compound to that of C? (2msk)

.....  
.....

28. State two factors which determine the stability of an isotope (2mks)

.....  
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