Name: …… **Index No.** ……

School: …… **Candidate's Sign.** ……

Date: ……

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

NYAMIRA DISTRICT JOINT EVALUATION TEST

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

Chemistry
Paper 1

INSTRUCTIONS TO THE CANDIDATES:-

- Write you **name** and **index number** in the spaces provided.
- Answer ***all*** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

For Examiner's Use Only

Question	Maximum score	Candidate's score
1-29	80	

This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing

1. (a) Define isotope? (1mk)

.....

(b) Silver exists naturally as $^{107}_{47}Ag$ and $^{109}_{47}Ag$ only. Determine the relative atomic mass of silver if they have same abundance. (2mks)

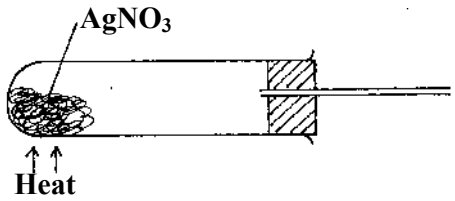
.....

.....

2. An organic compound is believed to have the structure $CH_3CH_2\ CH = CHCOOH$. Give two reactions which can be used to characterize the compound. (3mks)

.....

.....

3. 

(a) Give **one** observation made when $AgNO_3$ solid is heated. (1mk)

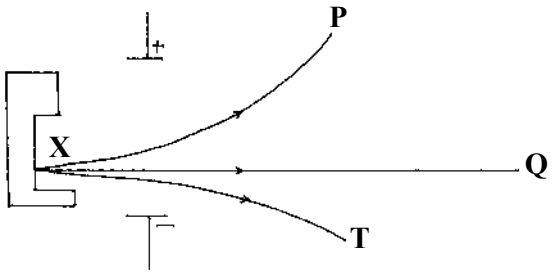
.....

(b) Complete the diagram above to show how the products is/are collected. (2mks)

.....

.....

4. The figure below shows the behaviour of emissions by a radioactive isotope x. Use it to answer the question follow.



(a) Explain why isotope **X** emits radiations. (1mk)

.....

.....

(b) Name the radiation labeled **T** (1mk)

.....

.....

(c) Arrange the radiations labeled **P** and **T** in the increasing order of ability to be deflected by an electric filed. (1mk)

……

……

5. Identify the species that acts as a base in the reverse reaction given below. Give a reason. (2mks)

$HSO_4^-{}_{(aq)} + OH^-{}_{(aq)} \rightleftharpoons SO_4^{2-}{}_{(aq)} + H_2O_{(l)}$

……

……

6. A given volume of ozone (O_3) diffused from a certain apparatus in 96 seconds. Calculate the time taken by an equal volume of carbon(IV) oxide to diffuse under the same conditions. (C=12,O=16) (3mks)

7. The table below shows tests carried out in a separate sample of water drawn from a well and results obtained.

Test	Results
(i) Addition of excess aqueous ammonia	White precipitate
(ii) addition of afew drops of dilute sulphuric (IV) acid	No white precipitate formed
(iii) addition of dilute hydrochloric acid followed by a few drops of barium chloride.	White precipitate

Identify the cation and anion present in the water

Cation (1mk)

……

Anion (1mk)

……

8. The table below shows the first ionization energies of elements A and B

Element	Ionization energy KJ/Mol
A	500
B	740

What do these values suggest about reactivity of **B** compared to **A**? Explain (2mks)

……

……

……

9. How would you obtain a sample of pure iodine and barium sulphate from a mixture of the two. (3mks)

……

……

……

10. Describe a simple laboratory experiment that can be used to distinguish between sodium sulphide and sodium carbonate. (2mks)

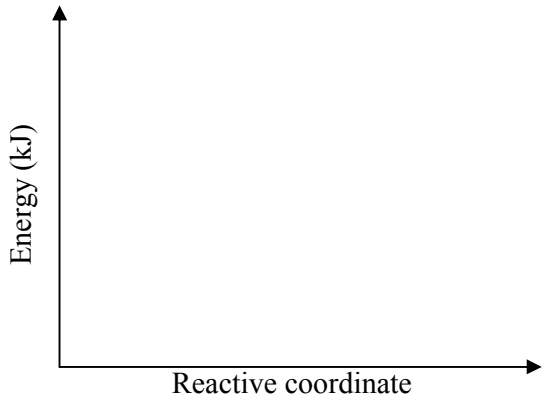
……

……

11. Hydrogen and Flourine react according to the equation.

$H_{2(g)} + F_{2(g)} \rightleftharpoons 2HF_{(g)} \quad \Delta H = -538kJ$

(a) On the grid provided below, sketch the energy level diagram for the reverse reaction. (1mk)



(b) Calculate the molar enthalpy of formation of HF (1mk)

12. Explain why burning magnesium continues to burn in a jar full of sulphur (IV) oxide while a burning wooden splint would be extinguished. (3mks)

……

……

……

13. An element Q has a relative atomic mass of 88. when a current of 0.5 amperes were 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 the ion of Q. 1 faraday = 96500 C) (3mks)

……

……

……

14. (a) what observations would be made if hydrogen sulphide gas was bubbled through a solution of Copper (II) sulphate. (1mk)

……

……

(b) Write an equation fro the reaction that takes place in (a) above. (1mk)

15 Chlorine reacts with methane as shown below.

$CH_{4(g)} + Cl_{2(g)} \longrightarrow CH_3Cl_{(g)} + HCl_{(g)}$

(a) What condition is necessary for this reaction to take place? (1mk)

……

……

(b) Identify the bonds which are broken and those that rare formed.

(i) Bonds broken. (1mk)

……

(ii) Bonds formed. (1mk)

……

……

16. Aluminium chloride is slightly soluble n organic solvents whereas anhydrous magnesium chloride. Explain (2mks)

……

……

17. What is the colour of the following?

Metal oxide	Colour when hot	Colour when cold
Zinc oxide	(i)	(ii)
Lead (II) oxide	(iii)	(iv)

(4mks)

……

……

……

……

18. A concentrated solution of sulphuric (VI) acid contain 72.5% sulphuric (VI) acid. If the density of the acid is 1.8g/cm^3 determine the molarity of the acid solution. (H= 1, O=16, S = 32) (3mks)

……

……

……

19. In a closed system an equilibrium exists between nitrogen(IV) oxide and dinitrogen tetraoxide as shown in the equation.

$N_2O_{4(g)} \rightleftharpoons 2\ NO_{2(g)} \qquad \Delta H = +27.5kJ$

Pale yellow — red brown.

(a) State and explain the observation made when a glass syringe containing the equilibrium mixture is immersed in ice-cold water. (2mks)

……

……

(b) If the piston of the syringe is pushed state the effect on the position of the equilibrium. (1mk)

……

……

20. Hydrogen peroxide decomposes according to the equation shown below.

$$H_2O_{2(g)} \longrightarrow H_2O_{(l)} + \tfrac{1}{2}O_{2(g)} \qquad \Delta H = -98kJ/mol$$

8.5g of hydrogen peroxide contained in $100cm^3$ of solution with water were completely decomposed. Calculate the rise in temperature due to the reaction.(specific heat capacity on water = $4.25g^{-1}k^{-1}$)

21. Below is a table of first five alkanes and their boiling points.

Name	Boiling point ^oC
Methane	-161.5
Ethane	-88.5
Propane	- 42.1
Butane	-0.56
Pentane	36.1

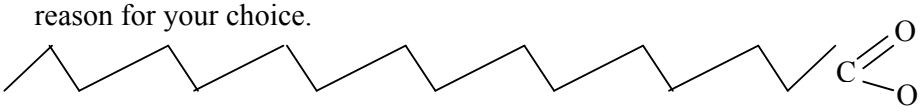
(a) What is the state of pentane at room temperature (25^oC)? Give a reasons. (2mks)

……

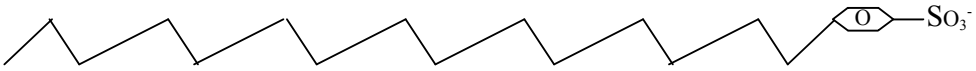
……

……

22. The diagram below shows two types of detergents which one of these detergents is a soap? Give a reason for your choice. (2mks)



Detergent A



Detergent B

……

……

23. Iron has two oxidation states, so it can form ions Fe^{2+}. How can you test a solution to find out which ion is present. Outline the tests and give the results for both ions. (3mks)

……

……

……

24. 5 g Sodium hydrogen carbonate were dissolved in $10cm^3$ of water in a boiling tube. Lemon juice was then added dropwise with shaking until there was no further observable change.

(a) Explain the observation which was made in the boiling tube when the reaction was in progress. (2mks)

……

……

(b) What observation would have been made if the lemon juice had been added to copper turnings in a boiling tube. Explain (2mks)

……

……

25. 5.0g of calcium carbonate were allowed to react with 25cm^3 of 1.0m hydrochloric acid until there was no further reaction. Calculate the mass of calcium carbonate that remained unreacted.
(Ca =40.0, O=16.0, C= 12.0) (3mks)

……

……

……

……

26. Construct a cell diagram fro a cell in which the following overall reaction takes place. (3mks)

$Zn_{(s)} + Cu^{2+}_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$

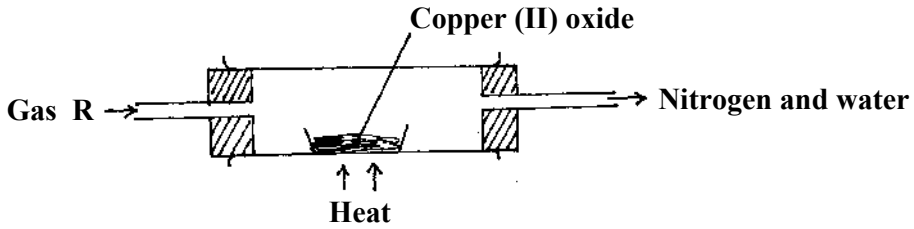
……

……

……

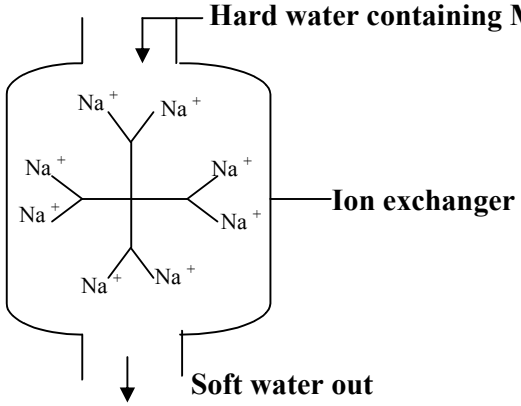
……

27.



The copper(II) oxide was converted to copper metal. Name the two diatomic genes that form **R**. (2mks)

28.



(i) Draw the ion exchanger and show how it will appear at the end of softening process. (2mks)

(ii) How is the ion exchanger recharged after exhaustion. (1mk)

……

……

29. The table below gives some properties of three metals: Aluminium, iron and copper. Use it to answer the questions that follow.

Metal	Density	Tensile Strength 10^{10}pa	Electrical conductivity
Aluminium	2.70	7.0	0.38
Iron	7.86	21.1	0.10
Copper1	8.92	13.0	0.59

Assuming that steel and stainless steel have similar properties to iron.

(a) Why do some stainless steel sauce pans have a copper base? (1mk)

……

……

(b) Aluminum with a steel core is used for overhead power cables in preference to copper. Why is a luminium preferred ? (1mk)

……

……

(c) Apart from over head power cables copper is chosen for almost all other electrical uses. Suggest **two** reasons fort he choice of copper. (2mks)

……

……