Name…………………………………………….. Index No…………………/…….

School…………………………………………… Date …………………………..…

Candidate's Signature……………………………….

233/1
CHEMISTRY
Paper 1
(Theory)
July/August 2012
Time: 2 Hour

LOITOKITOK DISTRICT JOINT EVALUATION TEST – 2012
Kenya Certificate of Secondary Education (K.C.S.E)

233/1
CHEMISTRY
Paper 1
July/August 2012
2 Hours

INSTRUCTIONS TO CANDIDATES
- Write your name and index number in the spaces provided above and sign
- 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 USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 - 26		
Total	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. This question concerns about alkaline earth metals. The following table gives information about their atomic and ionic Radii

| Elements	Atomic	Ionic radius m+2	1st ionization Energy	2nd ionization energy
Berflium	0.112	0.030		1800
Magnesium	0.160	0.065	736	1450
calcium	0.197	0.094	590	1150

a) How do you account for the fact that :-
   For all elements the ionic radius is smaller than the atomic radius . (1mk)

b) The second ionization energy is higher than 1st ionization energy is higher than 1st ionization energy for each element.
   Explain. (2mks)

2. Amino acids k and L were found to be a pure compound. A chromatography of these amino acids of k and L and also three sugars X,Y and Z was made with the results shown below.
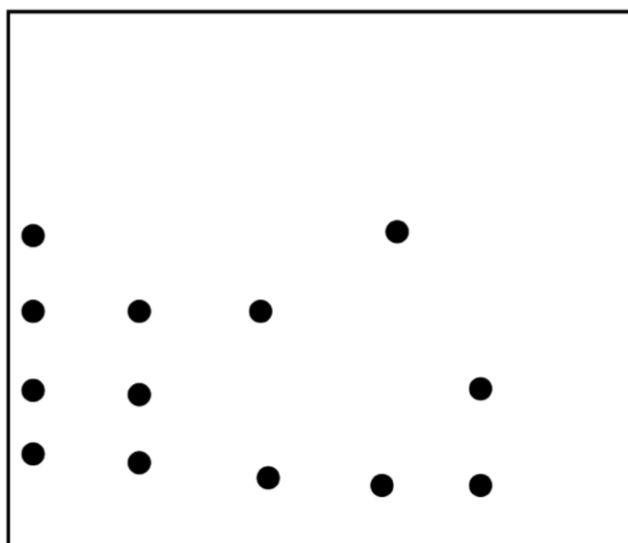
Amino acid K   Amino acid L   X   Y   Z

a) Which two sugars must be present in amino acid K and L. (1mk)
   ....
   ....
b) State and briefly explain two factors that made amino acid K and Y to more furthest. (2mks)
   ....
   ....
   ....
   ....

3. Study the set- up below and answer questions that follows.
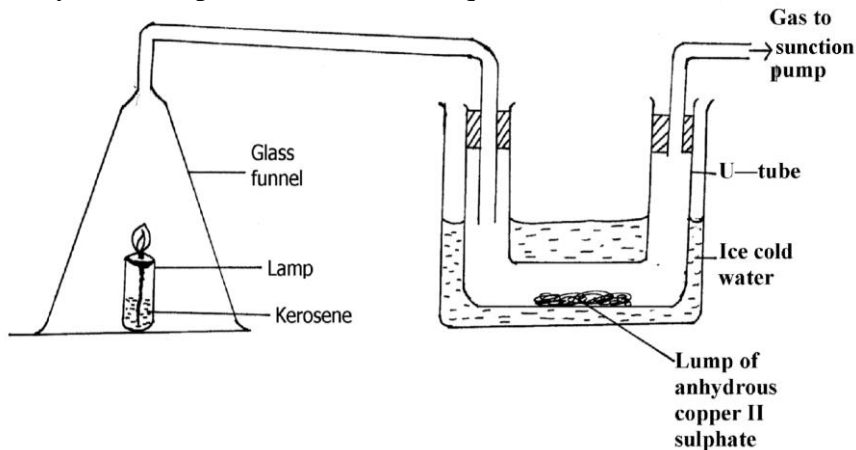
a) State and explain the observation made in the U- tube. (1mk)

....

....

b) Explain what will happen to lamp when the sunction pump is turned off. (2mks)

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4. The reaction between hydrogen and iodine can be represented by the equation below.

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2H_{I(g)} \quad \Delta H = -10kJ\ mol^{-1}$$
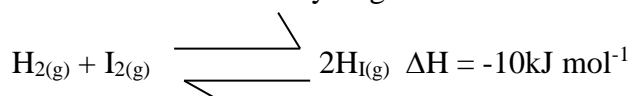
State and explain the effect on the equilibrium

If : a) Pressure is increased. (1 ½ mk)

....

b) Temperature is lowered. (1 ½ mk)

....

5. a) Ammonia gas was bubbled through equal amount of water and Hexane in separate test – tubes as shown below.
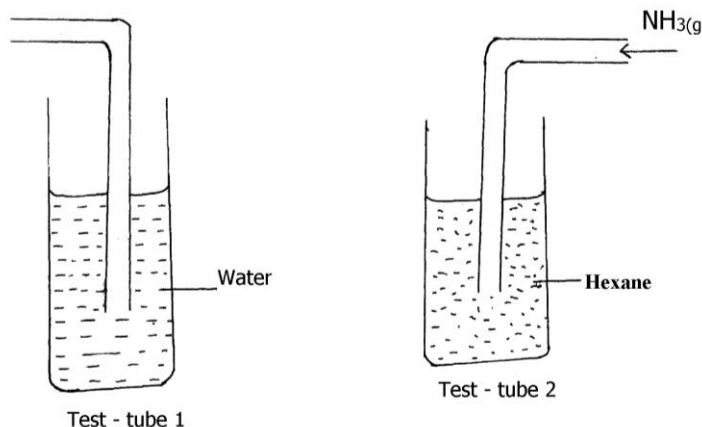
Explain the observations made when a wet red litmus paper was dipped into the two test – tube. (2mks)

....

....

....

....

b) The table below shows the PH values of some solution

Solution	A	B	C	D
pH	12.0	7.0	2.0	5.5

i) Which solution form a complex with aluminium oxide . (1mk)

ii) Which solution is likely to be a passion juice. (1mk)

6. 62g of hydrated sodium carbonated Na_2CO_3. nH_2O, were dissolved in distilled water and made up to one litre of solution $20cm^3$ of 1.5 m hydrochloric acid completely reacted with $30.0Cm^3$ sample of the sodium carbonate solution. Determine the value of n. (Na = 23.0 , C = 12.0, 0= 16.0). (3mks)

7. The table below gives atomic number of elements I,II,III, and IV

| Element	I	II	III	IV
Atomic number	15	16	17	20

a) Name the types of bonding that exists in the compound formed when element I and IV reacts. (1mk)

....

....

b) Select the elements which is the best oxidizing agent. Give a reason for your answer (2mks)

8.   A hydrocarbon was completely burnt in oxygen 1.08g of water and 5.28g of carbon IV) oxide were produced. Find the molecular formula of the hydrocarbon if it has a molar mass of 78. (3mks)

9.   a)   Diamond and graphite are both allotropes of carbon. Explain why graphite is used as a lubricate whereas diamond is used as an abrasive .   (2mks)

      b)   State one use of carbon II oxide.   (1mk)
      ....

      ....

10.   a)   To what temperature must 2 litres of air at 17°C be heated at a constant pressure in order to double the volume.   (2mks)

      b)   State Charles law
            ....
            ....

11.   Using dot (•) and crosses (x) diagram to represent electrons in the outer most energy levels only show bonding in phosphine molecule.pH^+_4.
      (P = 15 , H = 1)   (2mks)

12.   a)   Give the systematic IUPAC name of the following substances

            i) $CH_3CH\ CH\ CH_3$ (1mk)

            ii) $CH_3\ CH\ BY\ CH\ Br\ CH_3$ (1mk)
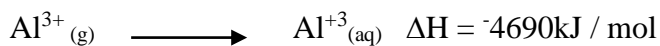
b)   Study the set – up below and answer question which follows.
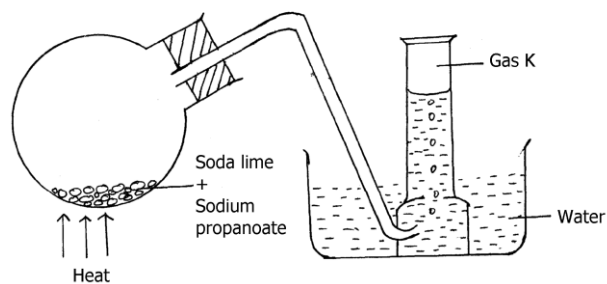
c)   Name gas K.   (1mk)

....

....

13.   The equations below shows the hydration energies of aluminium ions chlorine ions and the heart
      of solution of aluminium chloride.

$$Al^{3+}_{(g)} \longrightarrow Al^{+3}_{(aq)} \quad \Delta H = ^-4690kJ / mol$$

$$Cl^-_{(g)} \longrightarrow Cl^-_{(aq)} \quad \Delta H = ^-364kJ/ mol$$

$$AlCl_{3(s)} \longrightarrow AlCl_{3(aq)} \quad \Delta H = ^-332kJ/ mol$$

   Use the above equations to calculate the lattice energy of alluminium chloride.   (3mks)

14.   The graph below shows solubility of potassium nitrate and potassium chloride at different
      temperature .Study and answer the question below.

Temperature (°C)
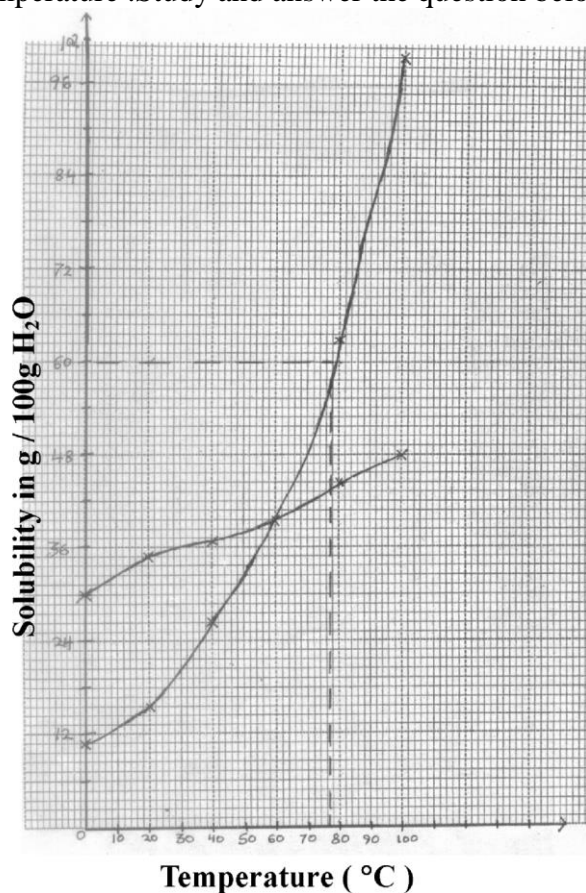
i) What happens when a solution containing 20g of potassium nitrate and 45g of potassium chloride in 100g of water at 80°C is cooled to 40°C? (2mks)

b) What technique can be used to separate solid with different solubilities. (1mk)
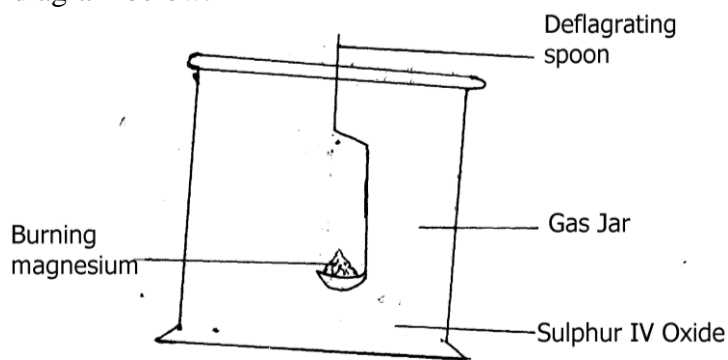
15. Radio active Thorium decays as shown

$$^{232}_{90}Th \rightarrow ^{228}_{88}Ra \rightarrow ^{238}_{89}AC$$
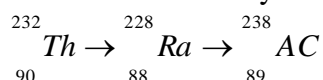
a) Name the type of radiation between

i) $^{232}_{90}Th \rightarrow ^{228}_{89}Ra$ (1mk)

ii) $^{228}_{88}Ra \rightarrow ^{228}_{89}AC$ (1mk)

iii) State one use of radioisotopes. (1mk)
....
....

16. A piece of burning magnesium was lowered into a gas jar full of sulphur (IV) oxide gas as shown in the diagram below.

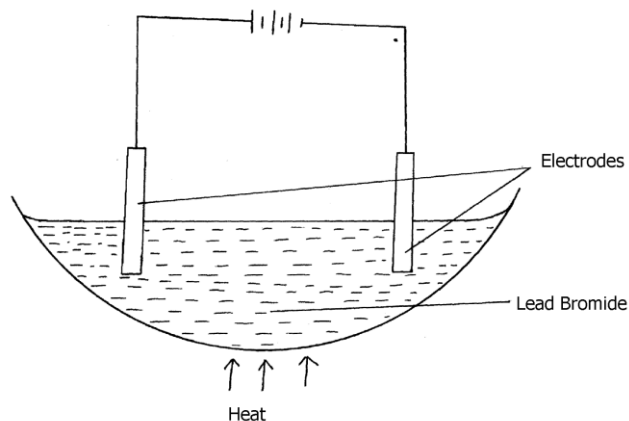i) State one use of sulphur (IV) Oxide. (1mk)
....
....

ii) State and explain one observation made in the gas jar. (2mks)
....
....
....
....

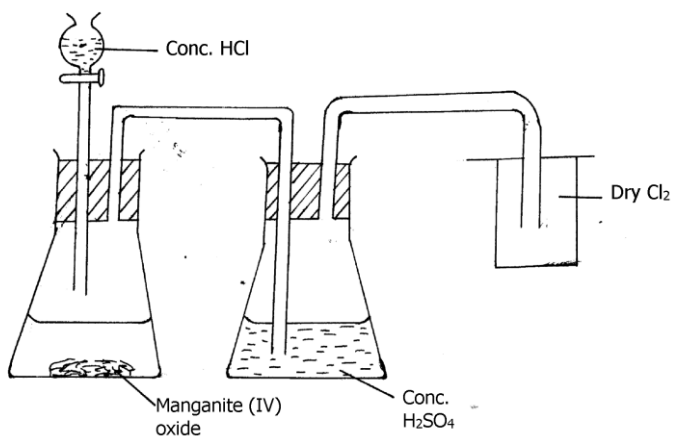17. The d diagram below shows electrolysis of lead bromide

a) Label the anode . (1mk)

b) Write half equations to shows reactions at cathode. (1mk)

c) State one application of electrolysis . (1mk)

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....

18 The set up below was used to prepare dry sample of chloride gas.

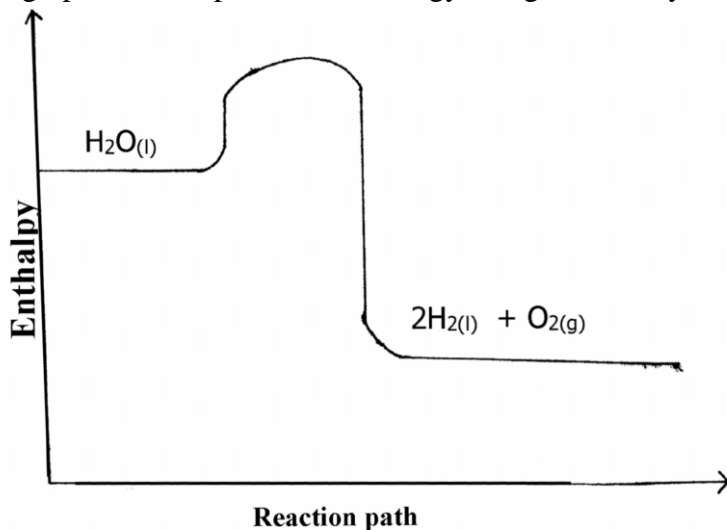a) What is the function of manganese (IV) oxide in the preparation of chloride. (1mk)
....

b) Explain the observations made when chlorine gas is bubbled through a solution of iron II sulphate. (2mks)

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....

19.	Starting with lead metal describe how a sample of lead II hydroxide is prepared .	(3mks)

20.	The graph below represents the energy charges when hydrogen peroxide decomposes

Reaction path

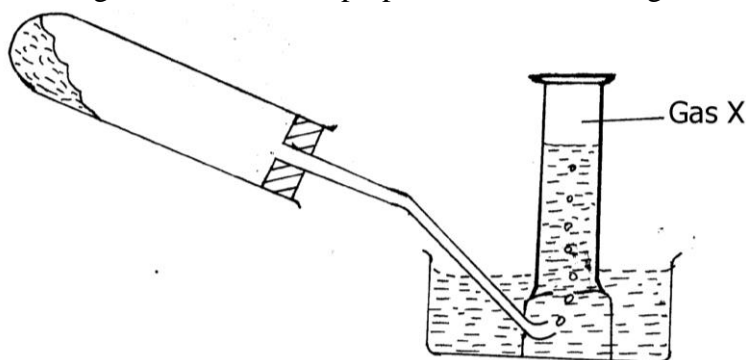a)	i)	State whether the reaction is endothermic or exorthemic.	(½ mk)

	....

	ii)	Give reason for your answer.	(½ mk)
	....
b)	On the diagram, sketch the reaction path for a catalysed reaction.	(1mk)

c)	State one factor other than a catalyst, which can improve decomposition of hydrogen peroxide.	(1mk)
	....

21.	The diagram below shows preparation of a certain gas x

i)   Name gas X.   (1mk)

....

ii)   State the confirmatory test for gas X.   (1mk)

....

iii)   Write an equation that occurs above,.   (1mk)

22.   In the extraction of sodium metal using down's cell

a)   Graphite   is used as anode instead of steel give a reason .   (1mk)
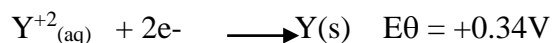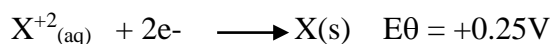   Give a reason

....

b)   State the function of a steel gauze.   (1mk)

....

c)   List one use of sodium metals.   (1mk)

....

23.   The following are half cell reduction potential for cell metal X and Y.

$$X^{+2}_{(aq)} + 2e^- \longrightarrow X(s) \quad E\theta = +0.25V$$

$$Y^{+2}_{(aq)} + 2e^- \longrightarrow Y(s) \quad E\theta = +0.34V$$

a)   Calculate the e.m.f of the electrochemical formed when the two half cells are connect.

                                                                       (1mk)

b)   Write the cell representation for the reaction in (a) above.   (1mk)

c)   Half cell of metal x was connect to another half cell of metal Z and the electrochemical
           cell formed overall e.m.f of +0.69V
           Determine the reduction potential of metal Z   (1mk)

24. The diagram below shows an experiment involving chlorine water.
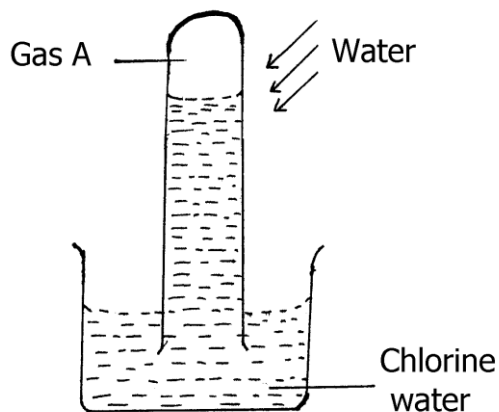
a)   Describe the confirmatory test for Gas A.   (2mks)

b)   Write an equation to show the formation of gas A.   (1mk)

c)   State one use of chlorine gas.   (1mk)
....

....

25. When solid B was heated, a gas which formed a white precipitate when passed through lime water
was produced.
The residue was dissolved in dilute Nitric (V) acid to form a colourless solution B2 when dilute
hydrochloric acid was added to solution B2 a white precipitate which dissolved on warming was
formed

a)   Write the formular of the :-

     i)   Cation is solid B_1 (1mk)

     ii) Anion in solid B_1 (1mk)

b)   Write an ionic equation for the reaction between the residue and dilute nitric (V)
     acid.   (1mk)

26. a) A certain volume of gas X diffuses through a porous boundary in 30 seconds. How much time is required for an equal volume of gas Y to diffuse through the same boundary under the same conditions? Rmm of x = 28 Y = 7   (3mks)

   b) State Graham's law.   (1mk)