

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

Date

Candidate's Signature.....

Class.....



233/1
CHEMISTRY
Paper 1
(Theory)
July/August - 2014
Time: 2 Hours

ALLIANCE GIRLS' HIGH SCHOOL
Kenya Certificate of Secondary Education (K.C.S.E)
MOCK EXAMINATIONS

233/1
CHEMISTRY
Paper 1
July/August - 2014
2 Hours

INSTRUCTIONS TO CANDIDATES

1. Write your name and index numbers in the space provided above.
2. Sign and write the date of examination in the space provided above.
3. Answers all the questions in the spaces provided in the question paper.
4. Mathematical tables and silent electronic calculators maybe used.
5. All working **MUST** be clearly shown where necessary.
6. This paper consists of 12 printed pages.

FOR EXAMINER USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1- 28	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. Two elements **A** and **B** have electronic configurations 2.8.3 and 2.6 respectively.
a) To which group and period does element **B** belong? (1mk)

b) If the two react, what is the formula of the compound they form. (1mk)

2. a) Draw a dot (•) and a cross (x) diagram to show bonding in Cl_2O . (1mk)

b) In terms of structure and bonding explain why the compound Cl_2O has a very low melting and boiling point. (2mks)

3. The empirical formula of a compound is CH_2 and it has a molecular mass of 42.
a) What is the molecular formula of this compound? (1mk)

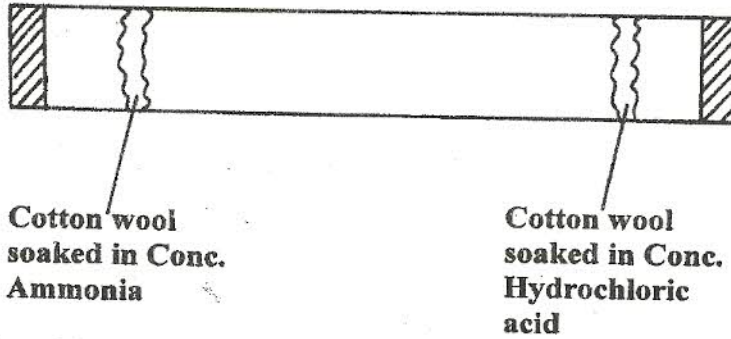
b) To which group of hydrocarbons does the the compound above belong? (1mk)

c) Draw the structural formula of the third member of this series and give its IUPAC name. (1mk)



4. 3.22g of hydrated sodium sulphate, $\text{Na}_2\text{SO}_4 \cdot x \text{H}_2\text{O}$ were heated to a constant mass of 1.42 g. determine the value of x in the formula (Na=23.0, s = 32.0, O = 16, H = 1) (3mks)

5. In an Experiment to study diffusion of gases, the following set up was used.



- i) State and explain observations made in the experiment. (2mks)

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- ii) Write an equation for the reaction that occurs in the experiment. (1mk)

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6. Describe how a mixture of sodium carbonate and Lead (II) carbonate can be separated. (3mks)

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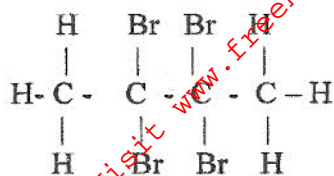
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7. A compound G reacts with 2 moles of bromine to form another compound whose graphical formula is.



- i) What is the formula and name of compound G. (2mks)

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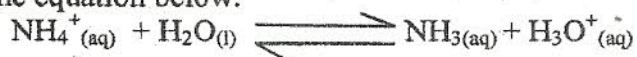
- ii) State the observations made when acidified potassium chromate (VI) is added to compound G. (1mk)

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8. In terms of structure and bonding explain why diamond has a higher melting point than graphite. (3mks)

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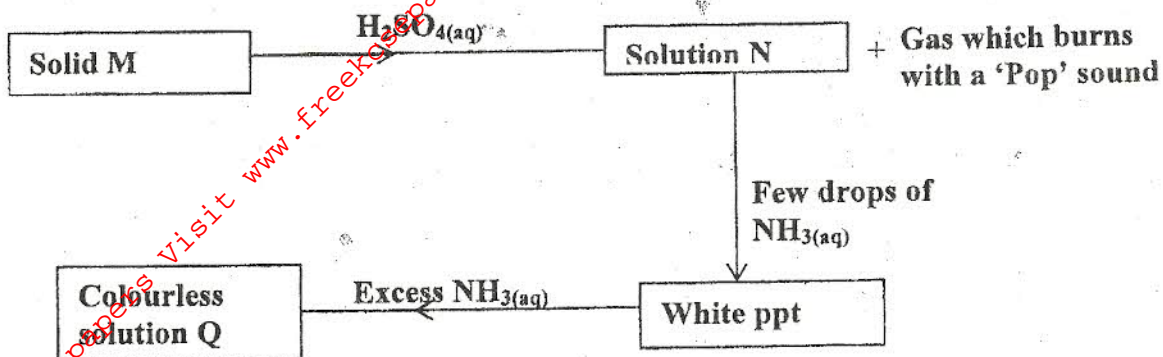
9. Giving reasons, identify the acids and bases in both forward and backward reactions in the equation below. (3mks)



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10. The scheme below shows some reaction sequence starting with solid M



(i) Name Solid M (1mk)

(ii) Write the formula of complex ion present in Solution Q. (1mk)

(iii) Write ionic equation of reaction between barium nitrate and solution N. (1mk)

11. In the Haber process, the industrial manufacture of ammonia is given by the following equation:-



(i) Name **one** source of hydrogen used in this process. (1mk)

(ii) Name the catalyst used in the above reaction. (1mk)

(iii) What is the effect of increasing temperature on the yield of ammonia? Explain. (1mk)

12. Explain the following concepts in respect to extraction of aluminium metal
 (a) Cryolite is added to Aluminium Oxide. (1mk)

(b) Graphite anode is replaced from time to time. (1mk)

13. When concentrated hydrochloric acid was electrolyzed for a long time, two gases were obtained at the anode.

(i) Name the two gases. (1mk)

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(ii) Explain how the two gases were obtained at the same electrode. (2mks)

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14. Given the following bond energies:-

C - H 414 kJ/Mol

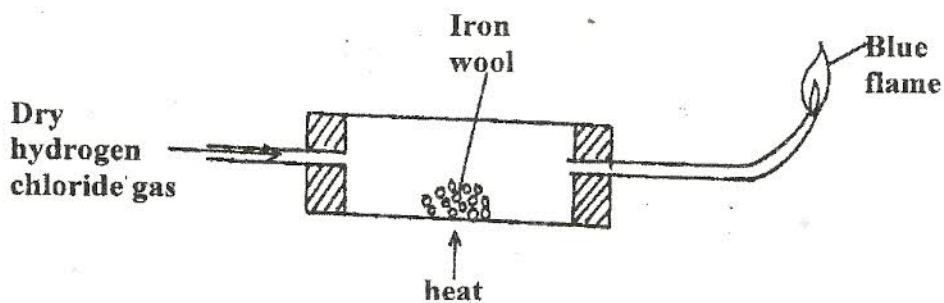
Cl - Cl 244 kJ/Mol

C - Cl 326 kJ/Mol

H - Cl 431 kJ/Mol

Calculate the enthalpy change when methane reacts with excess chlorine. (3mks)

15. Dry hydrogen chloride gas was passed over heated iron wool as shown below:-



(a) State the observation made in the combustion tube at the end of the experiment. (1mk)

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(b) Write the equation for the reaction taking place:-

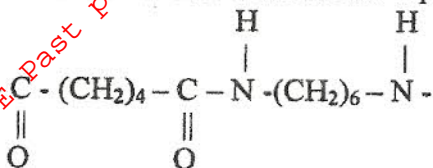
(i) in the combustion tube

(1mk)

(ii) Leading to production of a blue flame.

(1mk)

16. The structure below shows the repeat unit showed in a polymer.



(i) Name the polymer.

(1mk)

(ii) Draw the structures of the two monomers forming the polymer.

(2mks)

17. The table below shows the number of valence electrons in elements D, E and F.

Element	D	E	F
No. of valence electrons	1	2	7

(i) Explain why D and E would not be expected to react together to form a compound.

(1mk)

(ii) Write a chemical equation to show the effect of heat on a carbonate of E.

(1mk)

18. The table below gives information on four elements by letters K, L, M and N. Study and answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Electron arrangement	Atomic radius (nm)	Ionic radius(nm)
K	2.8.2	0.136	0.065
L	2.8	0.099	0.181
M	2.8.8.1	0.203	0.133
N	2.8.8.2	0.174	0.099

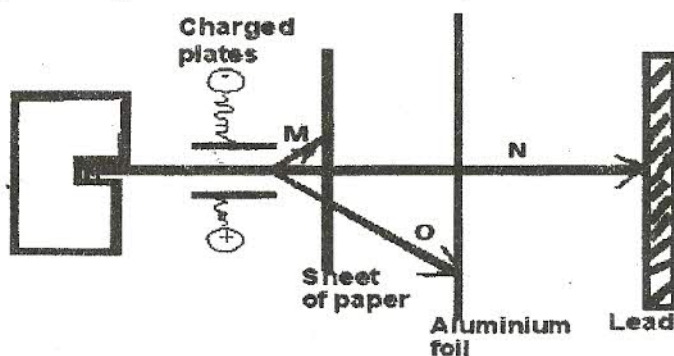
a) Which elements have similar properties? Explain (2mks)

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b) What is the most likely formula of the oxide of L? (1mk)

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19. Study the diagram below to answer the questions that follow.



Name the radiations M, N and O

i) M.....(1mk)

ii) N.....(1mk)

iii) O.....(1mk)

20. i) State Gay Lussac's law of combining volumes of gases (1mk)

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ii) What volume of methane would remain if a burner containing 40cm^3 of methane gas burns in 40cm^3 of enclosed air? (Assume oxygen is 20% by volume of air). (2mks)

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21. 1.7g of ammonia gas was passed over excess heated Copper (II) oxide at s.t.p. Calculate the volume of ammonia gas that reacted. (N=14, H=1, MGV at s.t.p =22.4dm³) (2mks)

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22. A fossil was discovered in the year 2007. Its half-life was found to be 440 yrs. Calculate the time it will take for the mass of the fossil to have reduced from 240g to 15g. (3mks)

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23. a) State Graham's law. (1mk)

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b) 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 (2mks)

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24. 10.0g of ethanol (C_2H_5OH) were completely burnt in air. The heat evolved caused the temperature of 400cm^3 of water to change from 20°C to 85°C . Calculate the molar enthalpy of combustion of ethanol.
 (H = 1, C = 12, O = 16. Specific heat capacity of water = $4.24\text{kJkg}^{-1}\text{K}^{-1}$) (3mks)

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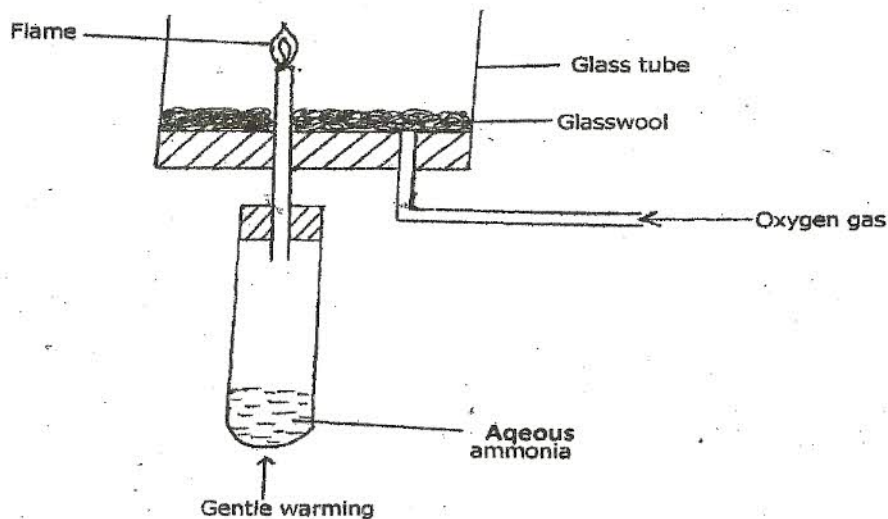
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25. Study the set-up below and answer the questions that follow.



- (a) Why is aqueous ammonia warmed gently? (1mk)
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- (b) What is the colour of the flame? (1mk)
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- (c) Write the chemical equation for the reaction that takes place. (1mk)
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26. The table below shows the tests carried out on a sample of water and the results obtained.

Sample	Tests	Observation
A	Addition of sodium hydroxide solution dropwise until in excess	White precipitate which dissolves in excess to form colourless solution
B	Addition of excess aqueous ammonia	White precipitate
C	Addition of dilute nitric (V) acid followed by barium chloride	White precipitate

a) Identify the anion present in the water. (1mk)

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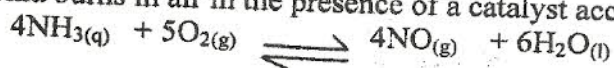
b) Write the ionic equation for the reaction in C. (1mk)

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c) Write the formula for the complex ion in A. (1mk)

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27. Ammonia burns in air in the presence of a catalyst according to the equation below



i) Given that an increase in temperature raises the amount of ammonia gas, state and explain whether the left to right reaction is exothermic or endothermic. (2mks)

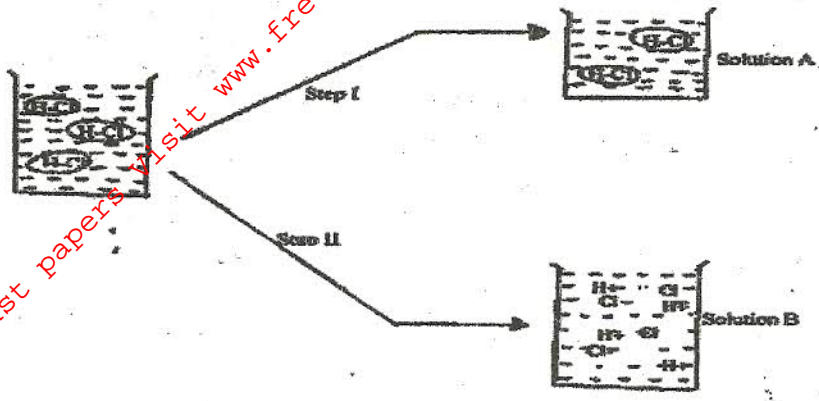
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ii) How will the increase in pressure affect the yield of nitrogen (II) oxide? (1mk)

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28. Study the diagram below and use it to answer the questions that follow.



a) Identify the solvent used in step I and step II (1mk)

Step I

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Step II

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b) Spatula endful of sodium hydrogen carbonate was poured into solution B. What observations were made? Explain. (2mks)

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