

CHEMISTRY PAPER 1

KAGONDO SECONDARY SCHOOL

JULY/AUGUST 2014

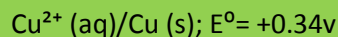
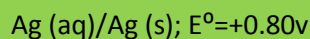
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1. Explain why magnesium continues to burn in a jar full of sulphur iv oxide while a burning wooden splint would be extinguished (3mks)

2. Describe a chemical test you would use to distinguish between nitrogen (I) oxide and nitrogen (II) oxide (3mks)

3 a) A current of 0.2A was passed for 20 minutes through a solution of sulphuric VI acid using platinum electrodes. Find the volume of oxygen in  $\text{cm}^3$  liberated at a pressure of 1 atmosphere and temperature of  $25^\circ\text{C}$  (Farady's constant 96500 Coulombs, molar gas volume at s.t.p is 22400 cc) (3mks)

b) A cell is constructed between copper and silver. Standard electrode potential for the two metals are given below



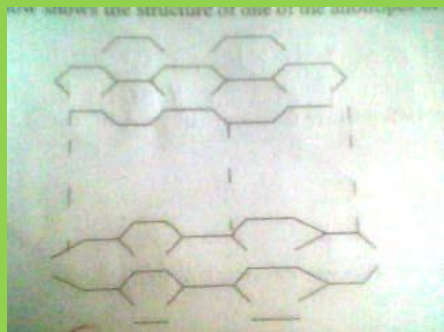
i) Name the cathode and the anode (2mks)

Anode.....

Cathodes.....

4 a) What is meant by allotropy? (1mk)

b) The diagram below shows the structure of one of the allotropes of carbon



i) Identify the allotrope (1mk)

ii) State one property of the above allotrope and explain how it is related to its structure (2mks)

5 a) Using dots and cross diagram, show how a hydro-Oxonium ion,  $\text{H}_3\text{O}^+$  is formed. (hint:  $\text{H}_2\text{O} + \text{H}^+ \rightarrow \text{H}_3\text{O}^+$ ) Atomic numbers (H=1, O=8 (2mks)

b) What is the name given to the bonding in (a) above (1mk)

6 The table below gives the atomic numbers of element w,x,y and z. The letters do not represent the actual symbol of the element

Element	w	x	y	z
Atomic number	9	10	11	12

a) Which one of the elements is less reactive? Explain (1mk)

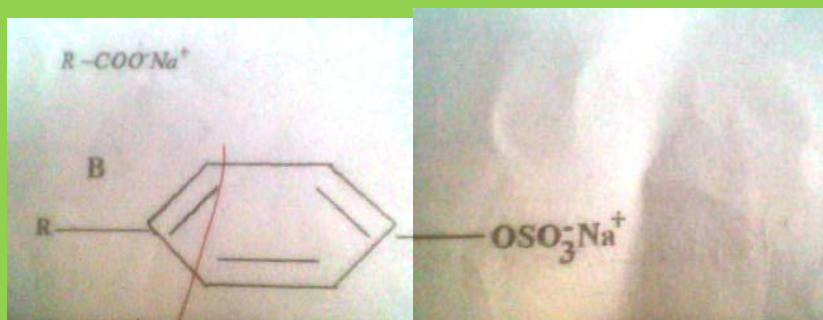
b) i) Which two elements react most vigorously with each other (1mk)

7. Draw a well labeled diagram showing a set up for laboratory preparation and collection of dry hydrogen chloride gas (3mks)

8 a) State Graham's Law of diffusion (1mk)

b)  $100\text{cm}^3$  of gas A diffuses through a porous plug in 41 seconds and the same volume of air diffuses through the plug in 155 seconds. Calculate the density of gas A. (density of air is  $1.0\text{g}/\text{cm}^3$ ) (2mks)

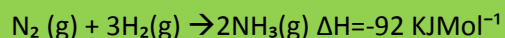
9. The structure below represents two cleansing agents, A and B



A)  $\text{R}-\text{COO}^-\text{Na}^+$

Which cleansing agent would be suitable for washing in water with dissolved Magnesium sulphate. Give a reason (2mks)

10. Given the equation



What happens to the position of equilibrium when

a) More hydrogen is introduced to the system (1mk)

b) The pressure of the system is reduced (1mk)

c)Temperature is raised (1mk)

11.Excess Iron filling were allowed to rust in  $1\text{dm}^3$  of moist air and the volume of remaining air measured each day

Day	0	1	2	3	4	5	6	7	8	9
Volume of Air ( $\text{cm}^3$ )	1000	950	900	860	840	820	800	800	800	800

a)Why did the volume of air remain constant from day six (1mk)

b)Determine the % volume of oxygen in air (1mk)

c)Write the chemical formula of rust (1mk)

12.Given that element G has an electronic arrangement of 2:8,18:7 and element H has an atomic number 17

a)To which period of the periodic table does the element G belong? Explain (1mk)

b)How would the reaction of Sodium metal with G compare to its reaction with H?Explain (2mks)

13.When  $50\text{cm}^3$  1M Potassium hydroxide was reacted with  $50\text{cm}^3$  of 1M hydrochloric acid, the temperature rose by  $8^\circ\text{C}$ .When the same volume of Potassium hydroxide was reacted with  $50\text{cm}^3$  of 1M Pentanoic acid, the temperature rose by  $3^\circ\text{C}$

i)Give reasons for the above difference in temperature (2mks)

ii)Write an equation to show dissociation of pentanoic acid (1mk)

iii)Draw the structural formula of ethanoic and propanoic acid (1mk)

iv)Give the name and formula of the organic compound formed when ethanol and propanoic acid react in presence of concentrated sulphuric acid (1mk)

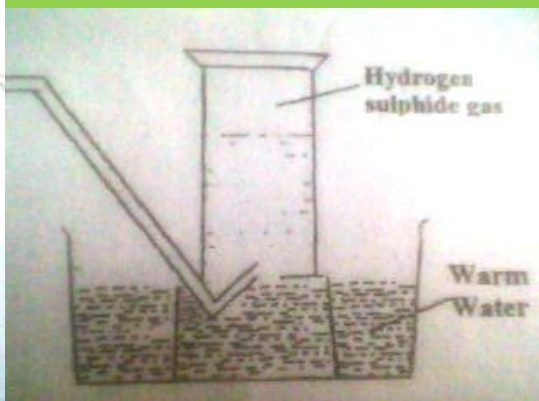
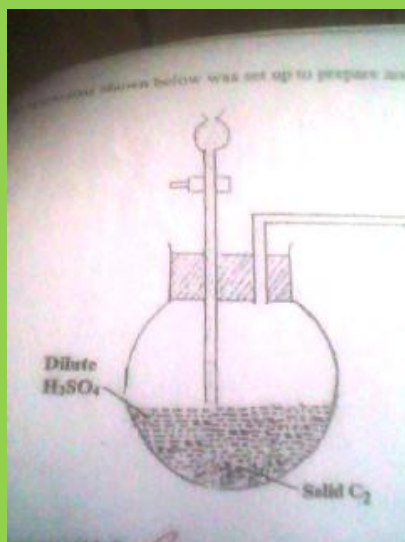
14.One mole of ethane gas was mixed with excess chlorine gas in a gas jar at room temperature and kept in dark conditions. On observation, no reaction occurred in the dark conditions. On exposure to light the chlorine gas was decolorized

i)State the importance of light in the above reaction (1mk)

ii)Write an equation for the reaction that occurs once the mixture is exposed to light (1mk)

iii)Name the organic product formed in the above reaction (1mk)

15.The apparatus shown below was set up to prepare and collect hydrogen sulphide gas

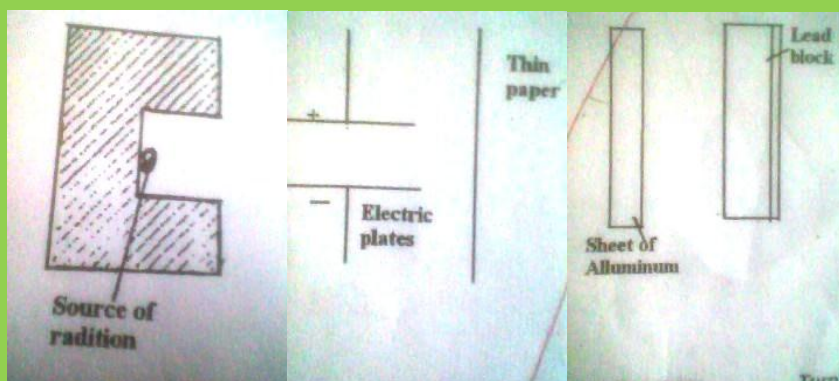


a) Name solid C<sub>2</sub> (1mk)

b) Give a reason why warm water is used (1mk)

c) What observation would be made if hydrogen sulphide gas was bubbled into solution of lead II nitrate? Explain (2mks)

16 a) Complete the diagram below to show how Alpha and Beta particles from radioactive source can be distinguished from each other. Label your diagram clearly (2mk)

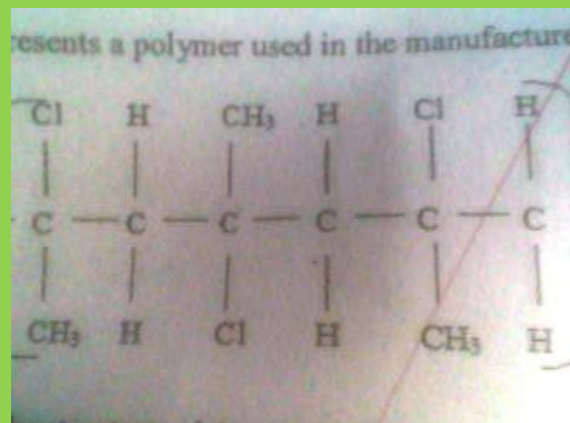


b) The following represent a nuclear reaction. Balance the equation (1mk)



c) Name the particle emitted in (b) above

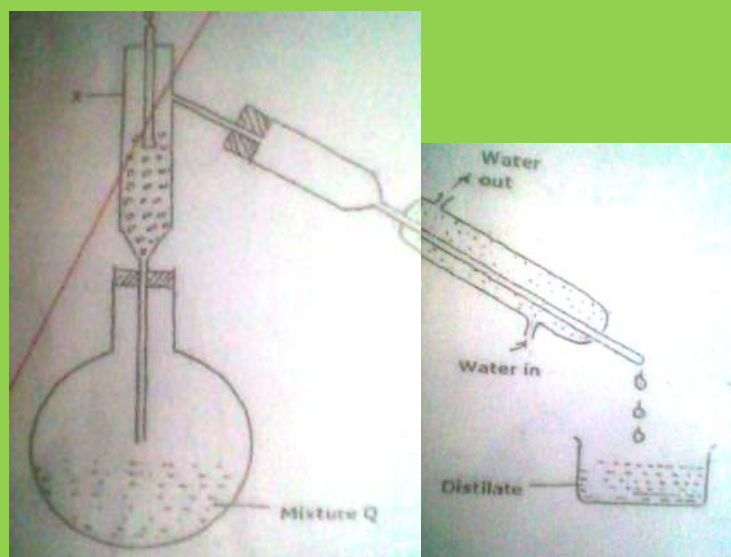
17. The structure below represents a polymer used in the manufacture of toys



i) Draw and name the structure of the monomer (2mks)

ii) Name the type of polymerization that occurs when forming the polymer (1mk)

18. Study the diagram below and answer the questions that follow. The diagram shows the method of separating components of mixture Q



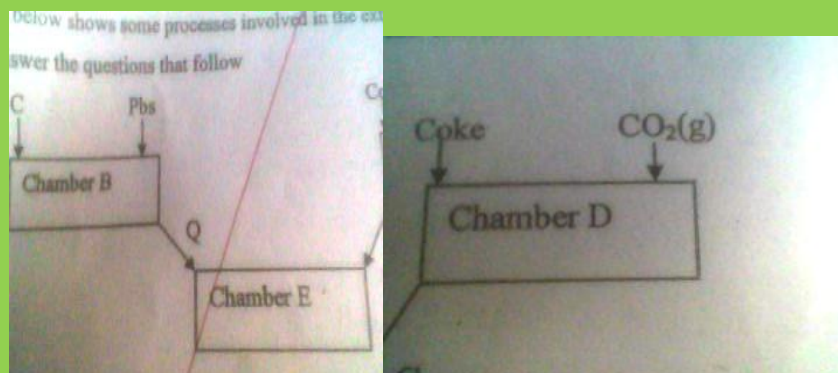
i) State the role of the part labeled X (1mk)

ii) State what would happen if the water inlet and water outlet in the Liebig's condenser is interchanged (1mk)

19 a) Define Gay-Lussac's law (1mk)

b)  $30\text{cm}^3$  of ethane were mixed with  $100\text{cm}^3$  of oxygen and the mixture was sparked to complete reaction. If all the volume were measured at a pressure of one atmosphere and a temperature of  $25^\circ\text{C}$ , Calculate the volume of the residual gas under same condition of temperature and pressure (2mks)

20. The flow chart shows some processes involved in the extraction of lead metal. Study it and answer the questions that follow



a) Name substance C fed into chamber B (1mk)

b) Write an equation for the reaction that take place in chamber B (1mk)

c) Give one use lead metal (1mk)

21. When a hydrocarbon was completely burnt in oxygen 4.2g of carbon iv Oxide and 1.71g of water were formed (H=1, C=12, O=16)

a) Determine the empirical formula of the hydrocarbon (2mks)

b) If the molar mass of the hydrocarbon is 70, determine its molecular formula (1mk)

22. A sample of oxygen gas was found to be mixed of two isotopes  $^{16}_8\text{O}$  and  $^{17}_8\text{O}$ .

Determine the relative molecular masses of the molecular formed when each of these isotopes is burnt in hydrogen (H=1) (2mks)

23. Write equation to show the effect of heat of the following

a) Potassium hydrogen carbonate (1mk)

b) Copper (II) nitrate (1mk)

24. Sodium chloride was formed to be contaminated with copper II oxide. Describe how a sample of sodium chloride can be separated from the mixture (3mks)

25. Define the term sublimation as used in chemistry (1mk)