NAME ……………………………………………………. **INDEX NO** ………………….

SCHOOL ………………………………………………… **DATE** ……………………

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CHEMISTRY   **PAPER 2**
FORM 4

JULY 2017
TIME: 2 *HOURS*
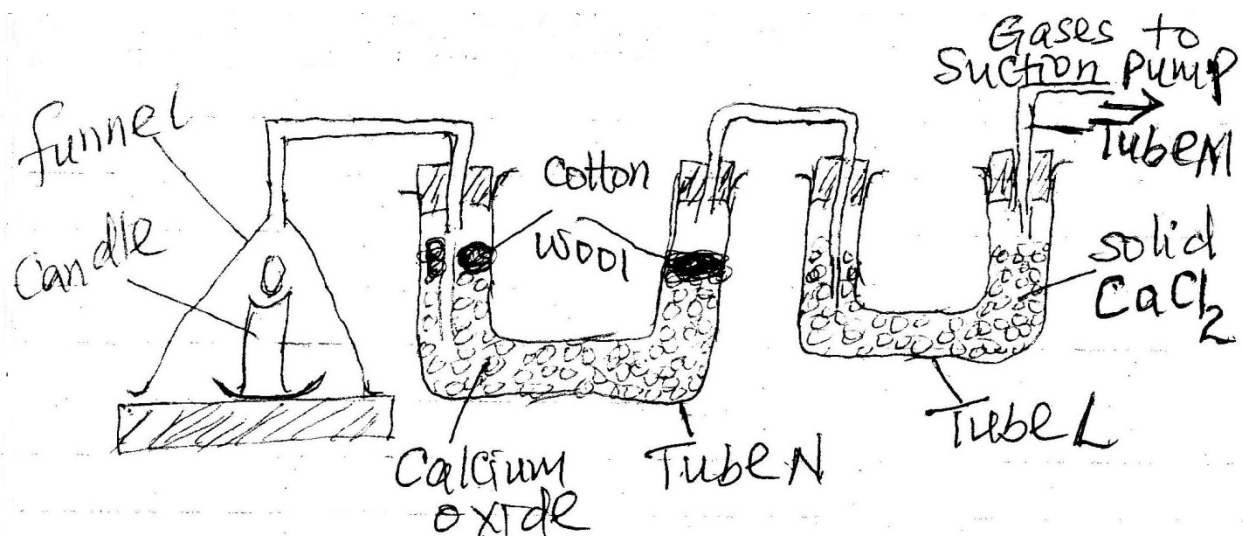
Kenya Certificate of Secondary Education

MURANG'A COUNTY MOCK

END OF TERM II EXAMINATION QUESTIONS

INSTRUCTIONS: Answer all the questions in the spaces provided

1. (a) A candle wax is mainly a compound consisting of two elements. Name the two elements.

   b) The set up below was used to investigate the burning of a candle. Study it and answer the questions that follow;

     (i)   What would happen to the burning candle if the pump was turned off?   (2mks)

(ii)   State and explain the changes in mass that are likely to occur in tube N by the end of the experiments.   (3mks)

(iii)   Name two gases that comes out through tube M.   (2mks)

(iv)   What is the purpose of calcium chloride in tube L?   (1mk)

(v)   Name another substance that could be used in the place of calcium oxide in tube N. (1mk)

2. (a) The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters are not the actual symbols of the elements.

A	D				B		C	
				E		F	G	
H								

(i)   Select the most reactive metal. Explain.   (2mks)

(ii)   Select an element that can form an ion with a charge of 3-.   (1mk)

(iii)   Select an alkaline earth metal.   (1mk)

(iv)   Which group I element has the highest first ionization energy? Explain. (2mks)

(v)   Element A combine with chlorine to form a chloride of A. state the most likely PH value of a solution of a chloride of A. Explain.   (2mks)

b) (i) Explain why molten calcium chloride and magnesium chloride conduct electricity while carbon tetrachloride and silicon tetrachloride do not. (2mks)

3. (a) Distinguish between a neutron and a proton. (1mk)

b) What is meant by a radioactive substance? (1mk)

c) Differentiate nuclear fussion and nuclear fission. (2mks)

d) State two industrial uses of radioactive elements. (2mks)

e) The two isotopes of hydrogen deuterium $\left(^{2}_{1}D\right)$ and tritium $\left(^{3}_{1}T\right)$ reacts to form element Y and neutron particles according to the equation below:

$$\left(^{2}_{1}D\right) + \left(^{3}_{1}T\right) = \left(^{a}_{b}Y\right) + \left(^{1}_{0}n\right)$$
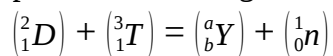
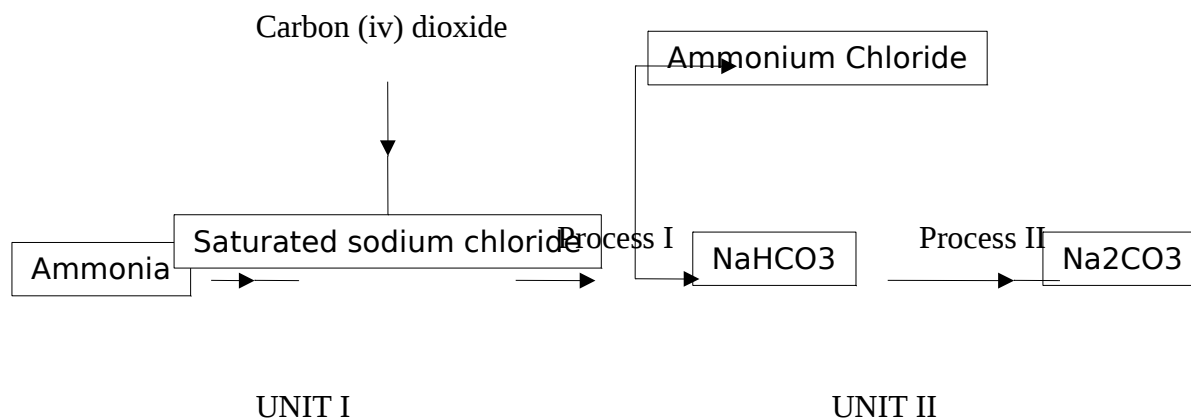(i) What is the atomic; (2mks)
    (I) Mass of Y

    (II) Number of Y

(ii) What name is given to the type of reaction undergone by the isotopes of hydrogen? (1mk)

(iii) What is meant by half life of a radioactive substance? (1mk)

f) 288g of a radio active substance decayed to 9 grammes in 40 days. Determine the half life of the radio active substance. (2mks)

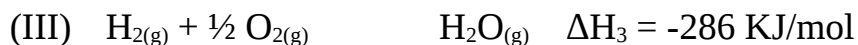4. (a) The schematic diagram shows part of the solvary process used for the manufacture of sodium carbonate.

Carbon (iv) dioxide

Ammonium Chloride

Saturated sodium chloride — Process I

Ammonia

NaHCO3 — Process II — Na2CO3

UNIT I   UNIT II

(i)   Explain how the sodium chloride required for this process is obtained from sea water. (2mks)

(ii)   Two main reactions take place in UNIT I. the first one is the formation of ammonium hydrogen carbonate.
   (a) Write an equation for this reaction.   (1mk)

   (b) Write an equation for the second reaction.   (1mk)

(iii)   State how the following are carried out;
   (a) Process I   (1mk)

   (b) Process II

(iv)   In an experiment to determine the percentage purity of the sample of sodium carbonate produced in the solvary process 2.15g of the sample reacted completely with 46.0cm^3 of 0.5M sulphuric (vi) acid.
   (a) Calculate the number of moles of sodium carbonate that reacted.   (2mks)

(b) Determine the percentage of sodium carbonate in the sample. (Na = 23, C=12, O=16).
(2mks)

(c) Name two industrial uses of sodium carbonate. (2mks)

5. (a) Define the standard enthalpy of formation of a substance. (1mk)

b) Use the thermo chemical equations below to answer the questions that follow:
(I) $C_2H_{6(g)} + 3\frac{1}{2} O_{2(g)}$ $2CO_{2(g)} + 3H_2O_{(l)}$ $\Delta H_1 = -1560KJ/mol$

(II) $C(graphite) + O_{2(g)}$ $Co_{2(g)}$ $\Delta H_2 = -394 KJ/mol$

(III) $H_{2(g)} + \frac{1}{2} O_{2(g)}$ $H_2O_{(g)}$ $\Delta H_3 = -286 KJ/mol$

(i)   Name two types of changes represented by ΔH_3 (2mks)

(ii)   Draw an energy level diagram for the reaction represented by equation (I)   (2mks)

(iii)   Calculate the standard enthalpy of formation of ethane.   (2mks)

(iv)   When a sample of ethane was burnt, the heat produced raised the temperature of 500g of water

by 21.5k (Specific heat capacity = $4.2Jg^{-1}K$). Calculate;

(I)   Heat change for the reaction.   (2mks)

(II)   Mass of ethane that was burnt. (R.A.M of ethane = 30).   (2mks)

6. (a) Give the names of the following compounds; (2mks)

   (i)   CH$_3$

                CH   C   CH$_3$

                   CH$_3$

   (ii)   CH$_3$C $\equiv$ C CH$_2$ CH$_3$
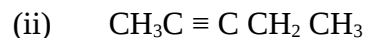
b) Determine a chemical test that can be carried out in order to distinguish between the compounds in (a) above.   (2mks)

c) Study the flow chart below and answer the questions that follow;

                                        (1) Ethanoic acid

                                        2) Conc H$_2$SO$_4$ acid

M   Polymerization Ethene   Step I Ethanol   Warm   L

              Hydrogen
              Nickel   150oC
                                  (1) Excess chlorine   P
                   N   (2) U.V. light   Step 3

   (i)   Name the compounds;   (1mk)
           (I)   L

           (II)   N

   (ii)   Draw the structural formula of compound M showing two repeat units.   (1mk)

   (iii)   Give the reagent and the condition used in step I.   (1mk)

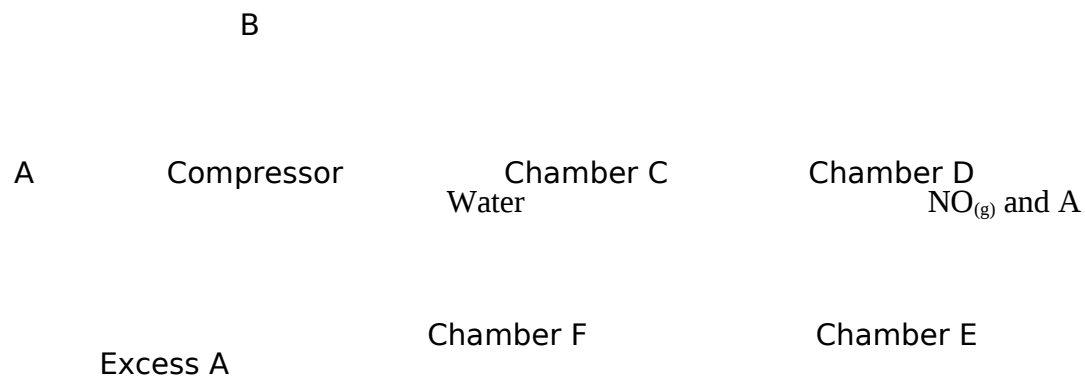   (iv)   State the type of reaction that take place in:

(I)   Step 2

(II)   Step 3

d) The molecular formula of compound P is $C_2H_2Cl_4$. Draw the structural formula of compound P.
(2mks)

7. The flow chart below illustrates the major steps in the manufacture of nitric acid. Study it and answer the questions that follows;

B

A   Compressor   Chamber C   Chamber D
                        Water $NO_{(g)}$ and A

                        Chamber F   Chamber E
      Excess A

                        65% nitric (V)
(a) Give reason for purifying the raw materials A and B.   (1mk)

(b) Name the substances;   (1mk)
    A _____

    B _____

(c) Name the parts labeled;   (3mks)
    D _____

    E _____

    F _____

(d) Write chemical equations for the reactions taking place in;
    (I)   Chamber D.   (1mk)

    (II)   Chamber F.   (1mk)

(e) Name any other condition required in chamber D apart from maintaining temperature at 900°C.
(1mk)

(f) A mixture that comes out is 65% acid and 35% water. How could the concentration of nitric (v) acid be increased. (1mk)

(g) Give one use of nitric acid. (1mk)

(h) When copper metal is reacted with dilute nitric (v) acid, a brown gas is evolved. Explain. (1mk)