KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

KABARAK HIGH SCHOOL
CHEMISTRY
**PAPER 1**
TIME: 2 HOURS

KABARAK HIGH SCHOOL KCSE TRIAL AND
AND PRACTICE EXAM 2016

INSTRUCTIONS TO CANDIDATES:

- Write your name and Index number in the space provided above.
- Answer *all* the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators can be used.

Question	Maximum score	Candidate's score
Score 1 - 29	80	

1.   Define the following terms   (3mks)
        (a)   Isotopes
        (b)   Mass number
        (c)   Isobars
2.   Calcium oxide can be used to dry hydrogen chloride gas.
        (a) Explain why calcium oxide is not used to dry chlorine gas   (2mks)
        (b) Name one drying agent for hydrogen chloride gas other than the one named above
                                                                    (1mk)
3.   (a) Give a reason why ammonia gas is highly soluble in water.   1mk)
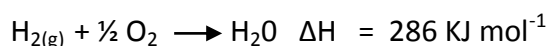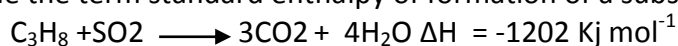   (b) The structure of ammonium ion is shown below
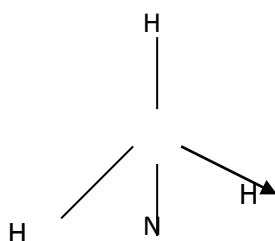
        Name the type oτ ɒond represented in the diagram by N ⟶ H.........................
                                                                    (1mk)
4.   The graph below shows part of a temperature –time curve obtained when solids
        naphthalene   was heated.

        Time (min)
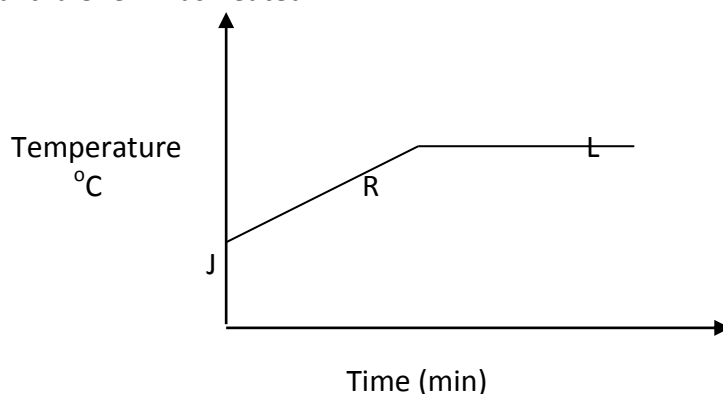
        (a) Explain what happens to the naphthalene molecules along the curves.
        (i) JR   (1mk)
         (ii) RL   (1mk)
5.   (a) Define the term standard enthalpy of formation of a substance   (1mk).
                $C_3H_8 + SO2 \longrightarrow 3CO2 + 4H_2O \ \Delta H = -1202 \ Kj \ mol^{-1}$

                $C_{(s)} \ graphite \ + \ O_2 \longrightarrow CO_2 \ \Delta H = -394 Kj \ mol^{-1}$

                $H_{2(g)} + ½ O_2 \longrightarrow H_2 0 \ \ \Delta H \ = \ 286 \ KJ \ mol^{-1}$

Using the above thermo chemical equations:

(b)   Name two types of heat changes represented by ΔH_3 (1mk)

(c)   Using an energy cycle diagram, calculate the molar enthalpy of formation of
propane   (2mks)

6.   The diagram below illustrates how sulphur is extracted by frasch process

→ Ground level

→ Sulphur beds
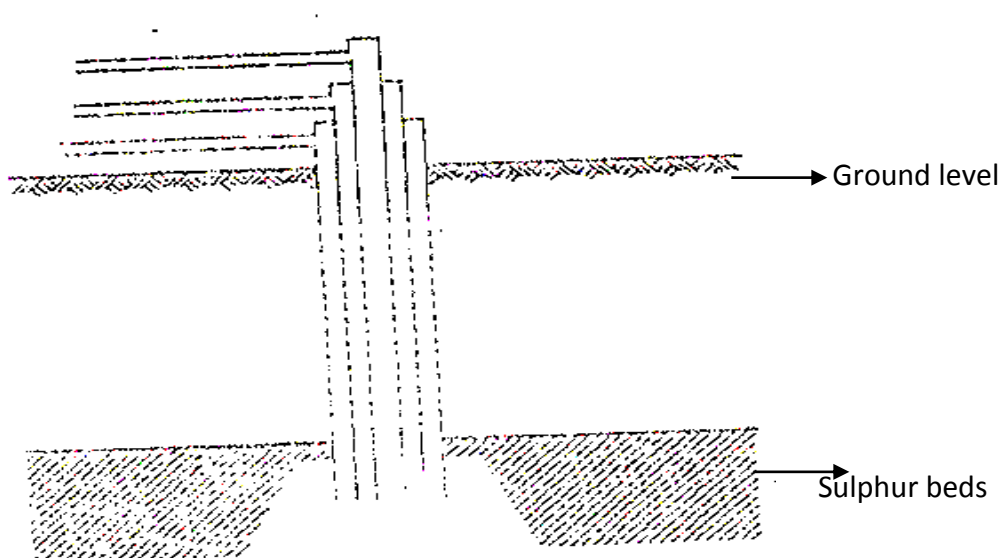
(a) Label the pipe through which super heated water is pumped in   (1mk)

(b) The equation below shows the oxidation of sulphur(IV) oxide to sulphur (VI) oxide in
contact   process.

$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ $\Delta H = -196Kj^{mol-1}$

(i)   Name one catalyst for this reaction   (1mk)

(ii)   State and explain the effect on the yield of sulphur (VI) oxide when

  I the temperature is increased   (1mk)

  II the amount of oxygen is increased (1mk)   (1mk)

7.   Both diamond and graphite have giant atomic structures. Explain why diamond is hard while
graphite is soft.   (2mks)

8   (a) Using dot (.) and crosses(x) to represent electrons, show bonding in the compounds   formed
when   the following elements reacts. (C-=6, Na=11,   F=9)
(a) Sodium and fluorine   (1mk
(b) Carbon and fluorine   (1mk)

9   The list below gives the formulae of some organic compounds. Use it to answer the   questions
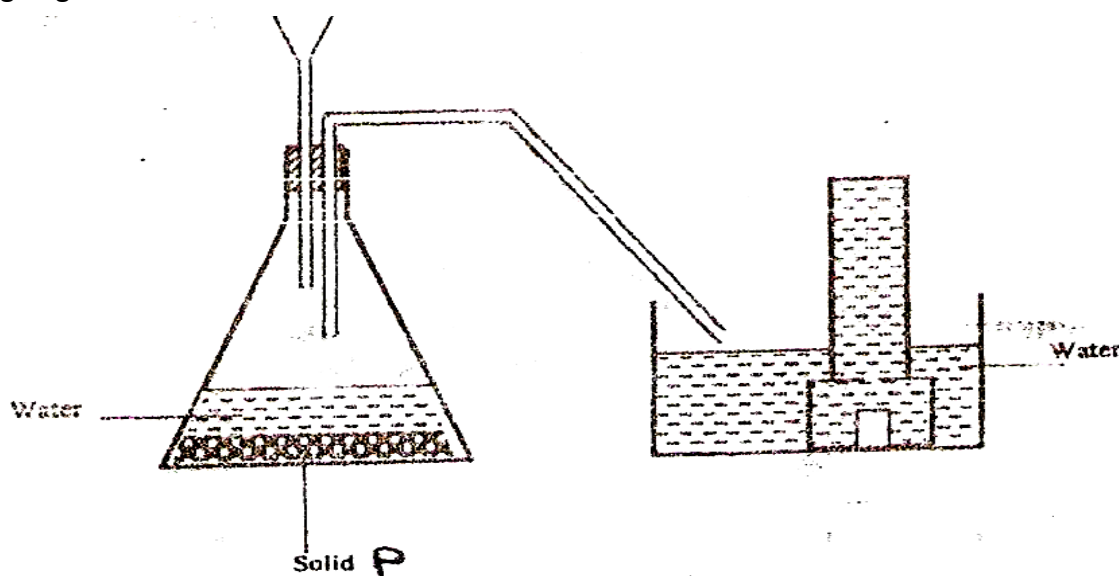that follow

    I $CH_3CH_2CH_2CH_2OH$
    II $CH_3CH_2CH_3$

                     O
                     ‖
    III $CH_3CH_2CH_2$ C   OH

    IV $CH_3CH_2CH_2$ CH_3

10. The table below gives the solubility of potassium bromide and potassium sulphate at 0°c and 40°C

Substance	Solubility g/100g H_2O at	
	0°c	40°C
Potassium bromide	55	75
Potassium sulphate	10	12

When an aqueous mixture containing 60g of potassium bromide and 7g potassium sulphate   in 100g of water at 80°c was cooled to 0 °C, some crystals were formed
   (a)   Identify the crystals   (1mk)
   (b)   Determine the mass of the crystals   (1mk
   (c)   Name the method used to obtain the crystals   (1mk

11.   The diagram below shows a set-up used by a student in an attempt to prepare and collect oxygen gas.

   (a)   Complete the diagram by correcting the mistakes in the set ups   (2mk)
   (b)   Identify solid P   (1mk)
12.   The table below gives information about the major components of crude oil. Study it and answer the questions that follow.

Components	Boiling point °C
Gases	Below 40
Petrol	40-175
Kerosene	175-250
Diesel oil	250-350
Lubricating oil	350-400
Bitumen	Above 400

   (i)   Which of the compounds of crude oil has molecules with the highest number of   carbon atoms?
          Explain   (1mk)
   (ii)   Name the process you would use to separate a mixture of diesel and petrol
                                                                              (1mk)
   (iii)   What condition could cause a poisonous gas to be formed when Kerosene is burnt
                                                                              (1mk)

13   In order to determine the molar heat of neutralization of sodium hydroxide 100cm3 of 1M sodium hydroxide and 100cm^3 of 1M hydrochloric acid, both at the same initial temperature were mixed and stirred continuously with a thermometer. The temperature of the resulting solution was recorded after every 30 seconds until the highest temperature of the solution was attained. Thereafter the temperature of the solution was recorded for further two minutes

(a)   Write an ionic equation for the reaction which took place   (1mk)

(b)   The sketch below was obtained when the temperatures of the mixture were plotted against time. Study it and answer the questions that follow
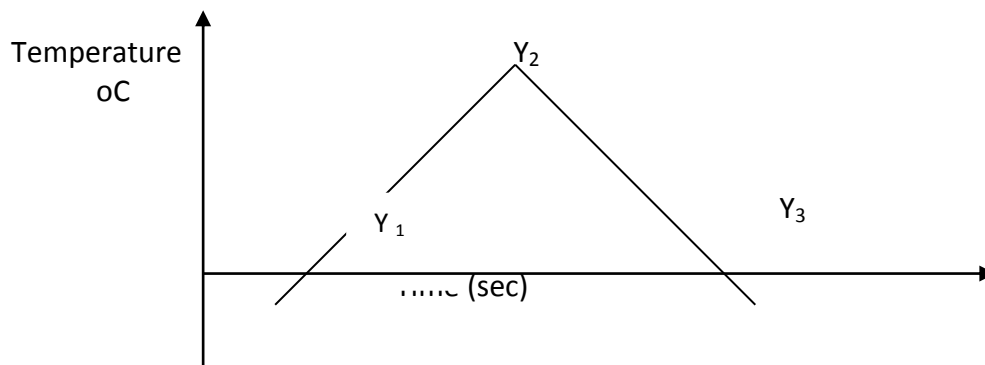

i)   What is the significance of point Y_2 (1mk)

ii)   Explain the temperature change   (1mk)

(a)   Between Y_1 and Y_2

(b)   Between Y_2 and Y_3 (1mk)

14.   For each of the following experiments, give the observations, and the type of change that occurs (Physical or chemical)

| Experiment	Observation	Type of change
A few drops of concentrated sulphuric acid added to small amounts of sugar		
A few crystals of Iodine are heated gently in a test tube		
A few crystals of copper (II) Nitrate are heated strongly in a test tube.		

15.   In the lab. Ammonia gas is prepared by heating an ammonium salt with an alkali.

(a)   What is meant by the term alkali   (1mk)

(b)   i) Explain using the physical properties of the gas, why ammonia is not collected

        (i) Over water   (1mk

        (ii) By downward delivery   (1mk)

16   The set up   below was used to prepare nitric acid

Liquid T

Sodium

cold   water

Nitrate

Nitric
acid

_____
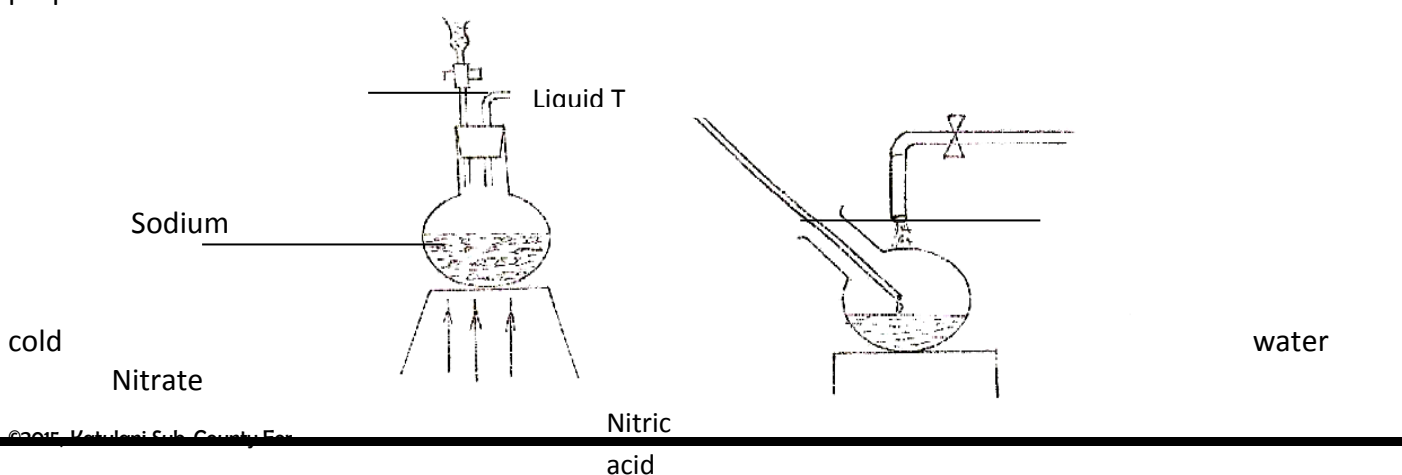
(a) Give the name of liquid T(1mk)   T   (1mk)
(b) Write the equation for the reaction which took place in the reaction flask
                                                                                                    (1mk)
 (c)   Explain why nitric acid is stored in a dark bottle   (1mk)

17. Study the diagram below and answer the questions that follow.
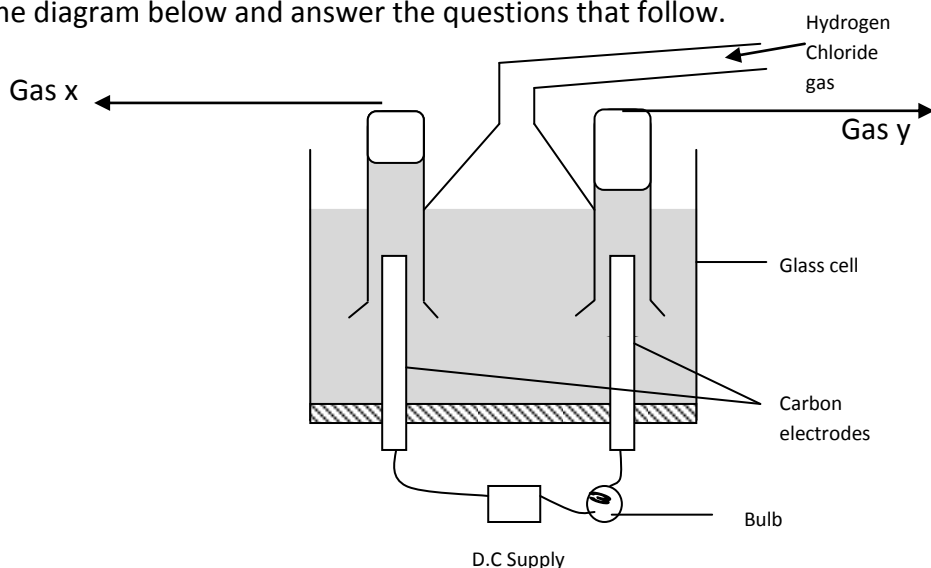
When some hydrogen chloride gas is allowed into water and the mixture stirred, the bulb
lights   and gasses X and Y are formed   (2mks)
(a) Name
    (i) Gas X
     (ii) Gas Y
(b) Explain why the bulb does not light before the chloride gas is let into the water
                                                                                              (2mks)

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

Elements	Electron arrangement	Atomic radius	Ionic radius
K	2, 8 2	0.136	0.065
L	2, 8, 7	0.099	0.181
M	2, 8, 8, 1	0.203	0.133
N	2, 8, 8, 2	0.174	0.099

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

19. The table below gives reduction potentials obtained when the half-cells for each of the elements
    represented by A, B, C, D and E were connected to a copper half-cell as the reference electrode.

Metal	Reduction Potential (Volts)
A	-1.10
B	-0.47
C	0.00
D	+0.45
E	+1.16

(a) What is element C likely to be? Give a reason   (2mks)

(b) Which of the metals cannot be displaced from the solution of its salt by any other metal in the table. Give a reason (2mk)

(c) Metal B and D were connected to form a cell as shown below
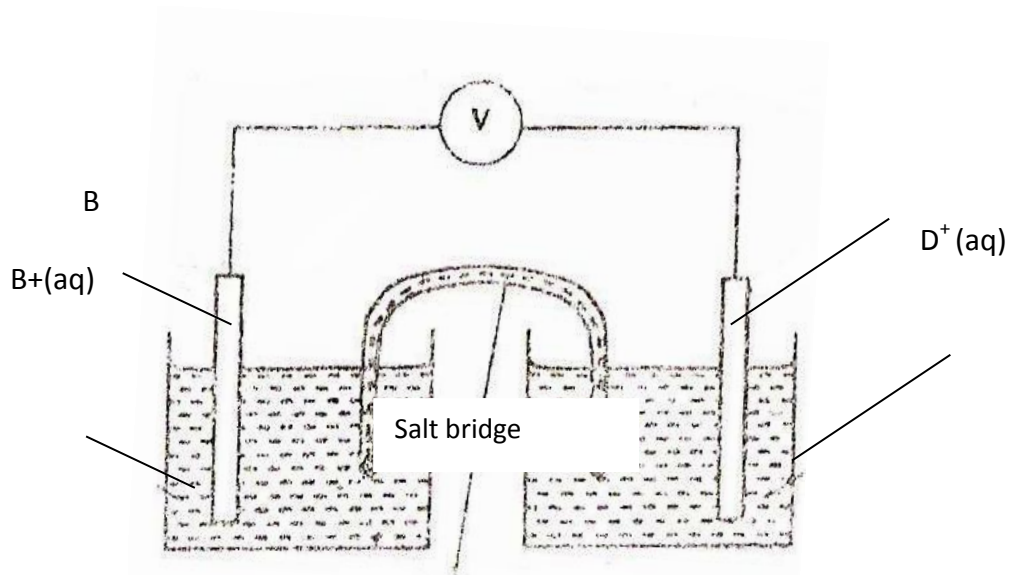
Write the equation for the half cell reaction that occur at metal B electrode
(1mk)

20. The graph below shows the behaviour of a fixed mass of a gas at constant temperature
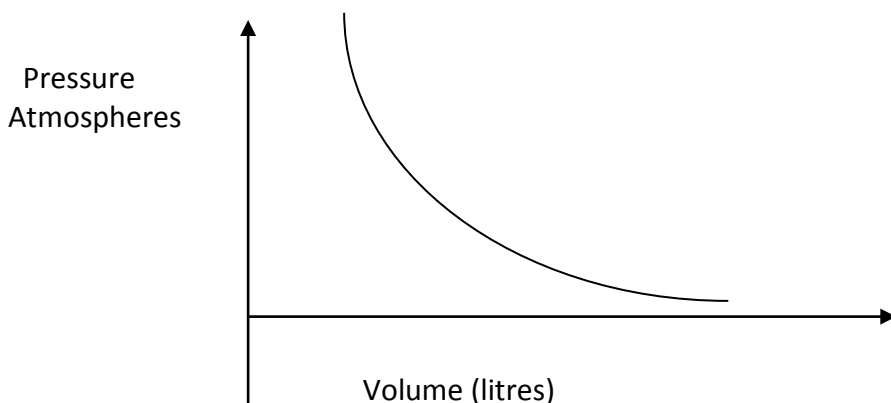
(a) What is the relationship between the volume and the pressure of the gas
(1mk)

(c) 3 litres of oxygen at one atmospheres pressure were compressed to two atmospheres Pressure at constant temperature. Calculate the volume occupied by the oxygen gas
(2mks)

21 Study the flow chart below and answer the questions that follow
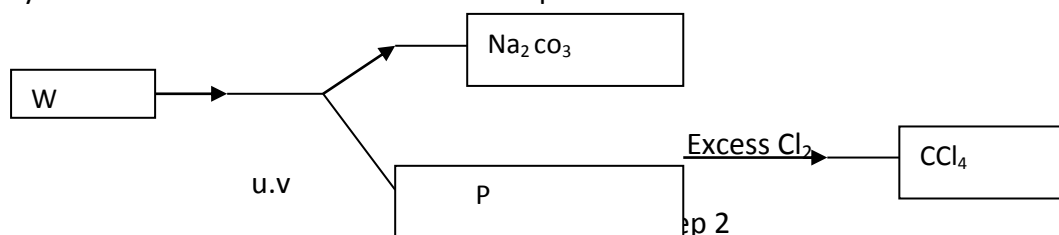
(a) Identify W and P (2mks)

(b) What name is given to the type of halogenation reaction in step 2. (1mk)

22   (a) Define the term half-life as used in radioactivity   (1mk)
      (b) 100g of a radio active substance was reduced to 12.5g in 15.6 years. Calculate one   half-life of
           the substance
23   (a) Define the term oxidation state.   (1mk)
       (b) Calculate the oxidation states of chromium and manganese in the following ions.
                                                                                                (2mks)
      (i) Chromium in $Cr_2O_7^{2-}$
      (ii) Manganese in MnO_4^-
24   Write one structural formulae of
      (i) Methanol   1mk)
       (ii) Methanoic acid   (1mk)
       (b) Write the equation for the reaction between methanoic acid and sodium hydroxide
                                                                                                (1mk)
      (c) Name the product formed when methanol reacts with methanoic acid   (1mk)
      (d) State one condition necessary for the reaction in (c) to take place (1mk)
25.   In an experiment to electroplate a copper spoon with silver, a current of 0.5A was passed for   18
minutes. Calculate the amount of silver deposited on the spoon (IF =96500 coulombs   ,Ag=108)
                                                                                                (3mks)