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

233/1   CANDIDATE'S SIGN………….…….……..
CHEMISTRY
PAPER 1   DATE………..……………………………
(THEORY)
JULY/AUGUST, 2014
TIME: 2 HOURS

KIHARU/KAHURO DISTRICT JOINT EXAMINATION - 2014

Kenya Certificate of Secondary Education
CHEMISTRY
PAPER 1
(THEORY)
TIME: 2 HOURS

<u>**INSTRUCTIONS TO CANDIDATES**</u>:
(i)   Write your **name** and **index number** in the spaces provided **above**.
(ii)   **Sign** and write the **date** of examination in the spaces provided **above**.
(iii) Answer **ALL** the questions in the spaces provided.
(iv)   Mathematical tables and silent electronic calculators **may be** used.
(v)   All working **must be** clearly shown where necessary
(vi)   Candidates should check the question paper to ascertain that all the pages
       are printed as indicated and that no questions are missing

For Examiner's Use Only

Questions	Maximum Score	Candidate's Score
1 – 28	**80**	

Chemistry Paper 1   *Turnover*
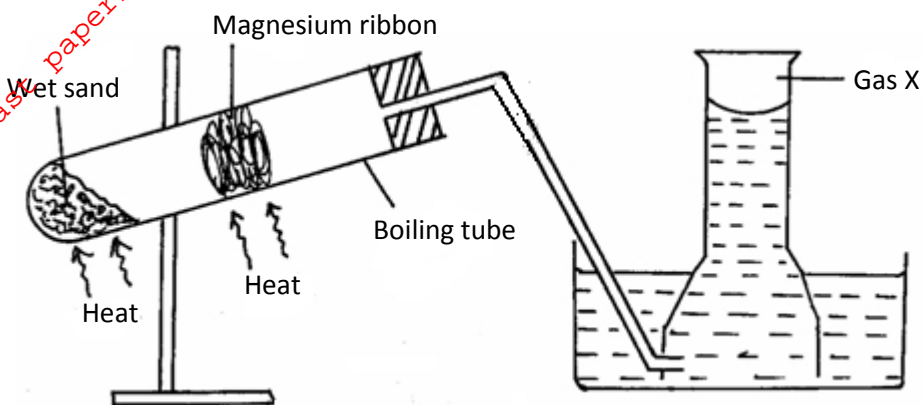
1. Volumes of liquids can be measured using a pipette; measuring cylinder or burette. Explain which one would be best for measuring 19.9cm³ of liquid. (2mks)

_____

_____

_____

2. Use the set-up below to answer the questions that follow:-

(a) Identify gas **X**. (1mk)

_____

(b) Explain the following precautions:
   (i) Wet sand was first heated before heating magnesium ribbon. (1mk)

   _____

   _____

   _____

   (ii) Delivery tube is removed from the water before heating is stopped at the end of the experiment. (1mk)

   _____

   _____

   _____

3. Give the I.U.P.A.C name of the oxide of nitrogen that:-
   (i) Relights a glowing splint. (1mk)

   _____

   (ii) Forms brown complex compound with acidified iron II sulphate solution. (1mk)

   _____

(iii) Reacts with water to form nitric V acid. (1mk)

_____

4. The table below gives atomic numbers of elements represented by letters **A**, **B**, **C** and **D**.

Element	A	B	C	D
Atomic number	7	8	9	12

(i) Name the type of bonding that exists in the compound formed when **B** and **C** react. (1mk)

_____

(ii) Select the letter which represents the best reducing agent. Give a reason. (2mks)

_____

_____

_____

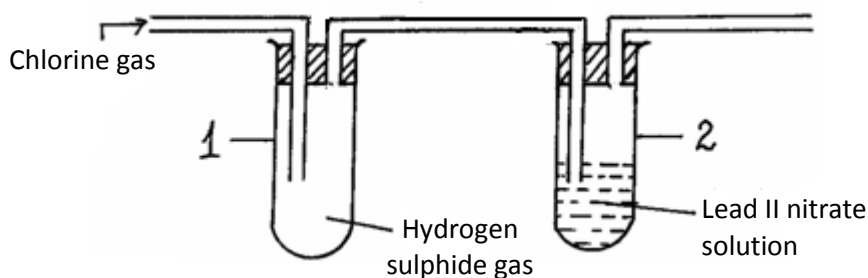5. Element R – 238 decays in series forming different nuclides as shown below:-

$$^{238}_{92}R \xrightarrow{X} {}^{234}_{90}P \xrightarrow{Y} {}^{234}_{91}T$$
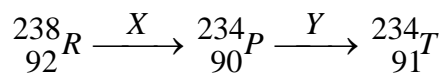
(a) Identify the type of decay. (2mks)

X _____   **Y** _____

(b) Give one use of radioactive isotopes. (1mk)

_____

_____

_____

6. In an experiment chlorine gas was passed into moist hydrogen sulphide gas as shown below.

Chlorine gas
1
2
Hydrogen sulphide gas
Lead II nitrate solution

(a) What property of chlorine gas was being investigated? (1mk)

_____

(b)   What observations were made in tube?   (2mks)

(i)   **1**_____

(ii)   **2**_____

7.   The P^H of a soil sample was found to be 5.7. An agricultural officer recommended addition of lime.

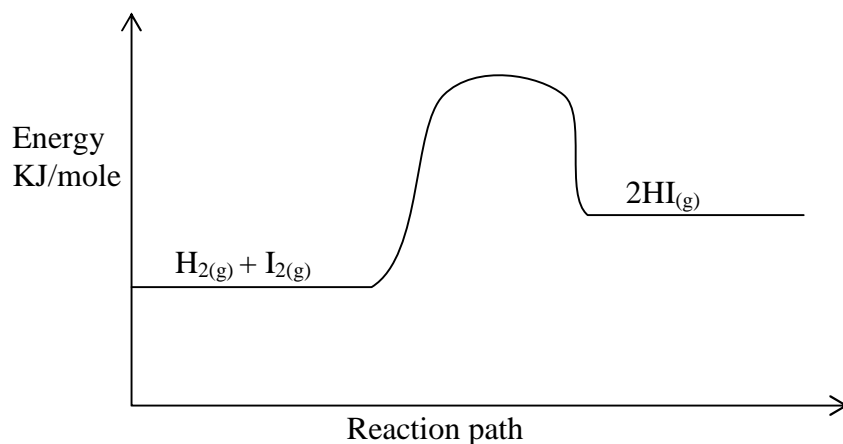(a)   State **two** functions of the lime.   (2mks)
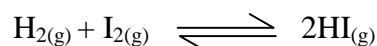
_____

_____

(b)   Give the name of the process applied in (a) above.   (1mk)

_____

8.   Name the **two** compounds formed when magnesium burns in air.   (2mks)

_____

_____

9.   Production of hydrogen iodide can be demonstrated by the equation.

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$$

Explain how the following would affect the yield of hydrogen iodide.

(i)   Increase in temperature.   (2mks)

_____

_____

_____

(ii)   Decrease in pressure.   (1mk)

_____

_____

_____

10. The table below shows elements in the halogen group of the periodic table. Study the table and answer the questions that follow.

Element	Atomic number	Melting point °
Fluorine	9	-218
Chlorine	17	-101
Bromine	35	-7
Iodine	53	114

(i) Name the element likely to be a solid at room temperature. Explain. (2mks)
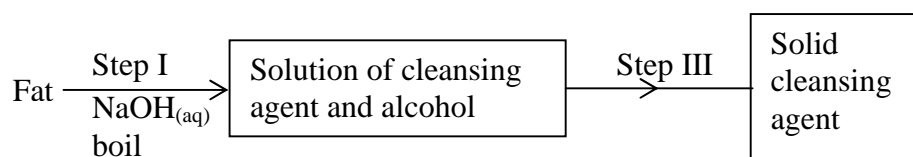
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_____

_____

(ii) Explain why the melting point increases from fluorine to iodine. (2mks)

_____

_____

_____

11. The scheme below was used to prepare a cleansing agent. Study it and answer the questions that follow:

Fat $\xrightarrow[\substack{NaOH_{(aq)} \\ boil}]{Step\ I}$ [Solution of cleansing agent and alcohol] $\xrightarrow{Step\ III}$ [Solid cleansing agent]

(a) What name is given to the type of cleansing agent prepared by the method shown in the scheme. (1mk)

_____

(b) Name **one** chemical substance added in Step II. (1mk)

_____

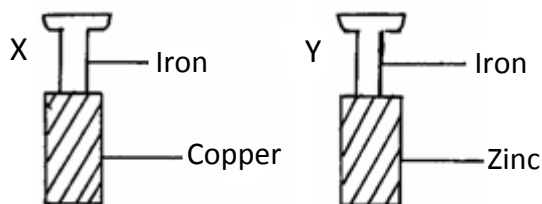(c) What is the purpose of adding the chemical substance named (ii) above. (1mk)

_____

_____

12. A form two student in an attempt to prevent rusting, put copper and zinc in contact with iron as shown below:

X ⊢— Iron   Y ⊢— Iron

— Copper   — Zinc

(i)   State what would happen in set up **X** and **Y** after one week.   (2mks)

_____

_____

(ii)   Explain your answer in diagram **Y**.   (1mk)

_____

_____

_____

13.   An element X has a relative atomic mass of 88. When a current of 0.5 amphere was passed through a fused chloride of X for 32 minutes 10 seconds, 0.44g of X was deposited.

(i)   Determined the charge of element X [1 Faraday = 96500C].   (2mks)

(ii)   Write the formula of hydroxide of **X**.   (1mk)

14.   In an experiment ammonium nitrate was strongly heated in a boiling tube and the gas **Y** produced collected as shown.
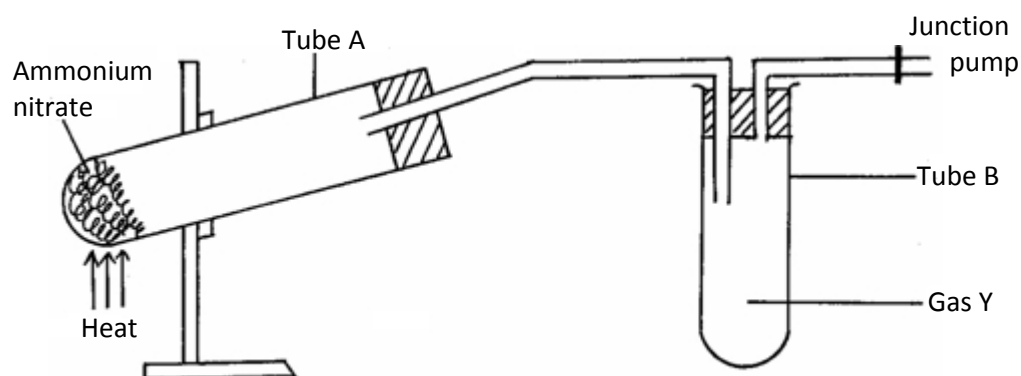
(i)   Write an equation for the reaction that occurs in tube **A**.   (1mk)

(ii) State **one** property of gas obtained by heating ammonium nitrate which is also a property of oxygen gas. (1mk)

_____

(iii) Burning sulphur was introduced into tube B after which a filter paper soaked in acidified potassium dichromate (VI) was dropped into tube B. State the observations made. (1mk)

_____

_____

_____

15. In the industrial extraction of lead metal, ore is roasted in a furnace. The solid mixture obtained is then fed into another furnace together with coke, limestone, and scrap iron. State the function of the following in the process. (3mks)

(i) Coke.

_____

_____

_____

(ii) Limestone.

_____

_____

_____

(iii) Scrap iron.

_____

_____

_____

16. (a) Describe how the following reagents can be used to prepare calcium sulphate. Solid potassium sulphate, solid calcium carbonate, dilute nitric (V) acid and distilled water. (2mks)

_____

_____

_____

_____

(b) Give the name of the method you have described above to prepare calcium sulphate. (1mk)

_____

17. Explain why it is not advisable to leave a jiko with burning charcoal in a closed room where one is sleeping. (2mks)

_____

_____

_____

_____

18. When 2g of iron fillings were placed in 100cm³ of 0.1M copper (II) sulphate solution, the temperature rose by 4°C. Calculate the molar heat of reaction given that specific heat capacity is 4.2JgK and density of solution is 1.0g/cm³. (3mks)

19. Study the structure of below:
$C_3H_7 COOC_2 H_5$
(a) Name the compound. (1mk)

_____

(b) Name the compounds used to prepare the above compound. (1mk)

_____

(c) What is the identifying physical property of the above compound? (1mk)

_____

20. An organic compound has empirical formular C_3H_6O. The molecular mass of the compound is 116.
(i) Calculate the molecular formular of the compound (C = 12, 0 = 16, H = 1). (1mk)

(ii)   To what homologous series does the above compound belong?   (1mk)

_____

(iii)   Draw the structural formulae of the compound above.   (1mk)

21.   Identify the particles which enable the following substances to conduct electricity.
(i)   Aluminium metal.   (1mk)

_____

(ii)   Molten lead (II) bromide.   (1mk)

_____

22.   100cm³ of gas A takes 30 seconds to diffuse through a porous plug. While 300cm³ of oxygen gas takes 120 seconds. Calculate the relative molecular mass of gas A.   (3mks)

_____

_____

_____

_____

_____

_____

23.   The table below shows liquids that are miscible and those that are immiscible.

Liquid	A_3	A_4
A_1	Miscible	Miscible
A_2	Miscible	Immiscible

(a)   Name the method that can be used to separate A_1 and A_3 from a mixture of the two. (1mk)

_____

(b)   Describe how a mixture of A_2 and A_4 can be separated.   (2mks)

_____

_____

_____

_____

24.   Explain the difference in bleaching action of chlorine and sulphure (IV) oxide gas.   (2mks)
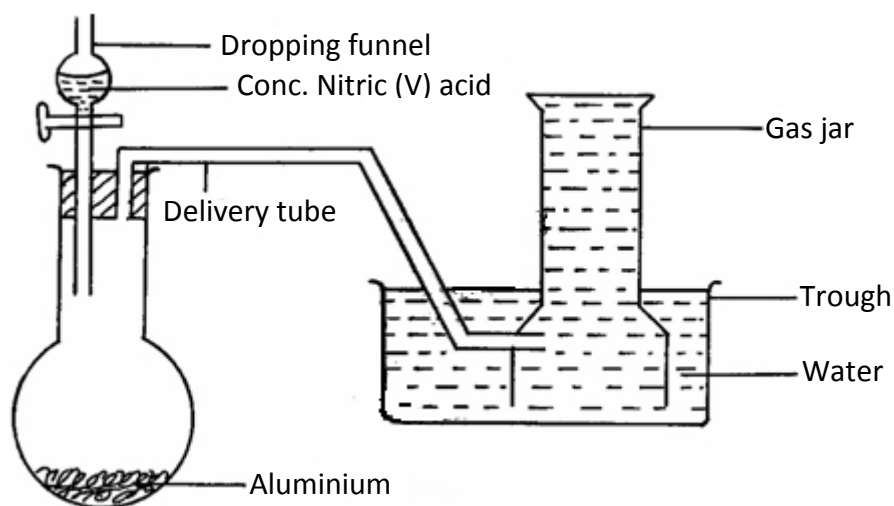
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25.   In order to prepare hydrogen gas in the laboratory a student set-up the apparatus as shown in the diagram below. Study it and answer the questions that follow.

(a)   Suggest why the student did not collect hydrogen gas.   (1mk)

_____

_____

_____

(b)   In a separate experiment the student reacted iron and hydrochloric acid to prepare hydrogen gas.

        (i)   Write an ionic equation for the reaction.   (1mk)

(ii) The hydrogen gas produced was found to have a foul smell. Suggest an explanation for this. (1mk)

_____

_____

_____

26. Study the information in the table and answer the questions below.

Substance	Solubility g/100g water
V	126
W	2

Describe how a solid sample of substance **V** could be obtained from a solid mixture of **V** and **W**. (3mks)

_____

_____

_____

_____
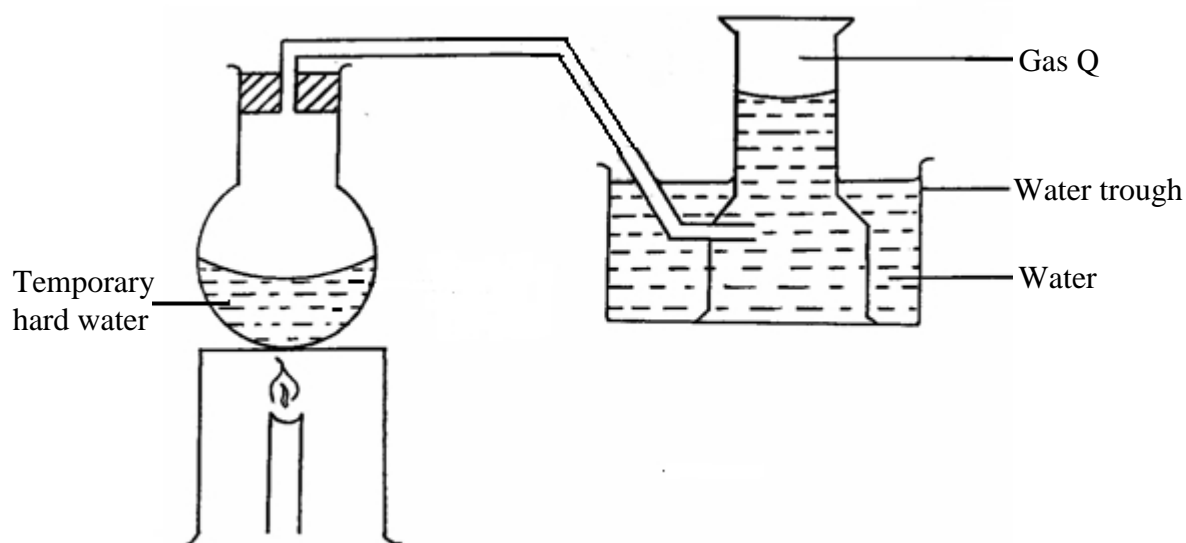
27. The set-up below is used to demonstrate the effect of heat on hard water.

(i) Name gas **Q**. (1mk)

_____

(ii) Explain why heating of the hard water produced gas **Q**. (2mks)

_____

_____

_____

_____
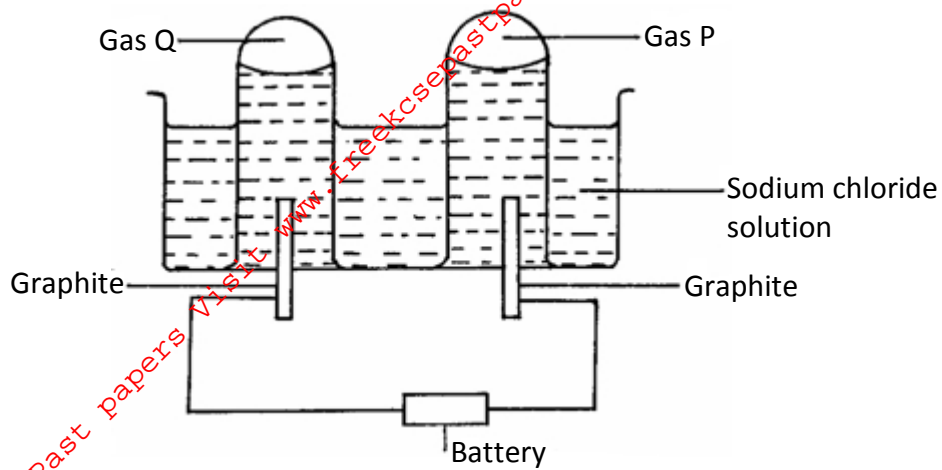
28. A solution of sodium chloride is electrolysed as shown below.

(a) Label the cathode and anode. (1mk)

(b) Write equations for the reactions at: (2mks)
   (i) Anode

   (ii) Cathode.