NAME:.. INDEX NO...

SCHOOL.. CANDIDATE'S SIGN...

DATE...

233/1
CHEMISTRY
(THEORY)
PAPER ONE
FORM FOUR
MARCH/APRIL 2013
TIME: 2 HOURS

WESTERN ZONE JOINT EXAMINATIONS (WEZOJE) - 2013
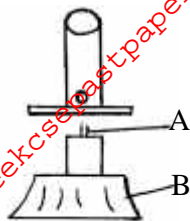## The Kenya Certificate of Secondary Education

Instructions to Candidates

1. Write your name, class and admission number in the space provided at the top of this page.
2. Answer all questins in the spaces provided

FOR EXAMINERS USE ONLY

QUESTION	MAX SCORE	CANDIDATES SCORE
1-24	80	

1. a) The diagram shows some parts of a Bunsen burner. Study it and answer the questions that follow.

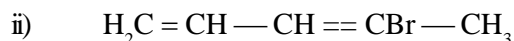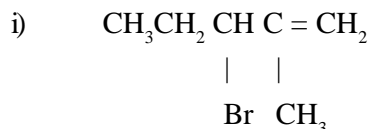Explain how the parts labeled A and B are suited to their functions.   (2marks)

I.   A

....

II   B

....

b) State TWO reasons why most apparatus in the Laboratory are made of glass.   (1mark)

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2. a) Give the structural formula of 3, 3 – dimethyl pent-1-yne.   (1mark)

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b) Name the following compounds using the IUPAC system.   (2marks)

i) $CH_3CH_2\ CH\ C = CH_2$

          | |

        Br CH_3

....

ii) $H_2C = CH — CH == CBr — CH_3$

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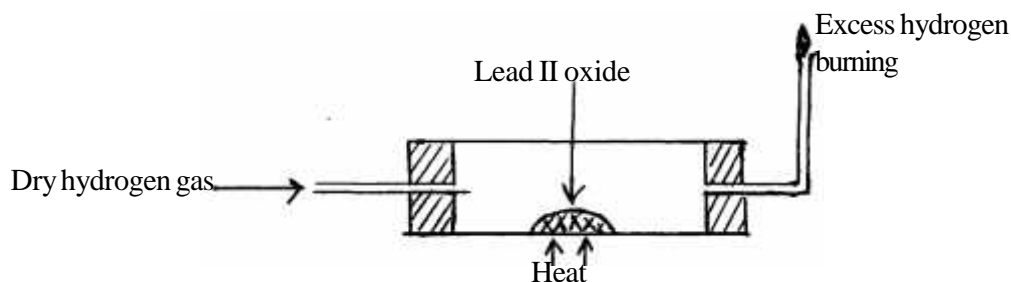
3. When excess magnesium ribbon is burned in air two products are formed.

i)   Identify the two products.   (1mark)

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ii)   Write two equations of the reactions that form the products in (u) above.   (2marks)

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4. In an experiment, dry hydrogen was passed over heated Lead (II) oxide as shown in the diagram below.

State and explain the observations made in the combustion tube. (3marks)

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5. The table below gives the solubility of potassium bromide and potassium Sulphate at 0^0 and 40^0C.

Substance	Solubility	g/100g og H_2O at
	0^0C	40^0C
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 80^0C was cooled to 0^0C, some crystals were formed.

a) Identify the crystals. (1mark)

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b) Determine the mass of the crystals. (1mark)

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c) Name the method used to obtain the crystals. (1mark)

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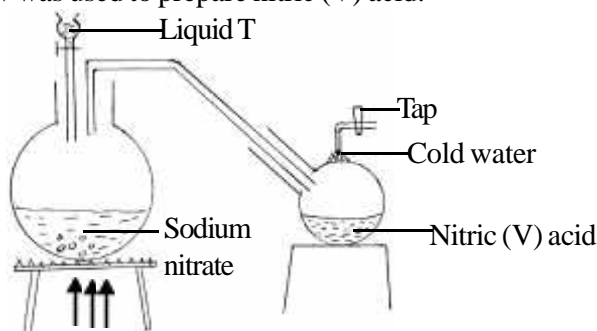
6. In terms of structure and bonding, explain why graphite is used as a lubricant. (2marks)

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7. The set-up below was used to prepare nitric (V) acid.

a) Give the name of liquid T. (1mark)

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b) Write the equation for the reaction which took lace in the reaction flask. (1mark)

....

c) Explain why nitric acid is stored in a dark bottle. (1mark)

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8. Aluminum oxide reacts with both acids and bases.

a) Write an equation for the reaction between aluminum oxide and hydrochloric acid. (1mark)

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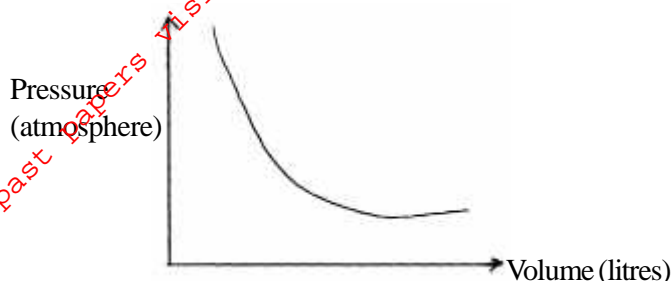
b)   Using the equation in (a) above, calculate the number of moles of hydrochloric acid that would completely react with 153.0g of aluminum oxide. (Al = 27.0, O = 16.0)   (2marks)

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9.   The graph below shows the beahviour of a fixed mass of a gas at a constant temperature.

Pressure
(atmosphere)

Volume (litres)

a)   What is the relationship between the volume and pressure of the gas?   (1mark)

....

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

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10   a)   Use the bond enthalpies given below to find the heat of reaction for

$$N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$$ $(1\frac{1}{2}$ marks$)$

Bond	Bond enthalpy (kj/mol)
H –H	436
N – H	388
N ≡ N	944

b)   Draw an energy level diagram for the reaction in (a) above.   (1½marks)

11.   An atom of element W (atomic number 11) and an atom of element Y (atomic number 9) combine to form a compound.

a)   Write the formula fo the compound.   (1mark)

....

b)   State the type of bond present in the compound.   (1mark)

....

c)   Identify the type of structure formed.   (1mark)

....

12.   The equation below represents an equilibrium reaction between chromate ions and dichromate ions.

$$2CrO_4^{2-} + 2H^+_{(aq)} \rightleftharpoons Cr_2O_7^{2-} = H_2O_{(l)}$$
(Yellow)   (Orange)

i)   What would happen to the above equilibrium if aqueous sodium hydroxide is added to the system?
                                                                          (2marks)

....

....

ii)   Calculate the oxidation number of chromium in $Cr_2O_7^{2-}$.   (1mark)

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13.   Using reagents provided only; explain by means of balance equations how you could prepare a salt of Zinc carbonate solid.

        Zinc powder, Nitric (V) acid (dilute) and solid sodium carbonate, water   (3marks)

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14.   When a burning candle is put into a gas jar of Sulphur (IV) oxide gas, it is extinguished but a burning magnesium ribbon continues to burn. Explain these observations.   (2marks)

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b)   Hydrogen sulphide is a highly toxic and flammable gas. It is normally prepared in a fume chamber.

      I.   Name TWO reagents that can be used to prepare hydrogen sulphide in the laboratory.
                                                                          (1mark)

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      II.   One of the uses of hydrogen sulphide is to produce sulphur as shown in the following equation.
            $$2H_2S_{(g)} + SO_{2(g)} \longrightarrow 3S_{(s)} + 2H_2O_{(l)}$$
            Identify the reducing agent in this reaction and give a reason for your answer.   (1mark)

....

      III. Other than production of sulphuric (VI) acid, state one commercial use of sulphur. (1mark)

....

15. The set-up below was raised to prepare dry chlorine gas. Study and answer the questions that follow.

a) Name reagent M and substance L.

M_____ (½ mark)

L _____ (½ mark)

b) A warm rod phosphorous was lowered into the gas jar of chlorine using a deflagrating spoon.

i) State any one observation made in this experiment. (1mark)

....

ii) Identify the substance formed in the above reaction. (1mark)

....

c) The use of CFCs has been linked to depletion of the ozone layer.

i) What does CFC stand for. (1mark)

....

i) Explain the problem associated with the depletion of the ozone layer. (1mark)

....

ii) State another environmental problem caused by CFCs. (1mark)

....

16. The set up below was used to investigate the effect of an electric current on molten Lead (II) iodide.

a) Identify the cathode and Anode. (2marks)

....

....

b) State what is observed at the ; (2marks)

i) Cathode

....

ii) Anode

....

c) Write equation for the reactions at the;
    i)   Cathode (1mark)

....

    ii)   Anode (1mark)

....

17. Charcoal is a fuel that is commonly used for cooking when it burns it forms two oxides.
    a) Name the two oxides. (2marks)

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    b) State one use of any of the two oxides. (1mark)

....

18. The electric arrangement of the ion of element Q is 2.8.8. If the formula of the ion is Q^{3-}, state the group and period to which Q belongs.

    Group _____ (½ mark)
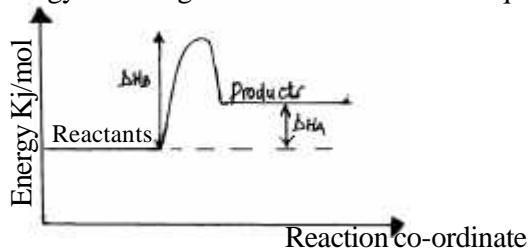   Period _____ (½ mark)

    b) Helium, neon and argon belong to group 8 of the periodic table. Give;
    i)   The general name of these elements. (1mark)

....

    ii)   One use of these elements. (1mark)

....

19. Study the energy level diagram below and answer the questions that follow;

    a) Give the name of ΔHA. (1mark)

....

    b) How can ΔH_B be reduced? Give a reason. (2marks)

....

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20. Aluminum is both malleable and ductile.
    a) What is meant by?
    i)   Malleable (1mark)

....

    ii)   Ductile (1mark)

....

    b) State one use of aluminum based on;
    i)   Malleability (½ mark)

....

ii)   Ductility   (½ mark)

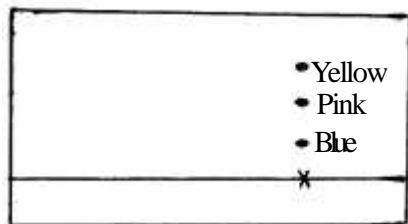...

21.   A compound has the following composition by mass carbon = 40.0%. Hydrogen 6.7%, Oxygen = 53.3%.
      Determine the molecular formula of the compound if its molecular mass if 180.   (3marks)
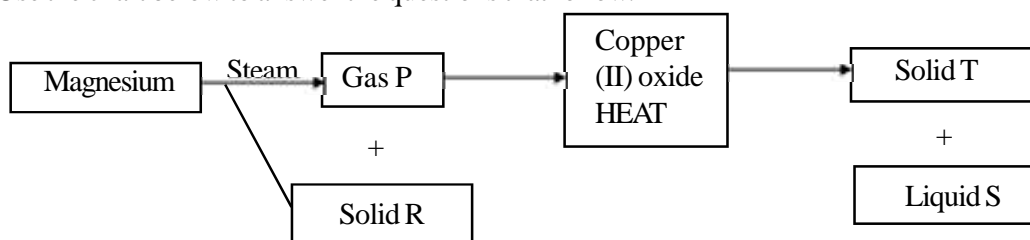
          (C = 12.0, O = 16.0, H = 1.0)

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22.   Form one student from Kipsangui Girl's secondary obtained the chromatogram below during an experiment to
      extract various dyes from a common plant.

      a)   Name a suitable solvent that was used to carry out the chromatography.   (1mark)

....

      b)   On the diagram identify and label the baseline.   (1mark)

      c)   State with a reason the least soluble dye in the solvent used.   (1mark)

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23.   Use the chart below to answer the questions that follow.

      Identify

      Gas P _____   (1mark)

      Solid R _____   (1mark)

      Solid T _____   (1mark)

      Liquid S _____   (1mark)

24.   a)   In the equation below, identify the reactant that acts as an acid. Explain how you arrive at your choices.

                $H_2PO_4^-{}_{(aq)} + OH^-{}_{(aq)} \longrightarrow HPO_4^{2-}{}_{(aq)} + H_2O_{(l)}$ (2mark)

....

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      b)   Define a base in refernce to your answer in (a) above.   (1mark)

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