**Name: ……………………………………………………………** **Index No.:……………………................**

**School: …………………………………………………………. Candidate’s Sign:……………………...**

**Date:…..……………..…………………………….........................**

**233/1**

**CHEMISTRY**

**(THEORY)**

**PAPER 1**

**JULY/AUGUST - 2015**

**TIME: 2 HOURS**

**TRANS-NZOIA COUNTY JOINT EVALUATION EXAM – 2015**

***Kenya Certificate of Secondary Education (K.C.S.E)***

**CHEMISTRY**

**PAPER 1**

**2 HOURS**

**INSTRUCTIONS TO THE CANDIDATES**

* Write your ***name*** and ***index* *number***  in the spaces provided above.
* ***Sign*** and write the ***date*** of examination in the spaces provided.
* Answer ***all*** questions in the spaces provided.
* Mathematical table and silent electronic calculators may be used.
* All workings ***must*** clearly be shown where necessary.

**For Examiner’s Use Only:-**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **MAXIMUM SCORE** | **CANDIDATE’S SCORE** |
| **1 – 28** | **80** |  |
|  |  |  |

*This paper consists of 8 printed pages.*

*Candidates should check the question paper to ascertain that all pages are printed as indicated.*

*And that no questions are missing*

**1.** A wooden splint was slipped through a region of a particular flame in the laboratory and was burnt as

shown in the diagram below.

**Unburnt** **part**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

**Burnt part**

1. Name the type of flame the splint was slipped through. (1 mk)

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1. Explain why the splint was burnt the way is shown in the diagram. (2 mks)

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………………………………………………………………………………………………

**2**. (a) State Gay Lussac’s law. (1 mk)

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1. 10 cm3 of a gaseous hydrocarbon, C2Hx required 30 cm3 of oxygen for complete combustion. If

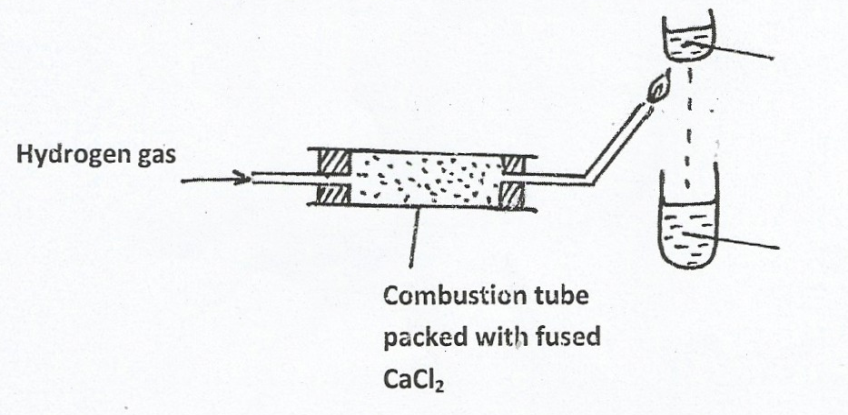
steam and 20 cm3 of carbon (IV) oxide gas were produced, what is the value of **x**? (2 mks)

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**3.** The diagram below shows the set-up used to burn hydrogen and collect the product.



**Cold water**

**Colourless liquid**

**Combustion tube packed with fused CaCl2**

**Hydrogen gas**

1. Why is hydrogen not readily used as a fuel? (1 mk)

………………………………………………………………………………………………..

1. (i) State the precaution that must be taken before igniting the hydrogen. (1 mk)

………………………………………………………………………………………………….

(ii) State **two** uses of hydrogen gas. (1 mk

…………………………………………………………………………………………………..

…………………………………………………………………………………………………..

**4.** (a) Define the term solubility. (1 mk)

…………………………………………………………………………………………………...

(b)The following were the results obtained in an experiment to determine solubility of Potassium

Nitrate at room temperature.

Mass of evaporating dish = 14.32 g

Mass of evaporating dish + saturated solution = 35.70 g

Mass of evaporating dish + salt (residue) = 18.60 g

Calculate the solubility of Potassium Nitrate from the specimen results. (2 mks)

**5.** The electron arrangement of ions X3+ and Y2- are 2. 8 and 2 . 8. 8 respectively.

(a) To which groups does X and Y belong to. (1 mk)

X………………………………………..……, Y………………..………………………………

(b) State the atomic numbers of X and Y. (1 mk)

X…………………………………….…………, Y………………………………………………

(c) Write a formula of compound formed when Y and X reacts. (1 mk)

…………………………………………………………………………………………………….

**6**. 50 cm3 of Carbon (IV) Oxide diffuses through a porous plate in 15 seconds. Calculate the time taken

by 75 cm3 Nitrogen (IV) Oxide to diffuse through the same plate under similar conditions.

***(C = 12, O= 16, N = 14)*** (3 mks)

**7.** (a) Name the following organic compound (1 mk)

CH3

⏐

CH3⎯ CH2 ⎯ C⎯CH2⎯CH2⎯CH3  …………………………………………………….

⏐

CH3

(b) Draw and name any **two** isomers of C4H10 (2 mks)

**8**. Hydrogen sulphide gas is bubbled into two solutions of metallic nitrate as represented in the flow

chart below.

**Blue solution**

**Brown solution**

**Black solid W**

**Green solution Q**

**Hydrogen**

**Sulphide**

1. Identify the cation present in:

(i) Blue solution (1 mk)

…………………………………………………………………………………………….

(ii) Brown solution. (1 mk)

……………………………………………………………………………………………..

(b) Write an ionic equation for the formation of black solid **W**. (1 mk)

……………………………………………………………………………………………….

**9**. The set-up below was used to prepare dry sample of Oxygen gas

**Water**

**J**

**Solid H**

1. (i) Complete the diagram to show how the gas was collected (1 mk)

(ii) Identify the following (1 mk)

I. Solid **H**

……………………………………………………………………………………………….

II. Solid **J**

……………………………………………………………………………………………..

1. Write an equation for the reaction that occurred in the flask between solid **H** and water. (1 mk)

………………………………………………………………………………………………….

**10.** The table below gives the melting points of oxides of elements in period 3. Study it and answer the questions that follow.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Formula of oxide** | Na2O | MgO | Al2O3 | SiO2 | P4O10 | SO3 |
| **Melting point (0c)** | 1190 | 3080 | 2050 | 1730 | 560 | -73 |

1. Identify the compound in the above table that will dissolve in dilute hydrochloric acid and dilute sodium hydroxide. (1 mk)

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1. Explain the difference in melting points of MgO and P4O10. (2 mks)

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……………………………………………………………………………………………………..

**11**. Calcium carbonate decomposes on heating producing a gaseous product and a residue. What volume

of gaseous product at s.t.p is produced from 2.5 g of the carbonate.

***(Ca = 40.00 C = 12.0 = 16.0, molar gas volume at s.t.p = 22400 cm3)*** (3 mks)

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**12.** Magnesium hydroxide is used as a medication to relieve stomach acidity.

(a) Write a balanced chemical equation for the reaction that occurs in the stomach when one takes in

the medicine. (1 mk)

…………………………………………………………………………………………………………..

(b) What type of reaction takes place in the stomach after taking the medicine. (1 mk)

………………………………………………………………………………………………

1. Sodium hydroxide cannot be used for the same purpose. Explain. (1 mk)

………………………………………………………………………………………………..

**13.** (a) Distinguish between nuclear fusion and fission. (2 mks)

……………………………………………………………………………………………………

……………………………………………………………………………………………………..

1. Complete the nuclear equation below.

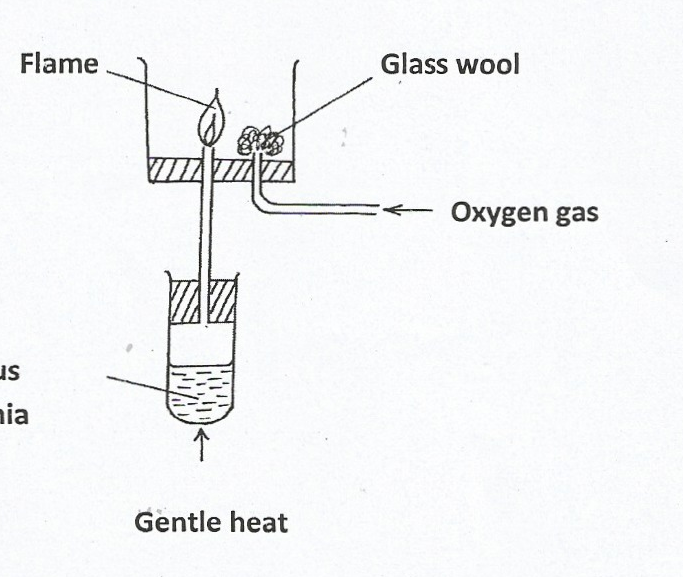
230Th 230 Pa + \_\_\_\_ (1 mk)

90 91

1. Copper – 64 has half – life of 12.8 days. What mass of copper – 64 will remain after 51.2 days starting with 20 g of the isotope? (1 mk)

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…………………………………………………………………………………………………….

**14.** Study the diagram below and answer the questions that follow:

**Oxygen gas**

**Flame**

**Aqueous ammonia**

**Gentle heat**

**Glass wool**

1. Why is aqueous ammonia warmed gently? (1 mk)

…………………………………………………………………………………………………

1. What is the colour of the flame? (1 mk)

…………………………………………………………………………………………………..

1. Write an equation for the reaction that produces the flame. (1 mk)

………………………………………………………………………………………………..

**15**. The following is an organic compound represented as CH3CH2COOCH2CH3

(i) Draw and name the organic acid and alkanol used in making the compound. (2 mks)

(ii) Name the organic compound and the gas formed when the alkanol in (i) above is reacted with

Potassium.. (1 mk)

…………………………………………………………………………………………………

……………………………………………………………………………………………………..

**16**. Use the information below to answer the question that follows.

Ca(s) + ½ O2(g ) CaO(s) ; ΔH = 635KJmol-

C(s) +O2(g) CO2(g); ΔH = -394 KJMol-

Ca(s) + C(s) +O2(g) CaCO3(s) ΔH = -1207 KJmol-

Calculate the enthalpy change for the reaction. (3 mks)

**17.** Study the information in the table below and answer the questions that follow. A mixture contains

three solids, aluminum sulphate sugar, and camphor. The solubility of these solids in different liquids is shown in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Solid | Water | Alcohol | Ether |
| Aluminium sulphate | Soluble | Insoluble | Insoluble |
| Sugar | Soluble | Soluble | Insoluble |
| Camphor | Insoluble | Soluble | Very soluble |

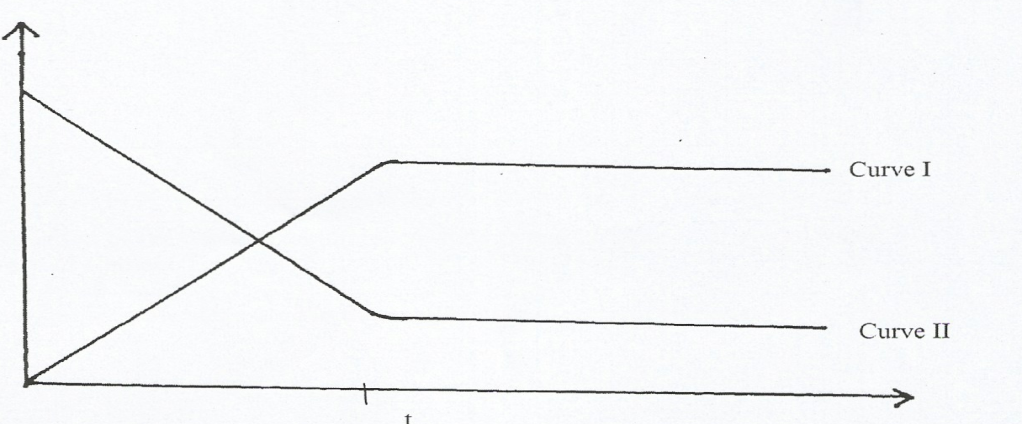
Describe how you would obtain a solid sample of sugar from the mixture. (3 mks)

………………………………………………………………………………………………………

………………………………………………………………………………………………………

……………………………………………………………………………………………………….

**18.** The curve below represent the changes in the concentrations of substance E and F with time in the

 reaction. E(g) F(g)

**Curve I**

**Curve II**

**t**

**Time (sec)**

**Concentration mole / dm3**

1. Which curve represents the changes in the concentration of substance F? Give a reason.(2 mks)

…………………………………………………………………………………………………….

…………………………………………………………………………………………………….

1. Give a reason for the shapes of the curves after time (t) minutes. (1 mk)

………………………………………………………………………………………………….

**19**. Reagent bottles labelled H2SO4(aq), K2CO3(aq)  and NaCl(aq) had labels accidentally removed. A packet of blue litmus paper is lying near a long with a rack of test-tubes, without using any other material, explain how you would go about labeling the bottles correctly. (3 mks)

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………………………………………………………………………………………………………

………………………………………………………………………………………………………….

**20**. Some sodium chloride was found to be contaminated with Copper (II) oxide. Describe how a sample

of sodium chloride can be separated from the mixture. (2 mks)

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……………………………………………………………………………………………………….

**21**. Describe how you can distinguish a solution of sodium sulphite from a solution of sodium sulphate

in the laboratory. (3 mks)

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**22**. The grid below represents part of periodic table. Study it and answer the questions that follow. The

letters given do not represent the actual symbols of the elements.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | | |  |
|  |  | |  |  |  |  | **P** |  |
|  | **Q** |  | **R** |  | **S** |  |  | **T** |
|  |  |  |  |  |  |  |  |  |

1. Write an equation of the reaction taking place when Q and P react. (1 mk)

…………………………………………………………………………………………………..

1. State **one** use of element **T**. (1 mk)

…………………………………………………………………………………………………

**23.** The diagram below shows some steps used in the manufacture of sodium carbonate by the Solvay

process.

**Ammonia**

**Ammonium**

**chloride**

**Concentrated**

**Sodium** **chloride**

**Step** 1

**CO2** (g)

**Carbonator**

**Substance D**

**Step III**

**Sodium**

**Carbonate**

**Sodium**

**Carbonate**

**Step** **II**

1. Name substance **D**  (1 mk)

………………………………………………………………………………………………..

(b) What process takes place in. (2 mks) i.) Step **II** …………………………………………………………………………

ii.) Step **III** ……………………………………………………………………….

**24.** Describe how you would prepare crystals of sodium nitrate starting with 200 cm3 of 2M sodium hydroxide. (3 mks)

………………………………………………………………………………………………………..…………………………………………………………………………………………………………..…………………………………………………………………………………………………………..…

**25**. Use the information below to answer the questions that follow:

Q(s)/ Q2+(aq) E~~0~~ = -0.76V

R(s)/ R2+(aq) E~~0~~ = + 034V

1. Write the cell equation for the cell. (1 mk)
2. Calculate the Emf value for the cell. (1 mk)
3. State **two** application of electrolysis. (1 mk)

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**26.** (a) Aluminium chloride sublimes. Explain. (1 mk)

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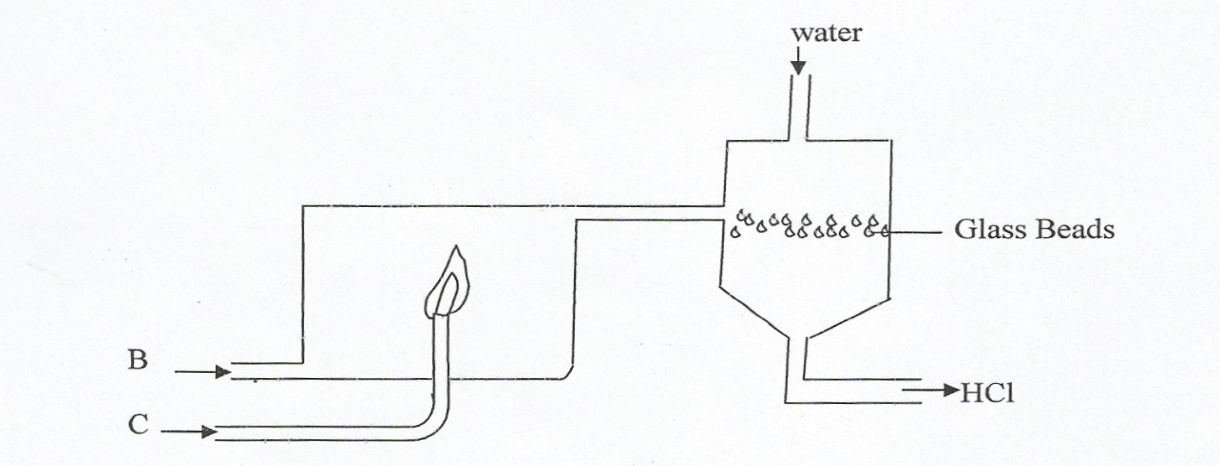
1. Aluminium is a reactive metal yet utensils made of aluminium do not corrode easily. Explain.

……………………………………………………………………………………………..(1 mk)

…..…………………………………………………………………………………………………

**27.** The diagram below shows industrial manufacture of hydrochloric acid.

**Water**



**Glass Beads**

**HCl (aq)**

1. Name the substance: (2 mks)

A …………………………………………..,B ……………………………………………….

1. State the effect of the above plant on the environment. (1 mk)

……………………………………………………………………………………………………

**28.** When excess ammonia solution is added to copper (II) ions a deep blue solution is formed.

Write the formulae of the complex ion formed. (1 mk)

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