**TOP EVALUATION EXAMINATION - 2016**

**Kenya Certificate of Education**

**Chemistry Combined Paper**

**FORM 1**

**JULY/AUGUST**

**MARKING SCHEME**

1. (a) What is a mixture? (1 mark)

**Combination of two or more substances that can be separated by physical means.**

(b) Name the method of separation you would use in separating: (3 marks)

1. Beans from maize beans mixture.

**Sorting/picking**

1. Water from sand.

**Decantation**

1. Cream from milk.

**Skimming**

(c) State **four** areas in which the knowledge of chemistry is used. (4 marks)

* **In washing/cleaning with soap.**
* **Understanding chemicals oflife.**
* **Baking requires understanding of chemistry.**
* **Medicine.**
* **Fractional distillation of crude oli.**
* **Manufacture of synthetic substances.**
* **Diagnosis/test for abnormal body functions.**
1. (a) Define the following terms as used in chemistry. (5 marks)
2. Drug

**Natural or manmade substance that when taken changes the body function.**

1. Medicine

**Natural or manmade substance that when taken alters/changes the abnormal body functioning to normal.**

1. Prescription

**Medical instruction to a patient/sick on the correct type of medicine to take and period between pne intake and the other.**

1. Dosage

**Correct quantity of drug required to alter the abnormal body function back to normal.**

1. Over the Counter drug

**Drug that needs minimal prescription and available without prescription from a pharmacist or doctor.**

(b) Name **three** illegal drugs that are normall abused. (3 marks)

* **Tobacco**
* **Miraa**
* **Alcohol**
* **Sleeping pills**
1. (a) State three reasons why most chemistry laboratory apparatus are made of glass. (3 marks)
* **Glass is transparent.**
* **Comparatively cheaper.**
* **Easier to wash after use.**
* **Unreactive to many chemicals.**

(b) Name each of the apparatus below and state what it is used for. (8 marks)

(i) 

**Measuring cylinder. Measure volume of liquid/solutions.**

(ii)

**Pipette. Measure and transfer small very accurate volumes of a liquid/solution.**

(iii)

**Stop watch. Measure time**



**Thistle funnel.Direct liquid solution into stoppered container.**

1. Draw a Bunsen burner and label all its parts. (3 marks)



(b) Outline the procedure for lighting a Bunsen burner. (4 marks)

* Adjust the collar to ensure the air holes are closed.
* Connect the burner to the gas tap using a rubber tubing. Ensure the rubber tubing has no side leaks.
* Turn on the gas tap.
* Ignite the top of the chimney using a lighted match stick/gas lighter/wooden splint.

.

(c) State three characteristic differences between luminous and non-luminous flame (3 marks)

|  |  |
| --- | --- |
| **Luminous flame** | **Non-luminous flame** |
| **1. Produced when the air holes are fully/completely closed.** | **1. Produced when the air holes are fully/completely open.** |
| **2. when the air holes are fully/ completely closed there is incomplete burning/ combustion of the laboratory gas** | **2.when the air holes are fully/ completely open there is complete burning/ combustion of the laboratory gas** |
| **3. Incomplete burning/ combustion of the laboratory gas produces fine unburnt carbon particles which make the flame sooty/smoky** | **3. complete burning/ combustion of the laboratory gas does not produce carbon particles.**  |
| **4. Some carbon particles become white hot and emit light.This flame is thus bright yellow in colour producing light** | **4. Is mainly blue in colour and is hotter than luminous flame.**  |
| **5. Is larger, quiet and wavy/easily swayed by wind** | **5.Is smaller, noisy and steady** |
| **Luminous flame has three main regions** | **Non-luminous flame has four main regions** |

1. Study the setup below of an experiment and then answer questions that follow.



1. State the purpose of the experiment. (1 mark)

**To obtain copper(II)sulphate (VI) crystals and water from copper (II) sulphate(VI) solution.**

1. Give a reason for each of the following.
2. the solution is heated. (1 mark)

 **To vapourize /evaporate the solvent/one component which is condensed at a different part of the apparatus.**

1. Using pieces of broken porcelain (2 marks)
* Prevent bumping of the solution during boiling.
* Ensure smooth and even boiling.
1. Liebig condenser has a cold water **inlet** near the receiver and cold water **out** let. (1 mark)

**To ensure efficient cooling**

1. Other than b(ii) above, what else can be used. (2 marks)

**Porous pot/glass/sand**

1. Name the method of separation illustrated by the setup. (1 mark)

**Simple fractional distillation**

1. The procedure below was followed when using commercial indicators to determine acidic and basic/alkaline and neutral solutions

Procedure

1. Place 5cm3 of the solutions in the table below.
2. Add three drops of litmus solution to each solution.
3. Repeat with phenolphthalein indicator, methyl orange, and bromothymol blue.
4. Complete the table by showing the colour change. (6 marks)

|  |  |
| --- | --- |
| Substance/ solution  |  **Indicator Used** |
| **Litmus**  | **Phenolphthalein**  | **Methyl orange**  | **Bromothymol**  **blue**  |
| wood ash  | **Blue** | **Pink**  |  |  |
| soap solution  |  | **Pink**  |  | **Blue**  |
| ammonia solution  | **Blue** |  | **Yellow**  |  |
| sodium hydroxide  |  |  | **Yellow**  | **Blue**  |
| hydrochloric acid  |  |  |  |  |

|  |  |
| --- | --- |
| Substance/ solution  |  **Indicator Used** |
| **Litmus**  | **Phenolphthalein**  | **Methyl orange**  | **Bromothymol**  **blue**  |
| wood ash  | **Blue** | **Pink**  | **Yellow**  | **Blue**  |
| soap solution  | **Blue** | **Pink**  | **Yellow**  | **Blue**  |
| ammonia solution  | **Blue** | **Pink**  | **Yellow**  | **Blue**  |
| sodium hydroxide  | **Blue** | **Pink**  | **Yellow**  | **Blue**  |
| hydrochloric acid  | **Red**  | Colourless  | **Red**  | **Orange**  |

**Each ½ mark**

1. Ferdinand placed 5cm3 of dilute hydrochloric acid in a small test tube. He then added 1cm length of polished magnesium ribbon. He stoppered the test tube using a thump. After this, he lit a wooden splint and Placed it on top of the stoppered test tube. He then released the thump stopper.
2. Write down **two** observations he made. (2 marks)
* effervescence/bubbles produced/fizzing.
* colourless gas produced.
* gas produced extinguishes a burning wooden splint with an explosion/pop sound.
1. Why wouldn’t Ferdinand use copper in stead of magnesium ribbon? (2 marks)

**Copper is not reactive enough to displace/remove the hydrogen from dilute acids.**

1. Write a word equation for the reaction that happens. (2 marks)

 **Magnesium +Hydrochloric acid->Magnesium chloride + Hydrogen**

1. Sodium carbonate is reacted with an acid A to produce chloride B, gas C and water.
2. Name: (3 marks)
3. Acid A

**Dilute hydrochloric acid**

1. Chloride B

**Sodium chloride**

1. Gas C

**Carbon(IV)oxide**

1. State the observations made in the experiment when:
2. Test tube holding the mixture is directed into lime water. (2 marks)

**gas produced forms a white precipitate with lime water**

**effervescence/bubbles produced/fizzing in all cases**.

1. Write word equation of the reaction in above. (2 marks)

**Sodium carbonate +Hydrochloric acid ->** **Sodium chloride + Carbon(IV)Oxide+ Water**

1. Write word and chemical equations for the reactions if the following would have been used in stead of sodium carbonate(acid remains the same). (6 marks)
2. Copper carbonate

**Copper carbonate +Hydrochloric acid ->** **Copper(II) chloride + Carbon(IV)Oxide+ Water**

 **CuCO3(s) + 2HCl (aq) -> CuCl2 (aq) + H2O(g) + CO2 (g)**

1. Potassium hydrogen carbonate

**Potassium hydrogen carbonate +Hydrochloric acid ->** **Potassium chloride + Carbon(IV)Oxide+ Water**

 **KHCO3(s) + HCl (aq)-> KCl (aq) + H2O(g) + CO2 (g)**

1. Sodium hydrogen carbonate

**Sodium hydrogen carbonate +Hydrochloric acid -> Sodium chloride + Carbon(IV)Oxide+ Water**

 **NaHCO3(s) + HCl (aq) -> NaCl (aq) + H2O(g) + CO2 (g**

1. State **three** physical properties of acids. (3 marks)
* **Acids have a characteristic sour taste**
* **Most acids are colourless liquids**
* **Mineral acids are odourless.**
* **All acids have pH less than 7**
* **All acids turn blue litmus paper red,methyl orange red and phenolphthalein colourless.**
* **All acids dissolve in water to form an acidic solution.**
1. (a) Giving the approximate their percentage composition by volume, identify **two** main gases present in the atmosphere/air. (2 marks)

|  |  |
| --- | --- |
| Gas | Approximate % composition by volume |
| Nitrogen | 78.0 |
| Oxygen | 21.0 |

b) the set up apparatus below was used to find out the composition of air that support combustion.



(i) What happens to the candle after a while? (1 mark)

**Candle continues to burn then extinguished/goes off**

**Level of water in the gas jar rises after igniting the candle**

(i)

I. the active part of the air. (2 marks)

Length of empty gas jar = M1= 20cm

Length of gas jar without water before igniting candle = M2= 15 cm

Length of gas jar with water after igniting candle = M3 = 12 cm

Length of gas jar without water after igniting candle = M2- M3 = 15 -12 = 3 cm

**M2 - M3 x 100% => 15- 12 x 100% = 20%**

 **M2 15cm**

II. The inactive part of the air. (2 marks)

**100% -20% = 80%**