**NAME …………………………..……………….. DATE …………………………**

**233/1**

**CHEMISTRY**

**PAPER 1**

**TIME: 2 HOURS.**

**ELERAI MCK GIRLS SECONDARY SCHOOL**

**233/1**

**CHEMISTRY**

**PAPER 1**

**TIME: 2 HOURS.**

**INSTRUCTIONS TO CANDIDATES.**

1. Write your **NAME** and **INDEX NUMBER** in the space provided above
2. Sign and write the date of examination in the spaces provided
3. Answer **ALL** the questions in the spaces provided
4. **ALL** working must be clearly shown where necessary.
5. Mathematical tables and silent electronic calculators may be used.

**FOR EXAMINER’S USE ONLY.**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum score** | **Candidate’s score** |
| **1 − 27** | **80** |  |
| **Total score** | **80** |  |

**1.** The substances in the table below have PH values of 1, 5, 9 and 14 (*not in order*). Complete the table by indicating the appropriate PH value against each substance 2**marks**

|  |  |
| --- | --- |
| Substance | PH value |
| Anti-acid tablet |  |
| Ethanoic acid |  |
| Dilute nitric (v) acid |  |
| Potassium hydroxide |  |

**2.** The grid below represents a section of the periodic table. Study it and answer the question that follows;

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **J** |  |  |  | | | | |  |
| **L** | **Q** |  | **M** | **P** |  | **J** | **K** |
| **S** |  | **T** |  | **V** | **R** |  |  |
|  |  |  |  |  |  |  |  |  |

1. Give the formula of the compound formed between element J and Q? 1**mark**

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1. Which element forms stable ion with a charge of +3? 1**mark**

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1. Which is the least reactive element? 1**mark**

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**3.** Below is a set up of apparatus used to prepare gas Q from ammonia



1. What observation is made in the combustion tube K? 1**mark**

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1. Identify

Liquid R 1**mark**

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Liquid Q 1**mark**

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1. Write an equation for the reaction which took place in tube K. 1**mark**

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**4.** The electronic arrangement of the atoms of elements P, Q, R and S are shown below, the letters are not the actual symbols of the elements.

|  |  |
| --- | --- |
| **Element** | **Electronic arrangement** |
| P | 2:8:7 |
| Q | 2:8:8:2 |
| R | 2:8:5 |
| S | 2:8:6 |

1. Which two elements could react to form a compound soluble in water and a strong electrolyte 1**mark**

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1. Using dot (.) and cross (x) diagram show how the molecule formed between P and S is formed. 1**mark**
2. Name the type of bond formed 1**mark**

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**5.** Study the diagram below and answer the questions that follow



1. What is observed on the anhydrous copper (II) sulphate? 1**mark**

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1. Write an equation for the reaction between lead (II) oxide and hydrogen 1**mark**

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1. After the reaction is over, dry hydrogen is continuously passed through the combustion tube until it cools down. Explain 1**mark**

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**6.** An organic compound K contains 64.9% carbon, 13.5% hydrogen and 21.6% oxygen. The reactive formula mass of K is 74. Given that C=16, O=16 and H=1

1. Calculate the empirical formula of K 2**marks**

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1. Determine the molecular formula of K 2**marks**

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**7.** A gas of known mass occupies 200cm3 at 250C and 101325Pa. What volume would it occupy at -230C and 100,000pa. 3**marks**.

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**8.** The diagram below represents the extraction of sulphur by Frasch process



Name the substances that pass through A, B, and C and the use of each substance in the extraction of sulphur 3**marks**

A: Substance

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Use

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B: Substance

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Use

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C: Substance

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Use

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**9.** When a student was stung by wasp, a teacher applied an aqueous solution of ammonia to the affected area of the skin and the student was relieved of pain. Explain 2**marks**

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**10. a)** Galvanised iron does not rust when scratched. In contrast when tin can is scratched then exposed iron

underneath corrode rapidly. Explain 2**marks**

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**b)** List two methods of preventing rusting 1**mark**

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**11.** Chlorine gas was bubbled through water for sometime. The green yellow solution formed was poured into a long glass tube as shown in the figure below. Use the set-up to answer the questions that follow.



1. What compounds are present in the yellow solution? 1**mark**

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1. Name substance Q 1**mark**

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1. Write an equation for the formation of substance Q 1**mark**

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1. What compound is usually left after complete formation of Q 1**mark**

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**12.** 25cm3 of a solution of Potassium carbonate required 26.8cm3 0.1M HCl for neutralization. Calculate the molarity of the carbonate 3**marks**

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Which substance has a 3**marks**

1. Giant ionic structure?

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1. Simple molecular structure?

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1. Giant metallic structure?

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13. A chromatogram of acid enzymes X and Y and three simple jars are shown below



1. On the diagram, show the solvent front 1**mark**
2. Which two simple sugars must be present in X and Y only 1**mark**

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1. Give two properties that make the pigments in the substances move furthest from the original spot 2**marks**

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14.Potassium is isotopic and has relative atomic mass of 39.5. Workout the percentage abundance of each isotope. The two isotopes are 39K, 40K and 38K(0.01%). (3mks)

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15. Chelule mixed wax and ammonium chloride accidentally. He found that it is not advisable to heat the mixture in order to separate them. Briefly explain how he could have separated them. (3mks)

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16. In ancient Greece, chewing chalk was used to combat excess stomach acid. A patient suffering from duodenal ulcer releases 30cm³ of 1M hydrochloric acid in the stomach. He chewed 5g of impure chalk to neutralize the acid released. (Ca = 40, C = 12, O = 16).

(a) Write a well balanced chemical reaction that took place. (1mk)

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(b) Calculate the number of moles of calcium carbonate used up. (1½mks)

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(c) Calculate the percentage impurity in calcium carbonate, chalk used. (1½mks)

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17 a)Define the term ionization energy. (1mk)

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(b) Sodium and aluminium belong to the same period, which of the two has a lower ionization

energy. Explain. (2mks)

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c) When 8.8g of hydrocarbon was burnt in excess air 14.4g of water and 13.44dm³ of carbon (IV) oxide were obtained at s.t.p. Determine the empirical formula of the compound. (3mks)

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18. (a) Distinguish isomers from isotopes. (2mks)

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

19. (a) Two gases A and B have molecular masses 64 and 100 respectively. If 300cm³ of gas A

diffuse through a porous plug in 20 seconds. How long will it take for 100cm³ of gas B to

diffuse through the same pug. (2mks)

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(b) Identify and state the law above. (1mk)

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20. Explain the industrial conversion of ammonia to nitric (V) acid. (3mks)

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Study the diagram below and use it to answer the questions that follow.

H2(g)

I II

Heat

Anhydrous copper II sulphate

Y

M

Anhydrous CaCl2

CuO

1. What are the observation made in the combustion tube at:

Part I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

Part II \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

1. Write a chemical equation for the reaction taking place at point Y. (1mk)

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(c) Name the apparatus labeled M. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1mk)

21. Study the diagram below and answer the questions that follow.

↑ ↑

Heat Heat Iron

Ceramic wool soaked in water

Gas P

(a) Give an equation for the reaction taking place in the boiling tube. (1mk)

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(b) Explain why it is not advisable to prepare gas P in the laboratory by reacting calcium metal with dilute sulphuric (VI) acid. (1mk)

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(c) Give **one** industrial use of gas P. (1mk)

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22. A polymer has the following structure.

CH2 – CH – CH2 – CH – CH2 – CH2

| | |

CH3 CH3 CH3 n

(a) Draw the structure of the monomer. (1mk)

↑ ↑

Heat Heat Iron

Ceramic wool soaked in water

Gas P