Name: ………………………………………………………………………………………. Class: ………… Adm.No. ……………

School: ……………………………………………………………………………………… Date: ………………………………………

 Sign:………………………………………..

**233/1**

**CHEMISTRY**

**Paper 1**

**JUNE/JULY 2021**

**Time: 2 hours**

**M O K A S A J O I N T E X A M I N A T I O N - 2021**

**Kenya Certificate to Secondary Education**

**CHEMISTRY PAPER 1**

**TIME: 2 HOURS**

**INSTRUCTIONS TO CANDIDATES**

* *Write your name, admission number, date and school in the spaces provided.*
* *Answer all the questions in the spaces provided.*
* *All working must be clearly shown where necessary.*
* *Scientific calculators may be used.*

**FOR EXAMINERS’ USE ONLY**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Maximum Score** | **Candidate’s Score** |
| **1 – 26** | **80** |  |

This paper consists of **11** printed pages. Candidates are advised to check and to make sure all pages are as indicated and no question is missing.

1. Ammonium nitrite was heated as shown below.

Apparatus **L**

Aluminium nitrate

Gas **R**

Heat

Water

(i) Give a suitable material that can be used to make apparatus **L**, explain your answer. **(2 marks)**

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 (ii) Write a chemical equation for formation of gas **R**. **(1 mark)**

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

2. Dilute hydrochloric acid and sodium sulphite were reacted as shown below.

Dilute hydrochloric acid

Delivery tube

Gas jar

Sodium sulphite

(i) Write a chemical equation for the reaction taking place in the flask. **(1 mark)**

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

(ii) State one main laboratory rule that should be observed during the above experiment and give a reason for your choice. **(2 marks)**

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(iii) Give two reasons why no gas was collected in gas jar. **(2 marks)**

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3. In an experiment 3.36g of iron filling were added to excess copper (II) sulphate solution. Calculate the mass of copper that was deposited given that Iron (II) sulphate and copper were the products.

 (Cu = 63.5, Fe = 56.0) **(3 marks)**

4. In a titration experiment 30cm3 of 2M sodium hydroxide required 30cm3 of sulphuric (VI) acid for complete neutralization. Determine the concentration of sulphuric (VI) acid in grams per litre.  **(3 marks)**

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

Anode

Cathode

Molten Copper (II) Iodide

 Heat

 (i) State the observation made at the cathode. **(1 mark)**

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

 (ii) Write the equation taking place at the Anode. **(1 mark)**

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

 (iii) What material should be used to make the cathode? **(1 mark)**

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6. (a) Define the term electrolysis. **(1 mark)**

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 (b) State two applications of electrolysis. **(2 marks)**

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7. (a) Write the electron arrangement of element **P** which has atomic number 16.

  **(1 mark)**

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

 (b) State the group and period of element **P**. **(1 mark)**

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 (c) Write the equation of element **P** when burnt in air. **(1 mark)**

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8. Study the diagram below and answer the question that follow.

Copper II oxide

Carbon powder

(excess)

 Limited

 oxygen

Blue flame

 **A**

**B**

Heat

 (a) State and explain observation made and point **A**. **(2 marks)**

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

 (b) Explain the observation made out point **B**. **(2 marks)**

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 (c) Why was it necessary to burn the gas at the jet? **(1 mark)**

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9. Give two reasons why carbon (IV) oxide is used at a fire extinguisher. **(2 marks)**

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

10. To determine the purity of limestone Form 3 students heated 12.5g of limestone in a crucible until they obtained a constant mass. If the volume of CO2 obtained was 2400. Calculate the purity of the limestone (C=12, O=16, Ca = 40, Mgv = 240dm3). **(3 marks)**

11. Determine the relative atomic mass of Neon whose isotopic composition is as follows.

 $\left(90.92\%\right) (0.26\%) \left(8.82\%\right) $ **(3 marks)**

12. Draw a well-labelled diagram to show how dry hydrogen can be prepared and collected in the laboratory. **(3 marks)**

13. Give **two** characteristics of a temporary chemical change. State one example of such reaction. **(2 marks)**

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14. (a) What is drug abuse? **(1 mark)**

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 (b) Name one commonly abused non-medicinal drug. **(1 mark)**

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 (c) A doctor prescribed drugs to a patient Amoxil 2x3. How should the patient

take the drug? **(1 mark)**

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15. The figure below shows a flame obtained from a Bunsen burner.

**T**

**S**

**R**

 (a) Name the type of flame. **(1 mark)**

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

 (b) A matchstick head placed at region R will not ignite. Explain. **(1 mark)**

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

 (c) Name region **S**. **(1 mark)**

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

16. The set-up below was used to separate a certain mixture.

Ice cold water

**B**

Iodine and sodium chloride mixture

Heat

 (a) Identify the method of separation shown. **(1 mark)**

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

 (b) Identity substance **B**. **(1 mark)**

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

(c) Give any other substance when mixed with sodium chloride can be separated as above? **(1 mark)**

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

17. Element **A** with atomic number 12 and **B** with atomic number 9.

 (a) To which chemical family is; **(2 marks)**

 **A** - ………………………………………………………………………

 **B** - ………………………………………………………………………

 (b) Write the equation for the reaction between **A** and **B**. **(1 mark)**

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

18. When chlorine gas is passed over heated iron metal, 26.7g of the product is formed. Calculate the mass of iron which reacted. (Fe = 56, Cl = 35.5) **(3 marks)**

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

$$H\_{2}S\_{(g)}$$

Beaker

$$H\_{2}SO\_{4}$$

(a) Give the observation made in the beaker. **(1 mark)**

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

 (b) Write an equation for the reaction that took place in the beaker. **(1 mark)**

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

 (c) Give one reason why the gas is directed into the beaker using the inverted funnel

as above? **(1 mark)**

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20. (a) State Graham’s law of diffusion. **(1 mark)**

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(b) It takes 50 seconds for 200cm3 of carbon (IV) oxide to diffuse through a plug.

How long will it take 300cm3 of nitrogen (IV) oxide to diffuse through the same plug under the same conditions of temperature and pressure.

(C = 12, N = 14, O = 16) **(2 marks)**

21. (a) State Gay Lussac’s law. **(1 mark)**

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(b) Calculate the volume of air required to completely react with 100cm3 of hydrogen gas. (Assume that oxygen is 20% by volume of air). **(3 marks)**

22. Name the following organic substances. **(3 marks)**

 Br

 (a) $CH\_{3} CH CH CH\_{3} $ …………………………………………………………………

 $CH\_{3}$

(b) $CH\_{3} CH CH CH\_{2} CH\_{3}$ …………………………………………………………………

(c) $CH\_{3} CH\_{2}COOCH\_{2 }CH\_{2 }CH\_{3}$ …………………………………………………………

23. (a) Define isomers. **(1 mark)**

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

 (b) Draw the possible structural isomer of $C\_{4}H\_{8}$. **(2 marks)**

24. (a) Give the chemical name for rust. **(1 mark)**

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

 (b) Name one condition which speeds up rusting. **(1 mark)**

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(c) Many iron products are coated with a layer of zinc to protect it from rusting. State two ways in which zinc prevents rusting of iron. **(1 mark)**

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25. Study the diagram below for the preparation of oxygen in the laboratory.

Hydrogen peroxide

Oxygen

Water

Solid **W**

(a) Name solid **W**. …………………………………………………………………….. **(1 mark)**

 (b) Write the equation for the reaction.  **(1 mark)**

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

 (c) What property of oxygen makes it to be collected as above? **(1 mark)**

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

26. Starting with Barium Oxide describe how Barium chloride can be prepared in the Lab.

 **(2 marks)**

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