**NAME: ………………………………. ADM NO: ……….. CLASS: …………….**

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**FORM THREE**

**CHEMISTRY**

**MID TERM 1 EXAMS 2023**

**TIME: 2 HOURS**

**Answer all the questions in the spaces provided.**

1. What is the temperature on the Kelvin scale for each of the following? (3 marks)

 (a) 100oC –

 (b) -100oC –

 (c) 22oC –

2. State any three differences between luminous and non-luminous flame. (3 marks)

|  |  |
| --- | --- |
| **Luminous** | **Non-Luminous** |
|  |  |
|  |  |
|  |  |

3. The table below shows liquids that are miscible and those that are immiscible.

|  |  |  |
| --- | --- | --- |
| **Liquid** | **L3** | **L4** |
| **L1** | Miscible | Miscible |
| **L2** | Miscible | Immiscible |

 (i) Name the method that can be used to separate L1 and L3 from a mixture of the two.

 (1 mk)

 (ii) Describe how a mixture of L2 and L4 can be separated. (2 mks)

4. A gas occupies 450cm3 of 27oC. What volume would the gas occupy at 177oC if its

 pressure remains constant? (3 mks)

5. The electron arrangement of ions X+3 and Y2- are 2.8 and 2.8.8

 (a) Write the electronic arrangement of the elements X and Y. (2 mks)

 X –

 Y –

 (b) Write the formula of the compound that would be formed between X and Y.(1 mk)

6. Explain why there is general increase in the first ionization energies of the elements in

 period 3 of the periodic table from left to right. (2 mks)

7. How would you obtain a sample of pure iodine from a mixture of iodine and lead sulphate?

8. (a) State Gay Lussacs law. (1 mk)

 (b) 10cm3 of a gaseous hydrocarbon (C2Hx) required 30cm3 of oxygen for complete

 combustion. If 20cm3 steam and 20cm3 of carbon (iv) oxide were produced, what

 is the value of X. (3 mks)

9. Explain how conduction of electricity take place in the following: (2 mks)

 (a) Iron metal –

 (b) Molten lead (II) iodide –

10. Study the set up below and answer the questions that follow.



 (a) What observation would be made in the tube? (1 mk)

 (b) Indicate with a cross (x) on the diagram the likely position where observations

 stated in (a) above would be made. (1 mk)

11. An organic compound had the following composition 37.21% carbon, 7.75% hydrogen

 and the rest chorine. Determine the molecular formula of the compound given that the

 molecular mass of the compound is 65 (C = 12, H = 1), Cl = 35.5) (5 mks)

12. Write an ionic equation for the reaction between an aqeous solution of Sodium hydroxide

 and dilute hydrochloric acid. (3 mks)

13. Use the scheme below to answer the questions that follow.

Carbon (iv) Oxide

Solid H

heat

H2O

Ca(OH)2(aq)

Solid J

 (a) Identify the solids H and J. (2 mks)

 H –

 J –

 (b) State one commercial use of solid J. (1 mk)

14. The diagram below shows a ‘Jiko’ when in use. Study it and answer the questions that

 follow.



 (a) Identify the gas formed at region A. (1 mk)

 (b) State and explain the observation made at region B. (2 mks)

15. (a) Diamond and graphite are allotropes of carbon. What is meant by an allotrope?

 (b) Explain why graphite can be used as a lubricant while diamond cannot. (2 mks)

16. (a) Distinguish between a covalent bond and co-ordinate bond. (2 mks)

 (b) Draw a diagram to show bonding in ammonium ion (N = 7, H = 1) (2 mks)

17. Study the information given in the table below and answer the questions that follow. The

 letters do not represent the actual symbols of the elements.

|  |  |  |
| --- | --- | --- |
| **Element** | **Atomic number** | **Boiling point(k)** |
| S | 3 | 1603 |
| T | 13 | 2743 |
| U | 16 | 718 |
| V | 18 | 87 |
| W | 19 | 1047 |

 (a) Select the elements which belong to the same;

 (i) Group - (1 mk)

 (ii) Period - (1 mk)

 (b) Which element;

 (i) Is in gaseous state at room temperature? Explain. (1 mk)

 (ii) does not form an oxide. (1 mk)

 (c) Write the;

 (i) formula of the nitrate of element T. (1 mk)

 (ii) equation for the reaction between element S and U.

 (d) What type of bond would exist in the compound formed when U and T react? Give

 a reason for your answer. (2 mks)

18. The table below shows the relative atomic masses and the percentage abundances of the

 isotopes L1 and L2 of element L.

|  |  |  |
| --- | --- | --- |
|  | **Relative atomic mass** | **% abundance** |
| **L1** | 62.93 | 69.09 |
| **L2** | 64.93 | 30.91 |

 Calculate the relative atomic mass of element L. (3 mks)

19. When magnesium metal is burnt in air, it reacts with both oxygen and nitrogen gases

 giving a white ash. Write two equations for the reactions taking place. (2 mks)

20. The chromatogram below was obtained from a contaminated food sample P.

 Contaminants Q, R, S and T are suspected to be in P. Use it to answer the following

 questions.



 (a) Identify the contaminant in mixture P. (1 mk)

 (b) Which is the most soluble contaminant in P? (1 mk)

21. Classify the following processes as either chemical or physical. (3 mks)

|  |  |
| --- | --- |
| **Process** | **Type of change** |
| (a) Heating copper (II) sulphate crystals |  |
| (b) Obtaining kerosene from crude oil |  |
| (c) Souring of milk |  |

22. Name two amphoteric oxides. (2 mks)

23. (a) What is the chemical name for rust. (1 mk)

 (b) State one condition that accelerates rusting. (1 mk)

24. (a) State Charles law. (1 mk)

 (b) Draw a sketch graph to illustrate Charles law. (2 mks)

25. (a) Define the term molar solution. (1 mk)

 (b) In a class of 30 students, each student requires 100cm3 of 0.1M sodium hydroxide

 solution for a tritration experiment. Calculate

 (i) The total volume of sodium hydroxide required for the class.

 (K = 39, O = 16, H = 1) (2 mks)

 (ii) The total mass of sodium hydroxide required to prepare the total volume of solution

 for the class. (3 mks)

26. The table below shows the values of solutions A, B, C and D.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution** | A | B | C |  D |
| **pH value** | 2 | 7 | 12 | 14 |

 (a) Which solution is likely to be that of magnesium hydroxide? (1 mk)

 (b) Select the solution that reacts with calcium carbonate powder. Give a reason. (1 mk)

27. Determine the volume of 2.0M NaOH which when diluted to 250cm3 would produce a

 0.8M NaOH solution. (2 mks)