Name ………………………………… ADM Number……………………

 Signature ……………………………….. Date …………………/…….………/…………

**FORM 3**

**END OF TERM 2 EXAM**

**INSTRUCTIONS TO CANDIDATES**

1. *Write your name and index no in the spaces provided above.*
2. *Sign and write the date of exam in the spaces provided above.*
3. *Answer all the questions in the spaces provided after each.*
4. *All working must be clearly shown where necessary.*
5. *Candidates should check to ensure that all pages are printed as indicated and that no questions are missing.*
6. *All answers should be written in English.*

1 . The table below shows different solutions with their PH values. Study it answer the questions that follow.

|  |  |
| --- | --- |
| solution | pH |
|  B |  7 |
| Q | 2 |
| R | 13 |
| T | 6 |
| S | 8 |

1. Which solution would turn pink when added phenolphthalein indicator? (1mk)
2. State and explain the observations made when a piece of magnesium is cleaned and added to solution Q. (2mk)
3. Which solution is likely to be; (2mk)
4. Sodium chloride
5. Rain water

2. (a) State Graham’s law of diffusion (1mk)

(b) 30cm3 of hydrogen chloride gas diffuses through a porous pot in 20seconds. How

long would it take 30cm3 of sulphur(IV) oxide gas to diffuse through the same pot under the same conditions (H =1 Cl = 35.5 S = 32 O =16) (2mk)

c) A gas occupied a volume of 250cm3 at 23ºC and 3 atmosphere. Determine its volume

at 127ºC and pressure is doubled. (2mks)

3.a) Write the chemical formulae of rust.(1mk)

b)State two conditions that accelerates the process of rusting.(2mk)

4. A factory produces Calcium Oxide from Calcium Carbonate as shown in the equation

below

CaCO3 (s) → CaO (s) + CO2 (g)

Calculate the volume of carbon iv oxide produced if 1000kg of calcium Carbonate was used. (Ca = 40, C = 12, O = 16, Molar gas volume at s.t.p = 22.4dm3) (3mks)

5.The set-up below was used to prepare and collect hydrogen sulphide gas. Study it and

answer the questions that follow:-



1. Name solid **V ( 1mk)**
2. Give a reason why warm water is used in the set-up ( 1mk)

 C)Identify one mistake in the set up (1mk)

1. What observations would be made if hydrogen sulphide gas was bubbled through a solution of acidified potassium mangananate vii. (1mks)

6. A student dissolved 8g of sodium hydroxide in 250cm3 and labeled the solution D. He pipetted 25cm3 of this solution and placed it in a conical flask, three drops of methyl orange indicator. He then filled a burette with a hydrochloric acid solution up to the zero mark. He titrated solution D against the acid from the burette. He filled the results in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| TITRE | I |  II |  III |
| Final burette readings (cm3) |  15.0 |  |  31.6 |
| Intial burette readings (cm3) |  0.0 |  15.4 |   |
| Volume of hydrochloric acid(cm3) |  |  15.2 |  15.1 |

1. FILL in the missing values. (1 ½ mks)
2. Calculate the average volume of the hydrochloric acid used.( 1mk)
3. Calculate the concentration of the sodium hydroxide solution D in moles per litre ( molarity) [O=16, H=1, Na= 23]. (2MKS)
4. Calculate the moles of sodium hydroxide used during the titration. (1mk)
5. Write a balanced chemical equation for the reaction that takes place .(1mk)
6. Calculate the moles of hydrochloric acid that reacted ( ½ mk)
7. Hence calculate the concentration of the hydrochloric acid in;
8. moles per litre. (2mks)
9. Grammes per litre ( Cl=35.5, H = 1) (1mk)

7. Dry carbon (II) oxide gas reacts with heated lead(ii)oxide as shown in the equation below.

PbO(s) + CO(g) Pb(s) + CO2(g)

(a) Name the process undergone by the lead(ii)oxide. (1mk)

(b) Name any other two gases that can be used to perform the same function as carbon(II)oxide gas in the above reaction. (1mk)

c)state the observation made during the reaction.(1mk)

8. The grid below is part of the periodic table. Use it to answer the questions that follow. ( The letters do not represent the actual symbols of elements.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| J |  |  |  |  |
|  |  |  |  |  |  | **R** | **S**  |  |
| **N** | **Q** | **V** | **D** |  |  | **T** | **U**  |
| **P** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

 (a) Indicate in the grid the position of an element represented by letter W, whose atomic number

 is 14. (1mk)

1. Select a letter which represents

I. a monoatomic gas. (1mk)

II. A metalloid (1mk)

 III. An element that forms an amphoteric oxide (1mk)

(c) write an equation for the reaction between Q and T (1mk)

d) **COMPARE** the following; (6mks)

 i) The atomic radius of element N and P

ii)The melting point of element D and element R.

iii)The reactivity of element S and T.

e)Draw a diagram for the ION of element P showing its nuclear composition if its mass number is 39. (2mks)

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



a)Write an equation for the reaction taking place in the flame . (1mks)

b)Explain why the product of the reaction in the flask should be burnt.(1mk)

c)DESCRIBE how the product formed after the flame can be confirmed.(2mk)

10. a)DESCRIBE how a mixture of sodium chloride , sand and iodine can be separated a pure solid sample of each. (3mk)

b)Choose the most appropriate method to acquire the first substance from the mixture.(4mk)

i)Water from a table salt solution.\_

ii)Oil from nuts.\_

Iii)Petrol from crude oil.\_

iv)Ammonium chloride from its mixture with copper (ii) oxide.\_

11.a) Describe how a pure sample of solid sample of lead sulphate can be prepared given solid potassium sulphate , dilute nitric (v) acid , water, lead carbonate and other lab apparatus. (3mk)

b)Define the following terms; (2mks)

 i) Salt

 ii)Deliquescence

c)Write balanced chemical equations to show how the following salts are affected by heat.(2mk)

i)Copper carbonate

 ii)Zinc nitrate

12.a) During the industrial manufacture of sodium carbonate during solvay process, ammoniacal brine is fed into a solvay tower where it reacts with carbon iv oxide.

i) Explain why the factory should be sited near a large water source. (1MK)

ii) Give a reason for the baffles lined in the solvay tower (1MK)

iii) Write equation for the slaking of lime. (1mk)

iv) State any two uses of sodium carbonate.(2mk)

b) Carbon shows allotropy its two allotropes are diamond and graphite.

i) Explain why graphite conducts electricity while diamond does not.(1mk)

ii) List any two uses of diamond (1mk)

 13.The table below shows physical properties of some substances. Use the information in the table to answer the questions that follow.

|  |  |  |  |
| --- | --- | --- | --- |
| Substance  | Melting  | Boiling | Electrical conductivity |
|  | Point oC | Point oC | Solid Liquid  |
| **M** | 1083 | 2595 | Good | Good |
| **N** | 801 | 1413 | Poor | Good |
| **O** | 5.5 | 80.1 | Poor | Poor |
| **P** | -114.8 | -84.9 | Poor | Poor |
| **Q** | 3350 | 4827 | Poor | Poor |

 (a) Which substance is likely to be:

 (i) A Metal? (lmk)

 (ii) A Liquid at room temperature( room temp is 220c)? Explain (2mk)

 (b)Which substance is likely to have the following structures; Explain your answers.(2mk)

 (i) Simple molecular?

(ii) Giant atomic?

15.a)Write the structural formulae of the following organic compounds.(2mk)

i) CH3CH2CH2 CH2CH2CH3

ii)CH2CHCH2CH3

b)Describe a chemical test that can be used to differentiate between C2H4 and C2H6 . (2MK)