**NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM/NO\_\_\_\_\_\_\_\_\_\_\_**

**DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FORM\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CHEMISTRY**

**TERM TWO 2016**

**FORM 4**

**PAPER 2**

**TIME: 2 HOURS**

**HOLA SECONDARY SCHOOL**

**MID TERM EXAMINATION**

****

**INSTRUCTIONS: ANSWER ALL QUESTIONS**

1. The table below shows the results obtained when potassium chlorate decomposed in the presence of manganese (IV) oxide catalyst to give oxygen gas.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time (sec) | 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 |
| Volume of oxygen (cm3) | 0 | 10 | 19 | 24 | 28 | 30 | 32 | 33.5 | 34 | 34 | 34 |

1. Plot a graph of oxygen against time and label it as A. (3mks)
2. Using the graph
3. Determine the volume of oxygen collected at the end of the 70th second. (1mk)
4. Determine the total volume of oxygen gas collected at the end of the reaction. (1mk)
5. Write an equation for the reaction leading to decomposition of potassium chlorate. (2mks)
6. Calculate the mass in grass of potassium chlorate decomposed at room temperature (K=39 O = 16 Cl = 35.5 Volume at r.t = 24dm3) (2mks)

ei) When does the reaction end? (1mk)

ii) Sketch a curve for the reaction if the experiment is repeated in the absence of manganese (IV) oxide and label it B. (1mk)

1. Draw a set up of the apparatus which could be used in carrying out the experiment. (3mks)
2. Metal Zn, Al, Cu, Ag, Mg and Pb had their half. Cells connected to a zinc half-cell. Their electrode potentials in volts me given below.

**Metal Reduction potential (v)**

Al -1.66

Cu +0.34

Ag +0.80

Mg -2.37

Pb -0.13

Zn -0.76

1. Which elements are likely to cause the reaction of Zn2+ 2e Zn(s)  (1mk)
2. Metals Aluminium and copper were connected to form a cell.
3. Construct the electrochemical cell set up when Aluminium and copper were connected. (3mks)
4. Determine the e.m.f of the above cell. (2mks)
5. Write the overall equation for the reaction that takes place in the cell. (1mk)

C). 16g of a metal T was deposited when its aqueous salt was electrolysed by passing a current of 0.75A for 1.8hours. Determine the charge on the ion of the metal T. (T = 63.5g if = 96 500c) (3mks)

1. The table below represents part of the periodic table of elements. (The letters do not represent the actual symbols of the elements). Study it and answer the questions that follow.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S |  |  |  | | | | | P |
|  |  |  |  |  |  |  |  |
|  |  | T |  |  | D |  | Q |
|  | C |  |  |  |  |  |  |
|  |  |  |  |  |  |  | R |

1. To which families do element P, Q and R belong? (1mk)
2. Write the electronic arrangements of element C and ion D. (2mks)
3. Compare the melting points of chlorides of C and T. (2mks)
4. Element P, Q and R exist as monatomic gases. Explain. (2mks)
5. State one use of element Q based on its properties. (1mk)
6. Identify on element that will react with oxygen to form
7. An acid onhydrade (1mk)
8. An amphoteric oxide (1mk)
9. A neutral oxide (1mk)
10. Basic oxide (1mk)
11. Which element is the best conductor of heat? (2mks)
12. Study the flow chart below and use it to answer the questions that follow.

*Step III A mixture of NaOH and Ca(OH)2*

G

CH3 – CH3

CH3CH2CL+J

F

Step IV

CO2 + Liquid L

C

CH3CH2CH3

Hexane

B

CH3CH2CH2 Br

CH3CH2CH2OH

K

H+

KM^O4 ( )

*Step V* *Polymerisation*

Process E

1. Name substance B, K and G
2. Name the reagents and conditions necessary in

i) Process E

ii) Step II

1. Write the chemical equation for the reaction taking place.

i) In process D (1mk)

ii) In step I (1mk)

1. Name the type of reaction in

i) process A (1mk)

Step V

ei) Draw the structural formular of compound C. (1mk)

ii) Given that the relative molecular mass of compound C is 6300g, calculate the value of R. (2mks)

fi) To what class of organic compounds does substance K belong? (1mk)

ii) State one general characteristics of this class of compounds in f(i) above. (1mk)

1. The set up below was used to prepare and collect dry hydrogen gas.

1. Complete the diagram to show how a dry sample of hydrogen gas can be collected. (3mks)

bi) Write an equation for the reaction which takes place in the flask. (1mk)

ii) State observation made in the flask. (2mks)

1. Explain observation made if led powder was used in place of iron powder. (2mks)

c) State the stages of gas preparation. (2mks)

d) 1.12dm3 of hydrogen gas was produced at s.t.p when 2.8g of iron were used. Determine the RAM of iron. (Molar gas volume is 22.4 litres at s.t.p) (3mks)

1. State one industrial use of hydrogen gas. (1mk)
2. The flow chart below shows the extraction of aluminium from its ore.

Substance A imputies

Substance B + impurities

Bauxite are + impurities

Heat stage 1 Hot conc. NaCH

Sodium Aluminate + Substance C

Aluminium liquid

Pure Al2O3

Molten Al2O3

Solid D + solution C

stage 2

Process I

Co 2

Stage 3

i) Filtration

ii) Process 2

Stage 4 Process 3

i) Add substance

ii) Heat 800-900oc

1. Write the chemical formula of the ore. (1mk)
2. Name the impurities present in the ore. (2mks)
3. Identify process 1, 2 and 3. (3mks)
4. Name substance A, B, C, D and F. (5mks)

ei) State on alternative procedure that can be used in stage 3 other than treatment with carbon (IV) oxide. (1mk)

ii) Write an equation of reaction taking place in stage 3. (1mk)

1. What is the role of substance F? (1mk) u