Name……………………………………………..........................Adm………………………………….

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

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

FORM FOUR

233/2

CHEMISTRY

MIDTERM ONE EXAM 2019

(2 hours)

INSTRUCTIONS.

.Write your name, admission number and signature in the spaces provided.

.Answer all the questions in the spaces provided.

.All working MUST be clearly shown where necessary.

.Mathematical tables and electronic calculators may be used.

**For Examiner’s Use only.**

|  |  |  |
| --- | --- | --- |
| Question | Maximum score | Candidate’s score |
| 1 | 10 |  |
| 2 | 11 |  |
| 3 | 11 |  |
| 4 | 13 |  |
| 5 | 09 |  |
| 6 | 13 |  |
| 7 | 13 |  |
| Total | 80 |  |

1. a)Explain why the following combination of reagents is unsuitable for the laboratory preparation of hydrogen.

i) Zinc + dilute nitric acid.(1mk)

ii) Lead + dilute hydrochloric acid.(1mk)

Iii) Copper + dilute sulphuric acid.(1mk)

iv) Potassium + dilute sulphuric acid.(1mk)

b) The diagram below was used to obtain hydrogen in the laboratory.

i)Name reagent Q…………………………………………………..(1mk)

ii)State and explain the effect of the resulting solution on litmus paper. (2mks)

iii) Write the equation of the reaction that produces the hydrogen gas. (1mk)

iv) Why is it not possible for calcium to react with dilute sulphuric acid the way it reacts with water? (2mks)

2 . a) Zinc carbonate decomposes on heating producing a gaseous product and a residue.

1. Write the equation of the reaction. (1mk)
2. What is the number of moles of the gaseous product formed.(2mks)
3. Calculate the number of moles of the residue formed.(2mks)
4. Work out the volume of the gaseous product at s.t.p.,if 2.5g of the carbonate is heated.(Zn=65,C=12,O=16,MGV=22400 cm3).(2mks).

b) 0.920g of a mixture of metallic copper and copper oxide was heated in a stream of hydrogen gas until the reduction is complete. The residue weighed 0.752g. What was the percentage of the metallic copper in the original mixture at s.t.p.?(Cu=63.5, O=16). (4mks).

3. a) A student was supplied with a colourless liquid suspected to be water.

i) Describe one chemical test that show the liquid is water. (2mks)

ii) How would it be shown that the water is pure.?(2mks)

b) The flow chart below shows the various stages of water treatment. Study it and answer the questions that follow.

i) Which substances are likely to be removed in unit I? (1mk).

II) What is the purpose of process Y? (1mk)

iii) State why sodium hypochlorite is used. (1mk)

c) What is observed when the following undergo reactions? Write the corresponding reaction equations:

i) Sodium and cold water. (2mks)

ii) Magnesium and steam. (2mks)

4. a) Name three sources of organic compounds.(3mks)

i)……………………………………………………………………..

ii)………………………………………………………………… iii)……………………………………………………………………

b) The table below gives information about the major components of crude oil. Study it to answer the questions that follow.

|  |  |
| --- | --- |
| Components | Boiling points(0C) |
| Gases | Below 40 |
| Petrol | 40-175 |
| Kerosene | 175-250 |
| Diesel oil | 250-350 |
| Lubrication oil | 350-400 |
| Bitumen | Above 400 |

1. Why is it possible to collect the components by fractional distillation?(1mk)
2. Explain why they do not have sharp boiling points.(2mks)
3. Which of them is a molecule with the highest number of carbon atoms? Explain. (2mks)
4. Name one gas which is likely to be a constituent of crude oil and write its formula.(2mks)
5. Under what condition a poisonous gas could be formed when kerosene burns? Explain.(2mks)
6. Give one use of bitumen.(1mk).

5. a) Give the names of each of the processes described below which occurs when salts are exposed to air for some time.

i) Anhydrous copper (ii) sulphate becomes wet.(1mk)

ii) Magnesium chloride forms aqueous solution.(1mk)

iii) Fresh crystals of sodium carbonate,Na2CO3.10H2O, becomes covered with a white powder of the formula Na2CO3.H2O.(1mk)

b) Explain why the following happen, writing the corresponding reaction equations.

i)White limewater forms a colourless solution when excess carbon(iv)oxide is bubbled through it.(2mks)

ii)White anhydrous copper(ii)sulphate powder turns into blue crystals.(2mks).

c) Explain why aluminium chloride has lower boiling point than sodium chloride, yet both aluminium and sodium are metals in the same period.(2mks)

6. Oxygen gas is prepared using the set-up below:

a) Complete the diagram to show how the gas can be collected.(2mks)

b) Name the part labelled P………………………………………………………………….(1mk)

c) What is the purpose of solid R?

………………………………………………………………………………………………………………………………(2mks)

d) Write an equation to show the reaction that forms oxygen gas from liquid Q.(1mk).

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

e) Give any two

i) physical properties of oxygen gas.(2mks)

ii) use of oxygen gas.(2mks)

f) Describe what is observed when oxygen part of the air reacts with magnesium, during burning.(3mks)

7. The grid below represents part of the periodic table. The letters are not the actual symbols of the elements. Study it to answer the questions that follow.

i)Select the element that can form ion with a charge of -2.Explain.(2mks)

ii) What type of structure would the oxide of C have? Explain.(2mks)

iii) How does the reactivity of H compare with that of E ?Explain.(2mks)

iv) 1.3g of B reacts completely when heated with 1.21 litres of Cl2(g)  at s.t.p.

(1 MGV=22.4 litres)

1. Write a balanced equation of the reaction between B and Cl2(g). (1mk)
2. Determine the relative atomic mass of B.(2mks)

v) Explain how you would expect the following to to compare:

a)Atomic radii of F and G.(2mks)

b) The pH values of aqueous solutions of the oxide of B and D.(2mks)

Good Luck!

Chem.Dept,2019.