THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/2 **CHEMISTRY 2**
ALTERNATIVE TO PRACTICAL
(For both School and Private Candidates)

Time: 2: 30 Hours **Tuesday, 12th October 2010 a.m.**

Instructions

1. This paper consists of **five (5)** questions.
2. Answer **all** questions.
3. Qualitative analysis Guidance Pamphlets are allowed after a thorough check by the Supervisor.
4. Calculators and cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. The following constants may be used:

   Na = 23, C = 12, O = 16, H = 1, S = 32, Cl = 35.5, I = 127, K = 39, Ca = 40.

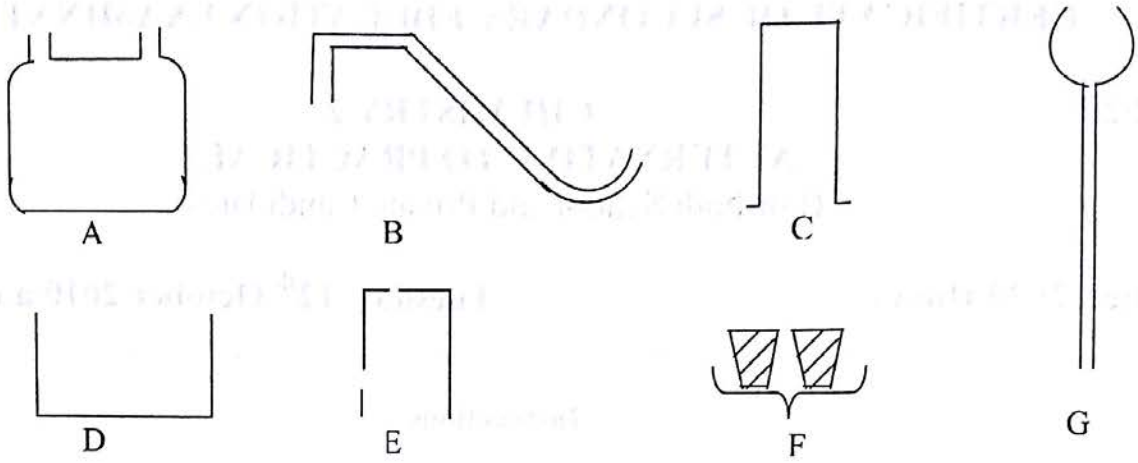
   1 F = 96500 coulombs.

   GMV at s.t.p. = 22.4 dm^3.

   1 litre = 1 dm^3 = 1000 cm^3.

This paper consists of 4 printed pages.

1. The following are some drawings of pieces of apparatus. The pieces, if correctly assem together, can form the apparatus for the preparation of hydrogen gas.



(a) Name each piece of apparatus A - G.

(b) Draw a neat diagram of the apparatus for the preparation of hydrogen using the pi of apparatus above.

(c) Label the hydrogen gas collected and any other substances involved in the prepara of hydrogen using such apparatus.

(d) The piece of apparatus marked A can be replaced by another relatively simpler p of apparatus. Name and draw the alternative piece of apparatus which can take function of apparatus A.

(10 marks)

2. In a practical examination, a student was given the following solutions for titration:

Solution QP containing 4.0g/dm^3 of MOH
Solution LL containing 0.1M H_2SO_4.
Methyl orange (MO) indicator.

On titrating 20cm^3 of solution QP with 0.1M H_2SO_4 acid, the following titre values w obtained:

Burette reading	**Pilot**	**1**	**2**	**3**
Final volume/cm^3	10.00	20.00	30.00	40.00
Initial volume/cm^3	0.00	10.00	20.00	30.00
Volume used /cm^3				

(a) Use the above information to calculate;
(i) the molarity of solution QP (MOH)
(ii) the molecular weight of MOH
(iii) the atomic mass of M.

(b) Name the element M.

(10 marks)

(a) Define the terms oxidizing agent and a reducing agent.

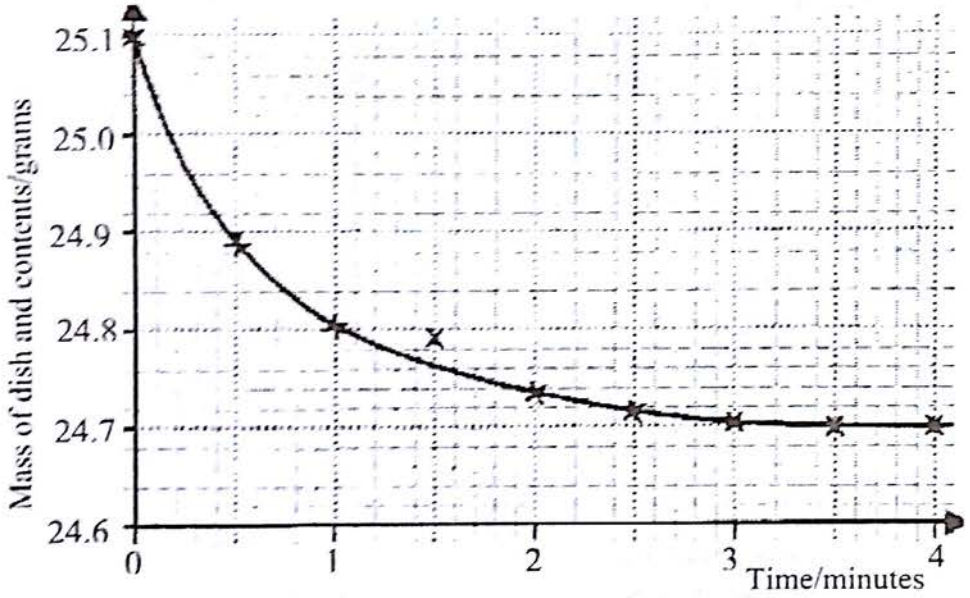
(b) Write molecular equations for the oxidation of copper metal by concentrated
(i) sulphuric acid
(ii) nitric acid.

(c) Draw a labeled diagram of voltameter for the electrolysis of potassium iodide solution. Indicate the movement of ions towards electrodes in your diagram.

(d) If a current of 2A was passed for 1 hour, calculate the mass of iodine liberated.

(10 marks)

4. A small quantity of hydrochloric acid was added to a large quantity of marble in an evaporating dish, which was placed on the pan of a balance. The mass of the dish and its contents was recorded every half minute. The results are shown in the following graph:



(a) Why does the curve slope down?

(b) What was the mass of the evaporating dish and contents at the
(i) start of the experiment
(ii) end of the experiment?

(c) What mass of carbon dioxide was produced?

(d) How long did the reaction last?

(e) Which result would seem to be incorrect? Give reasons. **(10 marks)**

5. An unknown sample P was analyzed and found to contain one cation and one anion. Complete the table and identify the cation, anion and write the formula and the name of the compound.

S/N	Experiments	Observations	Inferences
(a)	Appearance of sample P	White deliquescent crystals	
(b)	Sample P was heated in a test tube.	White acidic fumes which turned dense white fumes with ammonia. The residue was white when cold and yellow when hot.	
(c)	Dilute HCl acid was added to the small portion of the sample in a test tube.	No gas was evolved.	
(d)	To a small portion of the sample P in a test tube conc. H_2SO_4 was added.	White acidic fumes which turned dense white fumes with ammonia.	
(e)	Sample P was dissolved in the distilled water. The solution was divided into three and the following was done to the portions: (i) dilute silver nitrate followed by ammonia solution were added to the first portion.	White precipitate was formed which dissolved in excess ammonia solution to form a clear solution.	
	(ii) a little ammonia solution was added then in excess to the second portion.	White gelatinous precipitate was formed which was soluble in excess ammonia.	
	(iii) potassium hexacyanoferrate (II) solution was added to the third portion.	A white precipitate was formed.	

Conclusion

(i) The cation is _____.
(ii) The anion is _____.
(iii) The molecular formula of compound P is _____.
(iv) Name of compound P is_____. **(10 marks)**