THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/1 **CHEMISTRY 1**

Time: 3 Hours **Year: 2020**

Instructions

1. This paper consists of sections A, B and C with a total of **sixteen (16)** questions.
2. Answer **all** questions in section A and **two (2)** questions from each of sections B and C.
3. Section A carries **forty (40)** marks and sections B and C carry **thirty (30)** marks each.
4. Cellular phones and any unauthorised materials are **not** allowed in the examination room.
5. Mathematical Tables and non- programmable calculators may be used.
6. Write your **Examination Number** on every page of your answer booklet(s).
7. The following constants may be used:

   Atomic masses: H = 1; N = 14; O = 16; Zn= 65.

   1Faraday = 1F=96500C; Vm of gas at s.t.p=22.4dm^3. 1 liter = 1dm^3 = 1000cm^3.

SECTION A (40 Marks)

Answer **all** questions in this section.

1. Give one reason for each of the following observations:

   (a) 0.2M hydrochloric acid is stronger than 0.2M ethanoic acid.

   (b) Ammonia is a weak base while sodium hydroxide is strong.

2. The following reaction takes place in a vessel of a fixed volume:

   $$\underset{\text{LHS}}{A_{(g)} + 3B_{(g)}} \rightleftharpoons \underset{\text{RHS}}{5C_{(g)}}$$

   (a) How many moles of gas are there on the right and left hand sides of the equation?

   (b) Identify the high pressure side and the low pressure side.

   (c) To what direction will the equilibrium shift if:
   (i) the pressure is increased?
   (ii) the pressure is decreased?

3. (a) One of the isotopes of uranium has atomic number 92 and atomic mass 238. Give its number of electrons, protons and neutrons.

   (b) Given the following electronic configuration of elements, identify the elements and their corresponding valencies.
   (i) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$
   (ii) $1s^2\ 2s^2\ 2p^6$
   (iii) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$
   (iv) $1s^2\ 2s^2\ 2p^6\ 3s^1$

4. Outline four functions of a chemistry log book.

5. Why during the electrolysis of dilute NaCl solution, O_2 gas is produced at the anode; while in the electrolysis of concentrated hydrochloric acid the gas evolved at the anode is Cl_2. Briefly explain.

6. (a) Name each of the following complex compounds:
   (i) $[CrCl_2(H_2O)_4]^+$
   (ii) $K_3[CoF_6]$
   (iii) $[Co(NH_3)_5Cl]Cl_2$.

(b) Identify ligands of each complex compound.

7. Name the instruments used to measure specific volume of liquid and give one example of a liquid measured by each instrument.

8. Identify the two general properties of each of the following:
   (a) Sandy soil. (b) Clay soil.

9. Briefly describe four principles of teaching and learning Chemistry.

10. State four relevant assessment tools used when teaching the topic "Periodic classification".

SECTION B (30 Marks)

Answer **two (2)** questions from this section.

11. (a) Define standard solution.

(b) The specific gravity of concentrated nitric acid solution are as follows:
Nitric acid is redistilled
70% w/w HNO_3 in water
Density is 1.490g/cm^3
Molecular weight of HNO_3 is 63.01g
Chloride Cl- = 0.0005%
Sulphate SO_4^{2-} = 0.002%

(i) Calculate the concentration of HNO_3 in g/dm^3.
(ii) Find the number of moles of the concentrated acid in 1dm^3.
(iii) Determine the volume of concentrated HNO_3 acid required to prepare 500cm^3 of a 0.5M aqueous solution.

12. (a) (i) Define galvanization.
(ii) Give three significances of galvanization.

(b) Equal amounts of zinc sulphate and potassium iodide were dissolved in small amount of water to make the solution more concentrated. If a potential difference of 6 volts and current of 12 amperes was passed through the solution for 2 hours and Carbon electrodes were used in the process:
(i) Draw a well labeled diagram representing the above experiment.
(ii) Calculate mass of zinc deposited on cathode.
(iii) Calculate the volume of iodine gas liberated at s.t.p.

13. (a) Define each of the following types of organic reactants:
    (i) Electrophiles
    (ii) Free radicals.

    (b) State five characteristics of homologous series.

    (c) For each of the following hydrocarbons, give the IUPAC name and identify the functional group:

    (i) $CH_3CHCH_2CH_2CH_3$ (with CH_3 branch)

    (ii) $CH_3C{=}CHCH_3$ (with CH_3 branch)

    (iii) $CH_3CHC{\equiv}CCH_3$ (with CH_3 branch)

SECTION C (30 Marks)

Answer **two (2)** questions from this section.

14. Ability to improvise teaching and learning resources is an important skill a Chemistry teacher ought to possess. Analyse five qualities of a well improvised teaching and learning resources.

15. Explain the importance of providing first aid to a person who got whatever type of accident in a chemistry laboratory. Give five points.

16. Describe five criteria for selecting a project method in teaching and learning Chemistry.