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

732/1 **CHEMISTRY 1**

Time: 3 Hours **Friday, 10th May 2019 a.m.**

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 unauthorized 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:

   1 liter = $1dm^3$ = $1000cm^3$

SECTION A (40 Marks)

Answer **all** questions in this section.

1. (a) Define principal quantum number.
   (b) Briefly describe the three principles that govern the arrangement of electrons in an atom.

2. Find the constant of solubility product (Ksp) of Bismuth sulphide (Bi_2S_3) whose solubility is 1.0×10^{-5} mol/L at 25°C.

3. Why $CH_3CH(CH_3)CH(CH_3)CH_3$ and $CH_3(CH_2)_4CH_3$ have different boiling points regardless of their similarity in molecular mass?

4. Give four demerits of demonstration strategy in teaching and learning Chemistry.

5. Briefly explain four uses of a chemistry teachers' guide.

6. Outline four problems faced by the chemistry teacher with inadequate preparation.

7. (a) Provide the meaning of the following terms:
   (i) Electrochemistry
   (ii) Conduction.

   (b) Differentiate electronic from electrolytic conductors.

8. (a) Give the meaning of acid rain.
   (b) Briefly explain how primary and secondary air pollutants differ.

9. (a) List two supply systems in a chemistry laboratory.

   (b) Why it is recommended to;
   (i) add acid into water and not vice versa.
   (ii) cover a container holding sodium hydroxide pellets.

10. The industrial preparation of ammonia is represented in the chemical equation:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \ldots\ldots\ldots \Delta H = -ve$$

Give four strategies of increasing the speed of the formation of ammonia.

SECTION B (30 Marks)

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

11. (a) Given the complex compound $[CoCl(H_2O)_2(NH_3)_3]Cl$:
    (i) What is the coordination number of the central metal ion.
    (ii) What is the oxidation state of the central metal ion.
    (iii) Give the IUPAC name of the compound.

    (b) Why transition metal elements;
    (i) have variable oxidation states
    (ii) form complex ions
    (iii) exhibit paramagnetism.

12. (a) Give the meaning of the following terms:
    (i) sp^3 hybridization
    (ii) sp2 hybridization
    (iii) sp hybridization.

    (b) Calculate the wavelength in A of line in a Balmer series that is associated with a drop of electron from the fourth orbit (Rydberg's constant (R_H) = $1.09676 \times 10^6 cm^{-1}$

13. As a chemistry teacher, the 24 hours advance instructions requires you to prepare 0.119M sulphuric acid to be used by 120 students for titration. Each student needs 100 cm^3. The commercially available acid has the following specifications: 96% purity, density = $1.82 g/cm^3$ and molecular weight = 98g.

    (a) Mention two precautions you will take while handling this acid.
    (b) Show how you will prepare the required solution.
    (c) Determine the volume of the dilute acid that will neutralize 25 cm^3 of a 0.125M sodium carbonate.

SECTION C (30 Marks)

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

14. In six points, explain the importance of teaching and learning resources in the teaching and learning of chemistry.

15. Explain five procedures for moderating a chemistry test.

16. Explain five advantages of using role-play in the teaching and learning of the concept "States of Matter."