THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/1 **CHEMISTRY 1**

Time: 3 Hours **Year: 2022**

Instructions

1. This paper consists of sections **A** and **B** with a total of **fourteen (14)** questions**.**
2. Answer **all** questions.
3. Section **A** carries **forty (40)** marks , and section **B** carry **sixty (60)** marks.
4. Non-programmable calculators.
5. Cellular phones and any unauthorized materials are not allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet (s).

SECTION A (40 Marks)

Answer **all** questions in this section

1. In an experiment to determine the structure of an atom, Rutherford bombarded positively charged alpha particles to the atoms of a gold foil and observed the following:
   (a) Most of the alpha particles passed through the gold foil without suffering any deflection.
   (b) Very few particles rebounded completely on hitting the gold, foil. What is the interpretation of each of the observations?
2. Write the order of reaction with respect to Br_2 and H_2, together with overall order of reaction in rate equation: $R=k[Br_2]^{2}[H2]^{1}$.
3. (a) A chemistry teacher instructed his students to dissolve exactly 20 g of sodium hydroxide (NaOH) pellets in one dm^3 of solution. Name and explain such kind of a solution.
   (b) What is the molarity of a solution that has 0.491 g of NaOH dissolved in 400 cm^3 of solution?
4. Derive the degree of dissociation of weak acid. Given that
   $HA_{(aq)} \leftrightharpoons H^{+}_{(aq)} + A^{-}_{(aq)}$ is an equation for the dissociation of a weak acid electrolyte, show that the degree of dissociation (α) is given by $\alpha = \sqrt{\frac{Ka}{c}}$.
5. Briefly explain why ammonia molecule readily coordinate with cation of the transition metals but ammonium ion ($NH4^{+}$) does not.
6. (a) Complete the reactions in which:
   (i) methyl benzene reacted with bromine under $FeBr_3$,
   (ii) methyl benzene reacted with bromine under UV-light.
   (b) Account for the formation of products in part (a).
7. Give six activities on how to prepare a lesson by using an inquiry based learning approach to teach the topic of acids and bases.

8. Account for the use of methyl orange indicator during titration of HCl against Na_2CO_3, and the use of phenolphthalein indicator in titration of HCl against NaOH.
9. Give three factors to consider when preparing a chemistry lesson for Form One class.
10. Study the reaction for benzene against electrophile-nucleophile molecule with symbol E-NU under catalyst to form benzene substituted with E together with molecule H-NU.

SECTION B (60 Marks)

Answer all questions from this section

11. Calculate standard heat of formation of propane given that the heat of combustion of propane (C_3H_8) is -2220.2 $kJmol^{-1}$ and the heat of formation of carbon dioxide (CO_2) and that of water (H_2O) as -393 $kJmol^{-1}$ and -285 $kJmol^{-1}$ respectively.
12. Illustrate with four points, the causes of soil pH in the garden soil which has been tested and found to have a pH value of 4.10.
13. Give the importance of analyzing chemistry syllabus before the commencement of teaching in five points.
14. Analyze five points on the significance of keeping records of continuous assessment.