THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/1 **CHEMISTRY 1**

Time: 3 Hours **Year: 2021**

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 any **two (2)** questions from each of hte section **B** and **C.**
3. Section **A** carries **forty (40)** marks , and section **B** and **C** carry **thirty (30)** marks each.
4. Non-programmable calculators may be used
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. Explain the importance of the chemistry syllabus in four points.
2. Identify four features of micro-teaching that differentiate it from other teaching practices.
3. (a) Explain the difference between homogeneous and heterogeneous equilibria.

   (b) Given an equilibrium reaction: $2NO_{(g)} + O_{2(g)} \leftrightharpoons 2NO_{2(g)}$ at 230^{o}C:

   (i) write an expression of an equilibrium constant, (Kc),

   (ii) explain what will happen on the equilibrium if NO_2 is removed from the system.
4. Explain why,

   (a) Alkenes are slightly more soluble than their corresponding alkanes

   (b) the major product of the reaction between 1-butane and hydrogen bromide gas is secondary bromobutane, not primary bromobutane.
5. State four merits of classroom tests.
6. (a) Explain the concept of soil reaction.

   (b) Describe two sources of acid in the soil.
7. Given the half-reaction equations:

$$MnO^{-}_{4(aq)} + 5e^{-} + 8H^{+} Mn^{2+}_{(aq)} + 4H_2O_{(l)} E^{0} = 1.51V$$

$$ClO^{-}_{4(aq)} + 2H^{+}_{(aq)}\ ClO^{-}_{3(aq)} + H_2O_{(l)} E^{0} = 1.19V$$

   (a) Give the overall balanced cell reaction,

   (b) calculate E^{o} of the cell.
8. (a) Write electronic configuration of:

   (i) Copper ($_{29}$Cu),

   (ii) calcium ion ($_{20}Ca^{2+}$),

(iii) chloride ion ($_{17}Cl^-$).

(b) Explain why atoms undergo hybridization.

9. (a) Find the oxidation state of iron in the complexes, $[Fe(CN)_6]^{4-}$ and $[Fe(CN)_6]^{3-}$.

(b) Identify the property of cyanide ligand CN^- that makes it possible to form complexes with such a transition metal.

10. State four uses of a lesson plan.

SECTION B (30 Marks)

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

11. A solution of $1dm^3$ was made by dissolving 28.6 g of impure sodium carbonate in distilled water. A 25 cm^3 of this solution was completely neutralized by 24.9 cm^3 of 3.65 g of hydrochloric acid in $1dm^3$ solution.

(a) Calculate the concentration of pure sodium carbonate in g/dm^3.

(b) If the impurity in sodium carbonate is water of crystallization, calculate the value of Z in the formula $Na_2CO_3.ZH2O$.

12. Calculate the wavelength in meter, of a bulb light that is radiated by the energy of 2.76×10^5 Joules.

13. (a) Using a relevant example in each case, describe five characteristics of homologous series.

(b) Hydrocarbon **R** was found to contain 84% by mass carbon, and the rest percentage was hydrogen. If its molecular mass was 60 g,

find:

(i) Empirical formula

(ii) molecular formula.

SECTION C (30 Marks)

Answer any two (2) questions from this section

14. Suggest five safety precautions for the storage of chemicals in chemistry laboratory.
15. Elaborate five principles of teaching and learning chemistry.
16. Describe five procedures to be followed when moderating chemistry test items.