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

732 **CHEMISTRY 1**

Time: 3 Hours **Year: 2024**

Instructions.

1. This paper consists of sections A and B with a total of **Fourteen (14)** questions.
2. Answer **all** questions from section A and **four (4)** questions from section B.
3. Section A carries **forty (40)** marks and section B Carries **sixty (60)** marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).
6. The following constants can be used:

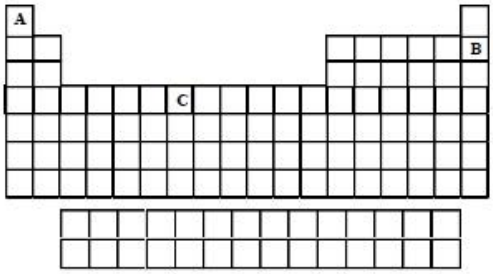
   Atomic Masses: H = 1 ; N = 14; O = 16; Zn = 65

   1Farady = 1 F = 96500C; Vm of gas at stp = 22.4 dm^3. 1 litre= 1 dm^3 = 1000 cm^3

SECTION A (40 Marks)

Answer **All** questions from this section. Each question carries **four (4)** marks.

1. The following diagram represents the modern periodic table with representative elements lettered A, B and C. Use the electronic configuration of each element to identify their blocks.



2. Use the Hess's law to calculate the standard enthalpy of the reaction $A + B$ ----------→C given the following standard enthalpy values:
   ΔH_f^{θ} (A) = +411 kJ mol^{-1}
   ΔH_f^{θ} (B) = -252 kJ mol^{-1}
   ΔH_f^{θ} (C) = +525 kJ mol^{-1}

3. (a) Student **A** carried ten moles of water in a liquid form while student **B** carried the same number of moles of water in vapour form. Who carried heavier weight than the other? Briefly, explain.
   (b) How many moles of nitrogen gas are there in 3.5×10^{20} molecules of the gas?

4. Triamminetriaquachromium(III) chloride is among of the complex compounds. Briefly explain two conditions which favour formation of such compound.

5. Briefly, justify the following observations:
   (a) 4-nitrophenol (p-nitrophenol) is more acidic than 4-nitromethylphenol (p-methylphenol).
   (b) Reactions of phenylamine favours more electrophilic substitution at para and ortho positions than at meta position.

6. Suppose you carried out an experiment to determine pH of soil in a school farm and you found the pH of 9.5; How would you correct it to a pH below 7.0? Give four ways.

7. The teaching and learning of Chemistry subject is guided by several principles. What considerations do these principles emphasize with regards to the student learning? Give four points.

8. You are invited at Mwangaza secondary school to prepare a practical work about titration between HCl and $NaHCO_3$. Suggest the standard volumetric apparatus and indicator that could be used during titration.

9. You have been invited to a certain school where staffs have contradiction between a syllabus and the curriculum. How would you help them to differentiate the two concepts? Give four points.

10. When Fe^{3+} and Sn^{2+} are simultaneously introduced into aqueous solution, the reaction begins immediately. The ionic equation representing the reaction is:

    $2Fe^{+3}$ (aq) + Sn^{2+} (aq)------→ $2Fe^{2+}$ (aq) + Sn^{4+} (aq)

(a) Write an expression for the rate of reaction with respect to the concentration of Fe^{3+}.
(b) If the initial concentration of Fe^{3+} = Fe^{2+} = 0.001 M, prove that the average rate of reaction of Fe^{3+} and Fe^{2+} will be the same after 38.5 seconds.

SECTION B (60 Marks)

Answer all questions from this question. Each question carries **fifteen (15)** marks.

11. You are provided with the following cell notation: Al/Al^{3+} (0.125M)//Sn^{2+} (0.352M)/Sn.
Given Al/Al^{3+} ,E^{θ} = -1.66 V and Sn^{2+}/Sn, E^{θ} = -0.13 V;
(a) Draw a well labeled diagram of this electrochemical cell.
(b) Calculate the e.m.f of this cell using the provided data.

12. (a) Complete the following organic reactions and determine the type of reaction involved.
(i) $CH_3CH=CH_2 + HBr \xrightarrow{\text{hydrogenperoxide}}$
(ii) $CH_3CH=CH_2 + Cl_2 \xrightarrow{H^+}$
(iii) $CH_3CH=CH_2 + Cl_2 \xrightarrow{\text{u.v.light}}$
(iv) $CH_3CH=CH_2 + Cl_2 \xrightarrow[\text{darkness}]{}$
(v) CHCHCHI + alcoholic NaOH $\longrightarrow$

(b) Write the expanded structural formula of the following ompounds:
(i) 2,3-dibromopentane.
(ii) 3,3- diethylpentane.
(iii)3-methylbut-2- ene.
(iv) 2 – bromo-3-chloropent-2-ene.
(v) But-2-yne.

13. By using knowledge obtained from improvisation explain six features of a well-prepared teaching and learning resources made from the local materials.

14. (a) Assume you are a new Chemistry teacher teaching Form One students in your school and you are required to prepare a monthly Chemistry test for the class. In four points, explain how you would accomplish the task step by step.
(b) Suppose you need to prepare a quality chemistry test for Form Three students at the end of the year, which guideline will you use to achieve your goal? Describe three steps to follow in developing the guideline.