MYOTA . F (0754370849)

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

732/1

CHEMISTRY 1

Time: 3 Hours

Monday, 13th May 2013 a.m.

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in sections A and **two (2)** questions from each of sections B and C.
3. Section A and B carry **thirty (30)** marks each and section C carries **forty (40)** marks.
4. Cellular phones 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; C = 12; O = 16; Na = 23.

   1 Litre = $1dm^3 = 1000\ cm^3$

   Dissociation constant of water ($Kw = 1 \times 10^{-14}$)



SECTION A (30 Marks)

Answer **all** questions in this section.

1. Give the meaning of the following terms:
   (a) Principal quantum number.
   (b) Electromagnetic spectrum.
   (c) Ionic bonding.

2. Outline three advantages of making analysis of test results.

3. (a) Define standard enthalpy of formation.
   (b) Find the enthalpy of reaction between NH_3 and HCl represented by the reaction equation:

   $NH_{3(g)} + HCl_{(g)} \rightarrow NH_4Cl_{(s)}$;

   Given that the standard enthalpies of formation of the respective compounds are: $NH_3 = -46\ kJmol^{-1}$, $HCl = -92.3\ kJmol^{-1}$ and $NH_4Cl = -315\ kJmol^{-1}$.

4. Briefly explain three functions of a Chemistry logbook.

5. (a) Give the meaning of 'isomerism'.
   (b) Write two isomers of chloroalkane with 5 carbon atoms ($C_5 H_{11} Cl$).

6. Why does each of the following **can not** be used to prepare primary standard solution?
   (a) Concentrated sulphuric acid.
   (b) Concentrated hydrochloric acid.
   (c) Sodium hydroxide pellets.

7. List three factors that must be considered when preparing a scheme of work.

8. If you were to attract a Form I class to study Chemistry, explain three points to convin basing on the importance of the subject in daily life.

9. Outline six common sources of unexpected fire in the Chemistry Laboratory.

10. (a) With relevant examples, give the meaning of the term "ligand" as applied in com compounds.

(b) With the aid of equation, explain why anhydrous blue cobalt (II) chloride turns pink when exposed to moisture.

SECTION B (30 Marks)

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

11. (a) Briefly describe five components of soil.

(b) The pH of a sample of sandy soil was dissolved in water for analysis. The sample solution was found to have OH^- concentration of 5×10^{-7}. Calculate the pH of the soil.

12. (a) Briefly explain how each of the following physical changes occurs.
(i) Melting (ii) Vaporization (iii) Condensation.

(b) (i) State the first law of thermodynamics.
(ii) Calculate the heat of formation of methane from the following data:

$CH_{4(g)} + 2O_{2(g)} \rightarrow 2H_2O_{(g)} + CO_{2(g)}$ ..... $\Delta H^0 = -886\,kJ$.

$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ ..... $\Delta H^0 = -407\,kJ$.

$H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(g)}$ ..... $\Delta H^0 = -285\,kJ$.

(c) Giving reason, state whether the reaction is endothermic or exothermic.

13. (a) What do you understand by the term 'soil fertility?'

(b) Explain five advantages of applying manures instead of synthetic fertilizers in the field.

14. (a) Give the meaning of the following terms as used in organic chemistry:
(i) Nucleophile.
(ii) Electrophile.

(b) In each of the following reactions, complete the equation and give the name of the major product only:

(i) $C_6H_5CH_3 + H_2SO_4 \xrightarrow{\text{Sulphonation}}$

(ii) $CH_4 + Cl_2 \xrightarrow[\text{control}]{\text{uv}}$

(iii) $C_6H_6 + CH_3Cl \xrightarrow{FeCl_3}$

(c) Predict the major product formed during the hydrochlorination of the propene. (CH_2=$CHCH_3$)

SECTION C (40 Marks)

Answer two (2) questions from this section.

15. (a) Answer the following questions in brief:
    (i) Give one reason for rinsing apparatuses before putting in the fresh solution.
    (ii) State what will happen if titration with non-self indicator solutions is conducted without indicator.
    (iii) Give an explanation why certain solutions are warmed during titration.
    (iv) State what will happen in a solution of a given concentration if more solvent is added into it.
    (v) Why is a pilot not involved in calculating titre volume? Give one reason.

    (b) Suppose you are in-charge of Chemistry Laboratory, a 24 Hours Advance Instruction f CSEE Chemistry Practical directs you to prepare a 100 cm^3 per candidate of 0.1 M Na_2CO_3. Describe how you will go about preparing this solution for 25 candidates.

16. (a) State four characteristics of specific instructional objectives.

    (b) Explain six advantages of having instructional objectives in teaching and learning.

17. Explain six criteria for selecting quality textbook for Chemistry subject.

18. (a) Briefly describe the levels of cognitive domain in increasing hierarchy.

    (b) Explain briefly five suggestions for construction of a good test.

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