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

732/1

CHEMISTRY 1

Time: 3 Hours DR. MYOTA. F. CB Monday, 16th May 2011 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. Sections 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; S = 32; K = 39; Mn = 55; Ca = 40; Cu = 65.

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

   Plank's constant (h) = 6.626×10^{34} Js

   Velocity of light, $c = 3.0 \times 10^8$ m/s

   1F = 96500 C

This paper consists of 4 printed pages.

Answer all questions in this section.

1. Give the meaning of the following terms:
   (a) Atomic radius.
   (b) Ionization energy.
   (c) Electron affinity.
2. Write three postulates according to Bohr atomic model.
3. Define the following terms:
   (a) Half-life of chemical reaction.
   (b) Equilibrium constant of a reversible reaction.
4. Give three significance of the scheme of work.
5. (a) What is the meaning of soil pH?
   (b) State two ways that can be used to treat acidic soil.
6. With the aid of chemical equations, suggest one reason for the following observations:
   (a) Zinc oxide dissolves in both acid and alkali.
   (b) A blue copper (II) sulphate solution turns deep blue when aqueous ammonia in ad
   excess.
7. Name the six preliminary tests in qualitative analysis experiments.
8. (a) What is corrosion?
   (b) Study the standard electrode potential at 25°C shown below then answer the questio
   that follow:

METAL	E^{θ} V
Zn^{++}/Zn	- 0.76
Fe^{++}/Fe	- 0.44
Sn^{++}/Sn	- 0.14

Predict which metal is suitable for coating /protecting iron more effectively. Explain yo
answer.

9. Write the type of extinguisher appropriate for putting off the fire caused by the followi

burning materials in the chemistry laboratory:

(a) Sodium metal.

(b) Volatile liquid chemicals.

(c) Piece of cloth.

10. Compute the enthalpy of formation of calcium hydroxide $Ca(OH)_2$ from the following reactions:

$H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(l)}$ ..... $\Delta H^0 = -68.3$kCal

$CaO_{(s)} + H_2O_{(l)} \rightarrow Ca(OH)_{2(s)}$ ..... $\Delta H^0 = -15.3$kCal

$Ca_{(s)} + \frac{1}{2}O_{2(g)} \rightarrow CaO_{(s)}$ ..... $\Delta H^0 = -151.8$ kCal

SECTION B (30 Marks)

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

11. (a) Give the meaning of the following terms

(i) Quantitative analysis
(ii) Volumetric analysis
(iii) Titration

(b) Potassium permanganate ($KMnO_4$) is standardized using standard solution of sodium oxalate ($Na_2C_2O_4$) according to the reaction equation:

$$5C_2O_4^{2-}{}_{(aq)} + 2MnO_4^-{}_{(aq)} + 16H^+{}_{(aq)} \rightarrow 2Mn^{2+}{}_{(aq)} + 8H_2O_{(l)} + 10CO_{2(g)}$$

If $19.20cm^3$ of $KMnO_4$ requires $20cm^3$ of 0.05M oxalate for completing the reaction, calculate the molarity of the permanganate.

12. (a) With the aid of a well labeled diagram, describe the structure of the hydrogen atom as proposed by the scientist Bohr.

(b) Point out any two (2) postulates on hydrogen spectrum.

13. (a) State Faraday's first law of electrolysis.

(b) A current of 1.3A was passed through copper II salt solution for 35 minutes. Find the mass of copper dissolved from the copper electrode.

(c) 2.24g of calcium was discharged from calcium chloride through electrolysis of the molten chloride. If the current was maintained at 15 A, calculate the time spent and the quantity of electricity used.

14. (a) Briefly explain the following observations in organic chemistry:
(i) Propene reacts with halogens while Propane does not.
(ii) But-1-yne reacts with strong base like sodium amide while But-2-yne show reaction.

(b) With the aid of chemical equation, describe how you will prepare the follo organic compounds:
(i) 2-Methylnitrobenzene from nitric acid and Bromomethane.
(ii) Butanol from Propene and Bromoethane.

SECTION C (40 Marks)

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

15. Free market economy has made it possible for teachers to have wide choice of textbooks in market. Explain four (4) appropriate criteria to consider when selecting Chemistry textbook

16. You are a Chemistry teacher at Shume Secondary School, your Head of Department instruc you to prepare 3 Litres of $0.5MH_2SO_4$ for use during acid – base titration experiment for for III students in your school. Explain how you would prepare this solution. Show all calculati where applicable. Use the following chemical specifications for sulphuric acid:
Assay = 96% v/v
Density = $1.8g/cm^3$
Molar mass $H_2SO_4 = 98$

17. One of your responsibilities in teaching is to set tests to assess your students. Explain three importance of classroom tests to each of the following parties:
(a) The students
(b) The teacher
(c) Parents

18. Elaborate five criteria for deciding the teaching method(s) to use in the teaching of chemi