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

032/1

CHEMISTRY 1

Time: 3 Hours

Tuesday, 15th May 2018 a.m.

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 **two (2)** questions from each of sections B and C.
3. Section A carries **forty (40)** marks and sections B and C carry **thirty (30)** marks each.
4. Cellular phones and any unauthorized materials 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:

   1 liter = $1dm^3 = 1000cm^3$; Gas constant, R, = 8.314 $J\ K^{-1}\ mol^{-1}$.

SECTION A (40 Marks)

Answer all questions in this section

1. As a chemistry teacher, justify the relevance of the chemistry subject in daily life to your Form I students. Give four points.

2. (a) What is a transition metal?

   (b) Briefly explain the observation that copper (I) compounds are coloured whereas copper (II) are not.

3. Briefly describe four criteria for choosing a chemistry text book.

4. State four amendments on atomic theory against the ones proposed by Dalton.

5. (a) List down four gases which cause global warning.

   (b) Differentiate between greenhouse gases and photochemical smog.

6. (a) Define standard solution.

   (b) With specific example in each case, state four characteristics of primary standard reagents.

7. Briefly describe four stages of the lesson development in the chemistry lesson plan.

8. Outline four characteristics of a good chemistry test.

9. Briefly describe four types of manures.

10. (a) Mention two uses of benzene.

    (b) (i) Give the meaning of electrophilic substitution.
    (ii) Using relevant reaction equation; show how aromatic compounds undergo electrophilic substitution.

SECTION B (30 Marks)

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

The experiment to investigate the factors affecting rate of chemical reaction was conducted by reacting 0.02M potassium permanganate solution and 0.05M oxalic acid in dilute sulphuric acid. The experiment was repeated four times using different temperatures and the data were collected as shown in Table 1.

Table 1: Experimental results

Temperature		$\frac{1}{T}$K	Time (sec)	$\frac{1}{t}$	$\log\frac{1}{t}$
C^0	K				
50	323	3.10×10^{-3}	50.2	0.019	-1.7212
60	333	3.00×10^{-3}	26.00	0.038	-1.4202
70	343	2.92×10^{-3}	12.00	0.083	-1.0809
80	353	2.82×10^{-3}	5.00	0.200	-0.6989

Questions

(a) What is the role of sulphuric acid in this experiment?

(b) Of the factors affecting rate of chemical reaction, which one was being investigated? Give a reason.

(c) Write
  (i) the half reaction for the oxidized and reduced species.
  (ii) overall reaction equation.

(d) Use equation: $\log\frac{1}{t} = \log A - \frac{Ea}{2.3RT}\frac{1}{T}$ in the form of $y = mx + c$ to calculate the activation energy. Take the value of $m = -9.112 \times 10^3$.

12. Compound A, C_4H_8, and compound B, C_5H_{10}, give C_4H_{10} and C_5H_{12} respectively upon hydrogenation. When compound A reacts with water under acidic medium, it gives compound C, a primary alcohol. When C_5H_{12} reacts with nitric acid under heat, it gives D, $C_5H_{11}NO_2$.

(a) Write the chemical reactions for the formation of A, B, C and D.

(b) Name the structures of A, B, C and D.

(c) Give a maximum of five isomers for each of compounds A, B and C.

13. (a) Give three differences between strong electrolyte and weak electrolyte.

(b) When 25 cm^3 of aqueous ammonia is titrated with 0.17 mol/dm^3 hydrochloric acid, 20 cm^3 of the acid were needed to attain the equivalent point.

(i) What is the concentration of the aqueous ammonia?

(ii) Given that, pKa for the ammonium ion is 9.3; calculate the pH of the solution equivalence point.

SECTION C (30 Marks)

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

14. Chemistry laboratory is a potentially dangerous place where accidents can occur. Descri six causes of danger in the chemistry laboratory.

15. Why is an inquiry the best method of teaching and learning chemistry? Explain by givi four reasons.

16. Elaborate five programs in computer, which can be used in teaching and learning chemistry