

**THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
FORM TWO SECONDARY EDUCATION EXAMINATION, 2013**

0032

CHEMISTRY

**Time: 2½ HOURS****INSTRUCTIONS**

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions.
3. Write your examination number at the top right corner of every page.
4. **ALL** writing must be in black or blue ink **EXCEPT** diagrams which must be in pencil.
5. Cellphones and calculators are not allowed in the examination room.
6. The following atomic masses may be used:  $H = 1$ ,  $O = 16$ ,  $C = 12$ ,  $Na = 23$ ,  $S = 32$ ,  $Ca = 40$

<b>FOR EXAMINER'S USE ONLY</b>		
<b>QUESTION NUMBER</b>	<b>SCORE</b>	<b>INITIALS OF EXAMINER</b>
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
<b>TOTAL</b>		

This paper consists of 8 printed pages.

**SECTION A (10 MARKS)**

1. Write the letter of the correct answer in the box provided for each of the following items:

(i) The apparatus used for grinding granular chemicals in the laboratory include:

- A. crucible and watch glass
- B. mortar and pestle
- C. pestle and pair of tongs
- D. spatula and basin.

(ii) The substances that can be used to extinguish fire are:

- A. carbon dioxide and sand
- B. carbon dioxide and sugar
- C. nitrogen and sand
- D. nitrogen and water.

(iii) Which of the following electronic configurations are of metals?

- A. 2:8:1 and 2:5
- B. 2:8:2 and 2:6
- C. 2:8:3 and 2:8:8:1
- D. 2:8:6 and 2:8:8:7

(iv) When sugar is dissolved in water, a uniform mixture is formed. The resulting mixture is called a:

- A. solute
- B. solution
- C. solvent
- D. suspension.

(v) Flammable chemicals are those which:

- A. burn skin
- B. catch fire easily
- C. explode
- D. extinguish fire.

(vi) Which of the following can be classified as a renewable source of energy?

- A. Biomass
- B. Coal
- C. Coke
- D. Petroleum

(vii) The part of the Bunsen burner that controls the amount of air coming in is called:

- A. air hole
- B. barrel
- C. collar
- D. jet.

- (viii) An element X with atomic number 16, belongs to:
- A. period 3, group III, valency of 2  
 B. period 3, group VI, valency of 2  
 C. period 3, group VI, valency of 6  
 D. period 6, group VI, valency of 6
- (ix) The simplest formulas of a compound formed when combining 13g of aluminium and 17g of chlorine is:
- A. AlCl  
 B. Al<sub>2</sub>Cl  
 C. Al<sub>3</sub>Cl<sub>2</sub>  
 D. AlCl<sub>3</sub>
- (x) The second step in the scientific procedure is:
- A. data collection and analysis  
 B. data interpretation  
 C. experimentation and observation  
 D. hypothesis formulation

**SECTION B (20 MARKS)**

2. Match each item in List A with a correct response in List B by writing its letter below the number of the corresponding item in the table provided.

LIST A		LIST B
(i)	Ability of an atom to gain or attract electrons towards itself	A. Chlorination
(ii)	Addition of oxygen to or removal of hydrogen from a substance	B. Covalent
(iii)	A substance which behaves in three states of matter	C. Electronegativity
(iv)	Bond formed between two atoms due to sharing of two electrons from each other	D. Electropositivity
(v)	Combining power of an element	E. Evaporation
(vi)	Liquids which form layers when mixed	F. Groups
(vii)	Reddish brown coating on metals	G. Ionic
(viii)	Supports burning of substances	H. Kerosene and water
(ix)	The number of electrons in the outermost shell	I. Oxidation
(x)	Treatment and purification of water for human uses	J. Oxygen
		K. Reduction
		L. Rust
		M. Sugar and alcohol
		N. Valency
		O. Water

**ANSWERS**

LIST A	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
LIST B										

3. (a) What do you understand by the following terms?

(i) Empirical formula \_\_\_\_\_  
\_\_\_\_\_

(ii) Relative atomic mass \_\_\_\_\_  
\_\_\_\_\_

(b) A certain compound K contains 15.8% carbon and 84.2% sulphur. The molar mass of K is 76 g/mol. Determine its:

(i) simplest formula

(ii) molecular formula

4. (a) What do you understand by the following terms?

(i) Flame \_\_\_\_\_  
\_\_\_\_\_

- (ii) Bunsen Burner \_\_\_\_\_  
 \_\_\_\_\_
- (iii) Laboratory \_\_\_\_\_  
 \_\_\_\_\_

(b) List four properties of each of the following:

- (i) A luminous flame \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- (ii) A non-luminous flame \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(c) Write the chemical formula for each of the following compounds:

- (i) Sodium carbonate \_\_\_\_\_
- (ii) Calcium nitrate \_\_\_\_\_
- (iii) Ammonium chloride \_\_\_\_\_

5. (a) Calculate the percentage by composition of the underlined elements in the following compounds:

(i) $\text{Na}_2\text{SO}_4$	(ii) $\text{Ca}(\text{HCO}_3)_2$

(b) Give the use of each of the following components which are found in the First aid kit:

- (i) Plaster \_\_\_\_\_  
 \_\_\_\_\_

(ii) A pair of scissors \_\_\_\_\_  
 \_\_\_\_\_

(iii) Cotton wool \_\_\_\_\_  
 \_\_\_\_\_

(iv) Gloves \_\_\_\_\_  
 \_\_\_\_\_

(c) Categorize the following changes as either chemical or physical:

(i) Freezing of juice in a bottle \_\_\_\_\_

(ii) Rusting of iron \_\_\_\_\_

(iii) Burning of wood \_\_\_\_\_

(iv) Drying of wet clothes \_\_\_\_\_

6. (a) Define the following terms:

(i) Chemistry \_\_\_\_\_  
 \_\_\_\_\_

(ii) Element \_\_\_\_\_  
 \_\_\_\_\_

(iii) Catalyst \_\_\_\_\_  
 \_\_\_\_\_

(b) Give three differences between the following:

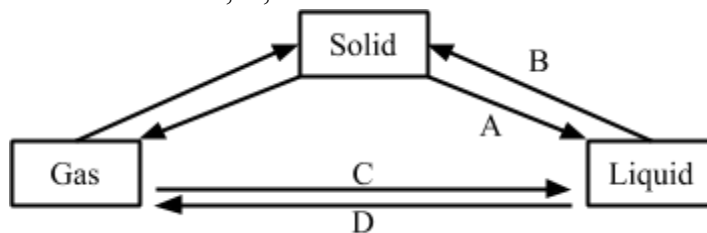
(i) Compound and mixture

Compound	Mixture

(ii) Suspension and solution

Suspension	Solution

7. (a) The figure below shows the relationship among three states of matter.  
Name the processes involved in A, B, C and D.



A \_\_\_\_\_ B \_\_\_\_\_

C \_\_\_\_\_ D \_\_\_\_\_

- (b) State the valency of the following atoms:

(i) Aluminium \_\_\_\_\_ (ii) Neon \_\_\_\_\_

(iii) Sulphur \_\_\_\_\_ (iv) Potassium \_\_\_\_\_

- (c) Give the chemical formula for the combination of the following sets of ions:

(i)  $Mg^{2+}$ ,  $PO_4^{3-}$  \_\_\_\_\_

(ii)  $Fe^{3+}$ ,  $SO_4^{2-}$  \_\_\_\_\_

8. (a) Write a word equation for each of the following reactions:

(i) Calcium burns in oxygen

\_\_\_\_\_

(ii) Sodium reacts with water

\_\_\_\_\_

- (b) What do you understand by the following terms?

(i) Water treatment \_\_\_\_\_

\_\_\_\_\_

(ii) Water purification \_\_\_\_\_

\_\_\_\_\_

- (c) Mention six uses of water in economic activities

(i) \_\_\_\_\_ (ii) \_\_\_\_\_

(iii) \_\_\_\_\_ (iv) \_\_\_\_\_

(v) \_\_\_\_\_ (vi) \_\_\_\_\_

9. Gas "L" has the following properties: It is highly flammable, readily combines with other elements, readily reacts with other chemical substances and is a strong reducing agent.

(a) Name the gas "L" \_\_\_\_\_

(b) What is the method used to collect gas "L" in the laboratory? Give a reason.

Method \_\_\_\_\_

Reason \_\_\_\_\_

(c) Give four uses of gas "L".

(i) \_\_\_\_\_

(ii) \_\_\_\_\_

(iii) \_\_\_\_\_

(iv) \_\_\_\_\_

10. (a) Mention four chemical properties of Oxygen.

(i) \_\_\_\_\_

(ii) \_\_\_\_\_

(iii) \_\_\_\_\_

(iv) \_\_\_\_\_

(b) Find the oxidation number of each of the underlined elements in the following:

(i) $\text{K}\underline{\text{C}}\text{ClO}_3$	(ii) $\underline{\text{C}}\text{r}_2\underline{\text{O}}_7^{2-}$

(c) Use the IUPAC system to name each of the following chemical compounds:

(i)  $\text{CuO}$  \_\_\_\_\_

(ii)  $\text{CaSO}_4$  \_\_\_\_\_

(iii)  $\text{HNO}_3$  \_\_\_\_\_

(iv)  $\text{ZnCl}_2$  \_\_\_\_\_