

**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: $H = 1$, $O = 16$, $C = 12$, $Na = 23$, $S = 32$, $Ca = 40$

| FOR EXAMINER'S USE ONLY | | |
|-------------------------|-------|----------------------|
| QUESTION NUMBER | SCORE | INITIALS OF EXAMINER |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| TOTAL | | |

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. Al₂Cl
 C. Al₃Cl₂
 D. AlCl₃
- (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) Na_2SO_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:

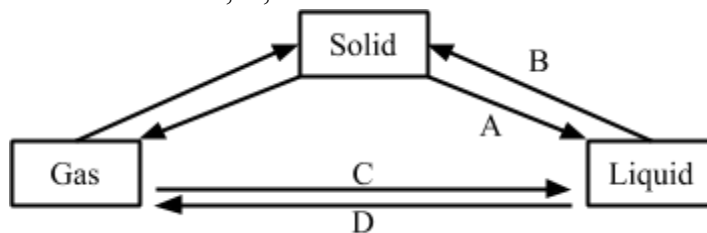
(i) Compound and mixture

| 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) CuO _____

(ii) CaSO_4 _____

(iii) HNO_3 _____

(iv) ZnCl_2 _____