



CHRISTIAN SOCIAL SERVICES COMMISSION

An Ecumenical Body of Tanzania Episcopal Conference and Christian Council of Tanzania

P.O. Box 9433, Dar es Salaam, Tanzania

CSSC-SOUTHERN ZONE FORM TWO JOINT EXAMINATION

032

CHEMISTRY

AUGUST 2024.

MARKING GUIDE SECTION A (15 MARKS)

1. .

i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x.
B	C	B	C	A	C	D	C	D	B

@ 01-mark x 10 (total 10 marks)

2. .

LIST A	i.	ii.	iii.	iv.	v.
LIST B	E	H	A	F	J

@ 01-mark x 5 (total 5 marks)

SECTION B. (70 MARKS).

3.

- a)
- Extinguish all glowing residues before disposing them.
 - Never heating flammable liquids with direct flames.
 - Never pouring flammable liquids into the sink.
 - Use the fuel which is meant for a particular burner
 - Switch off all burners after use.

Any four points (01mark@=04 marks)

b)

- Nail A would be heavier than nail B, because after getting rust, nail B was destructed by corrosion while nail A was not, because painting prevents rust. **[03 marks]**
- Electroplating
 - Greasing and oiling
 - Galvanizing
 - Enameling **[Any three 01@ = 03 marks]**

4.

- a) To determine the energy value of methanol **(1mark)**

b)

- A calorimeter is an insulated container used to minimize heat loses when measuring the heat energy liberated by a substance. **(1mark)**

- ii. When stirring, the thermometer should not touch the calorimeter, because the metal container is hotter than water. If it touches the calorimeter, a temperature higher than that of water would be recorded. **(1mark)**
- c) Required the energy value of methanol.

Data given

- Initial temperature of water (T_0)= 297.65K
- Final temperature of water (T_1)= 312.15K
- Initial mass of methanol+ burner (M_0)= 124.94g
- Final mass of methanol + burner (M_1) = 123.94g
- Volume of water used (V_w) = 200cm³
- Density of water = 1000Kg/m³
- Specific heat capacity of water (C_w)=4.18KJ Kg⁻¹K⁻¹

Energy value of methanol= mass of water × specific heat capacity of water × change in temperature

Mass of fuel

$$E_m = M_w \times C_w \times \Delta T / M_m \quad \textbf{(1mark)}$$

$$\Delta T = T_1 - T_0$$

$$= (312.15 - 297.65)K$$

$$\underline{\Delta T = 14.5K} \quad \textbf{(1mark)}$$

Mass of water:

Density of water = mass of water / volume of water

Basing on the SI-Units of specific heat capacity of water

$$1m^3 \rightarrow 1000000 \text{ cm}^3$$

$$V_w ? = 200 \text{ cm}^3$$

$$V_w = 1m^3 \times 200 \text{ cm}^3 / 1000000 \text{ cm}^3$$

$$= 0.0002m^3$$

$$\underline{V_w = 0.0002m^3} \quad \textbf{(1mark)}$$

Mass of water (M_w) = density of water × V_w

$$M_w = 1000Kg/m^3 \times 0.0002m^3$$

$$= 0.2Kg$$

$$\underline{\text{mass of water} = 0.2Kg} \quad \textbf{(1mark)}$$

Then, the mass of methanol

$$\begin{aligned}\text{Mass of methanol} &= M_0 - M_1 \\ &= 124.66\text{g} - 123.94\text{g} \\ &= 0.72\text{g}\end{aligned}$$

Mass of methanol = 0.2g

$$\begin{array}{ccc} 1\text{Kg} & \xrightarrow{\quad} & 1000\text{g} \\ \text{mass} & ? & = 0.72\text{g} \end{array}$$

mass of methanol = $1\text{Kg} \times 0.72\text{g}/1000\text{g}$

mass of methanol = 0.00072Kg (1 mark)

$$E_m = \frac{0.2\text{Kg} \times 4.18\text{KJ Kg}^{-1}\text{K}^{-1} \times 14.5\text{K}}{0.00072\text{Kg}}$$

E methanol = 16836.1KJ/Kg

Therefore, the energy value of methanol is 16836.1KJ/Kg (2marks)

5.

a)

Element	Atomic number	Mass number	Number of protons	Number of electrons	Electronic Configuration
T	3	7	<u>3</u>	<u>3</u>	<u>2:1</u>
U	<u>11</u>	23	<u>11</u>	<u>11</u>	2:8:1
Q	<u>20</u>	40	20	<u>20</u>	2:8:8:2

(01 @ = 08 marks)

b) Some elements in a periodic table are referred to as metalloids because they display or show both metallic and non – metallic characteristics. (01 marks)

Examples of metalloids are

- i) Boron
- ii) Silicon (@ 0.5 = 01 mark)

6.

a) A Bunsen burner is a laboratory heat source consisting of a vertical metal tube connected to a gas source (1 mark)

b)

- i. Connect the Bunsen to the gas supply
- ii. Close the air holes of a Bunsen burner

- iii. Pun on the gas tap
- iv. Light on the match stick and use it to light the Bunsen burner
- v. Adjust the metal ring (collar) to obtain non luminous flame.

(1 mark @ total 2 marks)

c)

- i. Ammonium carbonate
- ii. Sodium sulphate
- iii. Iron III oxide
- iv. Dinitrogen tetra – oxide

(0.5 mark @ total 2 marks)

- d) Luminous flame is used for lighting purposes

(1 mark)

Non luminous flame can be used for welding, heating purposes. (Any one) **(1 mark)**

7.

- a) Burning of paper(chemical change) while breaking of glass(physical change) so

Burning of paper/chemical change	Breaking of glass/ physical change
A new substance is formed	No new substance is formed
The change is irreversible	The change is reversible
There is change in mass	No change in mass
Energy is produced or absorbed	No energy is produced or absorbed
Are permanent changes	Are temporary change

@1 mark any four points

b)

i.

Shake before use/suspension	Mixing salt with water/ solution
1. heterogeneous mixtures	Homogeneous mixture
Opaque/not clear	Transparent/clear
Solute settle	Solute dissolves completely

3marks @ 1 mark

- ii.
 - a) reduce death
 - b) shortens the recovery time
 - c) Prevent permanent disability
 - d) Reduce pain (3 marks @1 mark any three)

8.

- i. Modern Dalton's atomic theory
- ii. Matter is made up of small divisible particles called atoms.
- iii. Atoms cannot be created or destroyed.
- iv. Atoms of the same element may be different in mass.
- v. Atoms of different elements may have the same mass.
- vi. Atom of different elements may combine in any ratio to form a compound.

(02 =10 Marks)

9.

a)

- i. Gas M is hydrogen **[01mark]**
- ii. Dilute hydrochloric acid **[01mark]**
- iii. Zinc/magnesium metal **[01 mark]**
- iv. Dilute hydrochloric acid + Zinc Zinc chloride + Hydrogen**[02 marks]**
- v. It burns with a pop sound **[01mark]**

b)

- i. Sedimentation
- ii. Addition of chemical such as potash alum
- iii. Sand filtration
- iv. Chlorination/Aeration/Iodation **(04 marks@01mark)**

10.

. Introduction **(02 marks)**

Hydrological cycle: is a continuous movement of water around the earth through different processes.

Main body **(02 Marks @ = 10)**

- Processes/ stages of water cycle
 - (i) Evaporation and transpiration
 - (ii) Condensation
 - (iii) Precipitation
 - (iv) Collection
- Importance of water in economic activities **(any two points; 01 Marks @ = 02)**
 - (i) Water is used in agricultural activities such as irrigation and in animal dips
 - (ii) Water is used in generating hydroelectric power
 - (iii) Water is used in fishing activities
 - (iv) Water is used in transportation activities

Conclusion **(01 Marks)**

- Any related conclusion