CHRISTIAN SOCIAL SERVICES COMMISSION- (CSSC)

NORTHERN ZONE JOINT EXAMINATION SYNDICATE(NZJES)

FORM TWO PRE-NATIONAL EXAMINATION AUGUST 2024

CHEMISTRY

MARKING SCHEME

SECTION A (15MARKS)

1. 1Mark@ total 10marks

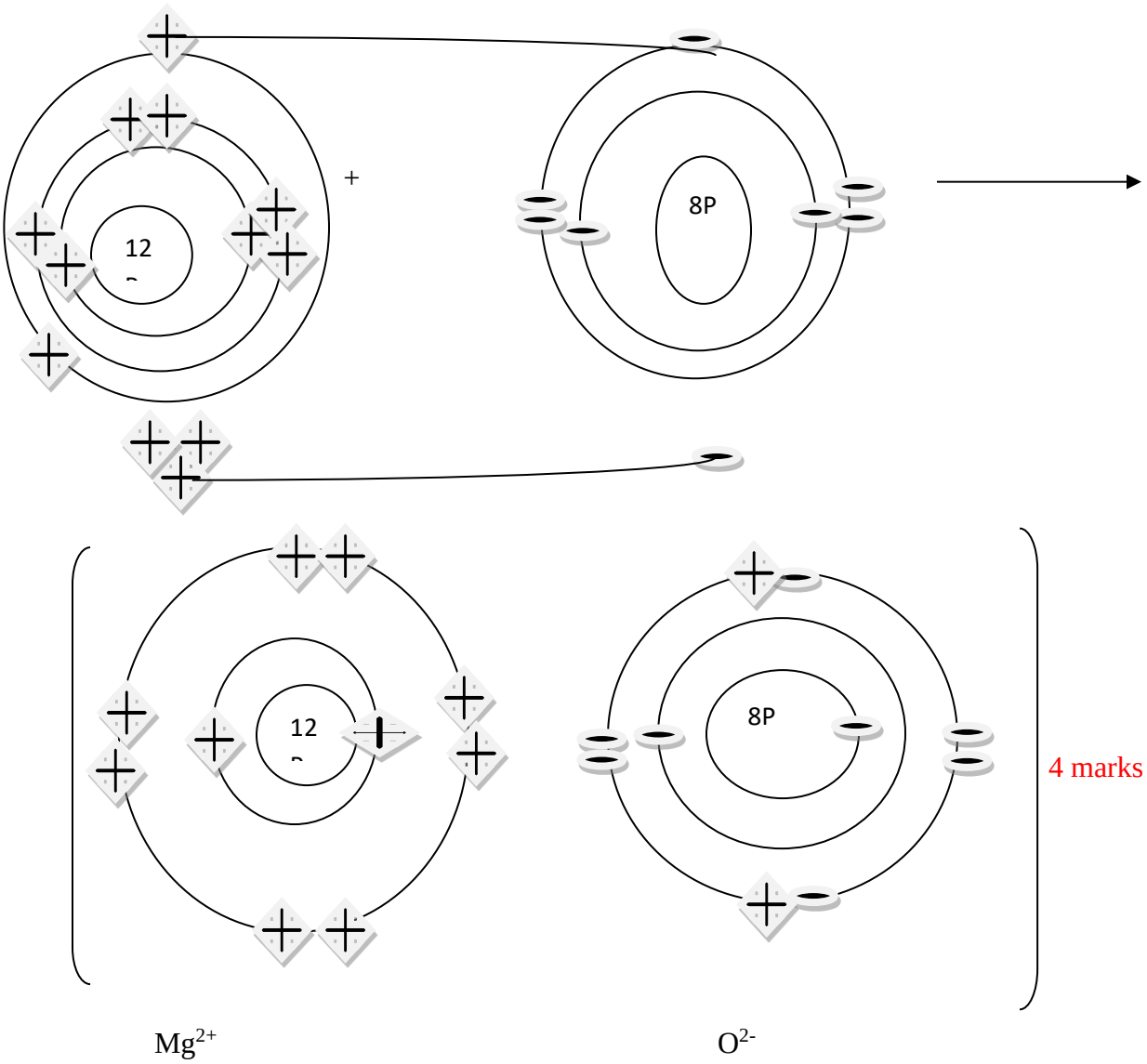
I	Ii	Iii	iv	v	vi	vii	viii	ix	x
B	B	D	A	D	B	D	C	B	C

2. 1mark@total of 05marks

I	ii	iii	iv	v
B	I	E	C	G

SECTION B (70MARKS)

3. (a) (i) Number of protons are equal to number of electrons hence electrons are 19,
$_{19}$M = 2:8:8:1
Therefore the value of Y is 1. 1mark
(ii) Atomic mass (A) = Atomic number (Z) + Number of neutron (N)
Then
Atomic mass (A) = 19 + 20
Atomic mass =39
Therefore atomic mass of M is 39 1mark
(iii) The group number of M is I 1mark
(iv) Period 4 and valency of M is 1 1mark
(b) (i) Charge of Magnesium ion is +2 1mark
(ii) Charge of oxide ion is -2 1mark
(iii) Electron transfer



4 marks

Mg^{2+} O^{2-}

4. (a) (i) Janet should collect the mixture of sugar and sand, then she will put in a container which contain some amount of water and she has to wait for sometimes till all sugar dissolve in water and sand to settle down, followed by **decantation**, after separate sugar solution from sand, She has to **filtrate** to obtain clear solution finally she will **evaporate** a clear sugar solution to get sugar. (03 marks)

   (ii) Methods used to separates are: Decantation, filtration and evaporation. (03marks)

(b) Differences between solutions and suspensions

1mark@ total of 04marks

SALT SOLUTIONS	MIXTURE OF WATER AND RICE
(i) It's homogenous mixture	(i) It's heterogeneous mixture
(ii) It's clear and transparent	(ii) It's opaque
(iii) Solutes dissolve to form clear solution	(iii) Particles settle down at the bottom of container
(iv) Components can separated by evaporation	(iv) Components can be separated by filtration

5. (a) (i) Fuel: Is any combustible substance which on burning in air gives a large amount of heat energy. 01 marks

(ii) Combustion: Is a chemical reaction that involves the burning of a substance usually in the presence of oxygen. 02marks

(b) Elactrovalency: Refer to the total number of electrons transferred during the bond formation. 02marks

(c) 5 steps of lighting a Bunsen burner **(five points @ 01 x 5 = 05 marks)**

I. Check connections to burner and desk outlet valve
II. Close the air holes by turning a collar
III. Light the match and hold it on top of a barrel with on hand
IV. Slowly turn on the gas by using another hand.
V. Open the air holes to adjust the flame

6. (a) (i) Slightly soluble in water can be used by aquatic organism for breathing.

(ii) It support combustion Therefore used in incineration, welding and metal cutting.

(iii) React with many elements used in manufacturing of different industrial products

(iv) It support combustion hence used in sewage treatment.

1marks@ total of 04marks

(b) Solution

Relative atomic mass = $\frac{\sum \text{ of isotopic mass x percentage abundance}}{100}$ 02marks

Then

Relative atomic mass = $\frac{(20x\ 90.5 + 21\ x\ 0.3 + 22\ x\ 9.2)}{100}$ 02marks

Therefore relative atomic mass of Ne is 20.187 02marks

7. (a)(i) Periodicity: Refer to the recurrence of similar properties when elements are arranged according to the atomic number. 02marks

(ii) D = 1.5Marks, L= 0.5mark@ 2.5marks

Groups

I	II	III	IV	V	VI	VII	VIII/0
Alkali metal	Alkali earth metal	Transition metal				Halogens	Inert gases

(b) Yes 01 mark

Reasons 1mark@ total 03marks

(i) Hydrogen exist as a gas at room temperature

(ii) Hydrogen need one electron to attain duplet stable state

(iii) Hydrogen can react with metal to form metal hydride.

8. (a) – Helps to make fertilizers

- Helps to make pesticides (five points 01 MARKS **@=5 MARKS)**
- Helps to make Herbicides
- Helps to advices farmers on the best use of soil
- Helps to make Animal Vacines

1mark@total of 4marks

(b) (i) In order to extinguish fire, when the fire accident happens in the chemistry laboratory.

(ii) In order to allow the proper ventilation during the experiment.

(iii). In order to avoid unnecessary accident that may happen in the chemistry laboratory such as explosion

(iv) In gases, molecules are wider a part. The free space between the molecules in gases is much larger than that in liquids. The intermolecular interactions in gases are much weaker than those in liquids. As a result, during compression, molecules in gas experience lesser resistance than the molecules in a liquid. That is why more compressible than liquids.

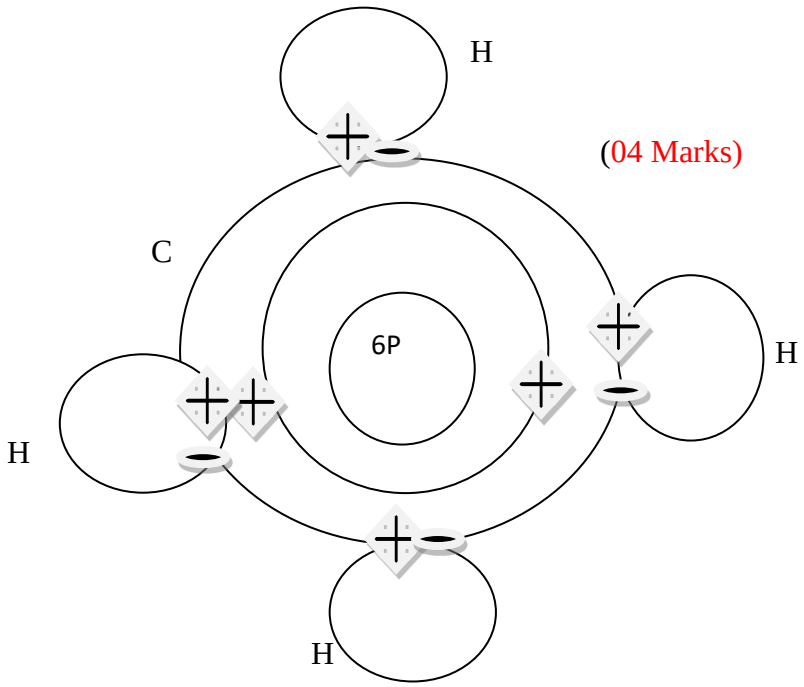
9. (a) Differences between covalent compounds (COMPOUNDS HAVING THE NATURE OF SO_2) and electrovalent compounds (COMPOUNDS HAVING THE NATURE OF NaCl) (01 mark @ 04 marks)

COVALENT COMPOUNDS (COMPOUNDS HAVING THE NATURE OF SO_2)	ELECTROVALENT COMPOUNDS (COMPOUNDS HAVING THE NATURE OF NaCl)
(i) Formed by electrons sharing	Formed by electron transfer
(ii) Exist as a liquid or gas at room temperature	Exist as crystalline at room temperature
(iii) Has low melting and boiling point	Has high melting and boiling point
(iv). Poor conductor of electricity	Allow passage of electricity when in molten state or solution
(v) Does not dissolve in water	Soluble in water

(b) Gas A – Pop Sound (1mark)

Gas B- Glowing wooden Splint (1 mark)

(c) Show by using dotes and cross how the compound of the following formula CH_4 is formed.



(04 Marks)

SECTION C (15 MARKS)

10. (a) Data given:

Heat value = 43,400KjKg^{-1}

Volume of water = 20L= 20 x $10^{-3}m^3$

Initial temperature (T_1) = 24^{o}C = 300K

Final temperature (T_2) = 100^{o}C = 376K (01 mark)

Specific heat capacity of water (Cw) = 4.18KjKgK^{-1}

Density of water (Dw) = 1000Kgm^{-3}

Density of kerosene (Dk) = 810Kgm^{-3}

Volume of kerosene = ?

Solution

$$heat\ value\ of\ fuel = \frac{heat\ libarated\ (mc\Delta\theta)}{mass\ of\ fuel}\ (\ 01\ mark)$$

43400

$$= \frac{mass\ of\ water\ x\ specific\ heat\ capacity\ x\ change\ in\ temperature\ (mc\Delta\theta)}{mass\ of\ fuel}\ (01\ mark)$$

$$mass\ of\ fuel\ = \frac{volume\ x\ density\ of\ water\ x\ 4180\ x\ (100-24)}{43400}\ (01\ mark)$$

$$mass\ of\ fuel\ = \frac{0.02\ x\ 1000\ x\ 4180\ x\ (100-24)}{43400} = 146.4\ kg\ (01\ mark)$$

For volume of kerosine,

$$volume\ of\ kerosine\ = \frac{mass}{density}\ (01\ mark)$$

$$volume\ of\ kerosine\ = \frac{146.4}{810} = 0.1807\ m^3$$

Therefore the volume of kerosine is 0.1807 m^3 (180.7 litres) (01 mark)

(b) Calculate the oxidation number of each of the underlined elements in the following chemical substances: 02 marks@ 08marks

(i) $Na_3\underline{P}O_4$

$(+1 \times 3) + P + (-2 \times 4) = 0$

$(+3 + -8) + P = 0$

$-5 + P = 0$

P = + 5

(ii) $\underline{S}O_3^{2-}$

$S + -2 \times 3 = -2$

$S + -6 = -2$

$S = -2 + 6$

S= +4

(iii) $K\underline{Cl}O_3$

$+1 + Cl + -2 \times 3 = 0$

$+1 + Cl + -6 = 0$

$Cl + -5 = 0$

Cl = +5

(iv) Al

Al = 0