GIANCHERE FRIENDS SEC SCHOOL
FORM TWO CHEMISTRY SERIES EXAMINATIONS
TERM TWO 2021

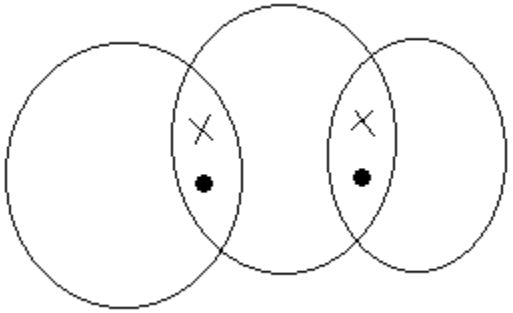
MARKING SCHEME

1.(a)C- region of un burnt gases//colorless zone √1

A-Luminous flame//yellow zone√1

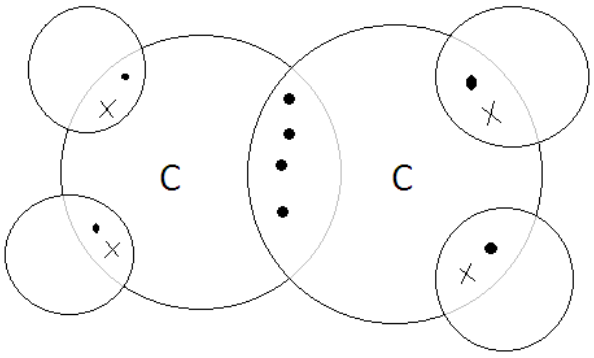
b) Size of flame reduces√1// color change from yellow to blue//number of visible regions increase//roaring sound heard*(any one observation*)

2.a) i) H_2O



√1

ii) C_2H_4 :



√1

b) Co-ordinate$\sqrt{1}$ // dative covalent. *(Accept any relevant name but not symbol)*

3.a) Have delocalized e^- within their structures $\sqrt{1}$

b) Better conductors of electricity // has more delocalized e^- $\sqrt{1}$

Not reactive with water and air // forms protective coating

More abundant // easier to extract $\sqrt{1}$

4.a) Volume of $H_{2\,(g)}$ will be equal to the 1st case $\sqrt{1/2}$. In both cases, moles of HCl are the same and Zn is in excess $\sqrt{1/2}$.

b) He is inert //does not react $\sqrt{1}$

c) -$H_{2\,(g)}$ Not easily portable

-Expensive to obtain $\sqrt{1}$ (any correct answer)

5. a) G $\sqrt{1}$

b) A_1 $\sqrt{1}$

6.. Heat mixture $\sqrt{1/2}$ NH_4Cl sublime $\sqrt{1/2}$

Dissolve residue in water $\sqrt{1/2}$. NaCl dissolves $\sqrt{1/2}$

Filter the mixture to recover CuO $\sqrt{1/2}$. Evaporate filtrate to recover NaCl crystals. $\sqrt{1/2}$

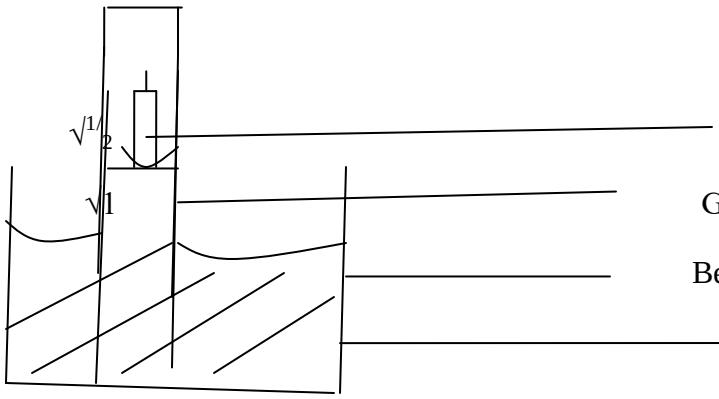
OR

Dissolve in water $\sqrt{1/2}$ and filter $\sqrt{1/2}$ to obtain CuO $\sqrt{1/2}$

Evaporate filtrate to dryness $\sqrt{1/2}$ and heat to sublime NH_4Cl $\sqrt{1/2}$

NaCl is left behind. $\sqrt{1/2}$

7.



√½ √1 √½ √½

8(i) Allotropes - different forms of the same element existing in the same physical state .

(ii) In diamond each C-atom is bounded to 4 others through strong covelant bonds√ ½ leading to a giant atomic structure √ ½ in which covalent bonds permeate the whole lattice, hence very hard.

In graphite each C-atom is bounded to 3 other C-atom through covalent bonds√ forming hexagonal layers√ ½ . The layers are joined by weak van der waal forces hence they slide over each other graphite is soft and slippery

9. Fractional crystallization - a method of separation of a mixture of soluble salts based on the differences solubility. (1mk)

Fractional distillation - method of separating a mixture (miscible liquids) based on differences in boiling points.

10.(a) magnesium burns with a brilliant white √ (½) flame to form a white residue. √ (½)

(b) (i) $Mg\ (s) + H_2O\ (g) \longrightarrow MgO\ (s) + H_2\ (g)$ (1)

(iii) $2H_2\ (g) + O_2\ (g) \longrightarrow 2\ H_2O\ (1)$

11(a) B √ (1) it is neutral (b) C – √ ***1mk***

Aluminum chloride is acidic √ hence will dissolve in an alkaline solution (2)

12.(a) Neutrons 71 - 31 = 40 √ (1mk)

(b) RAM = $\frac{(69 \times 60.4) + (71 \times 39.6)}{100}$ √

= 69.792 √

13.(a) Substance P = anhydrous $CaCl_2$ // Cao

(b) Add a few drops of the liquid to anhydrous cobalt (ii) chloride √ which changes from blue to pink// add a few drops to anhydrous $CuSo_4$√ which changes from white to blue√

14.(a) The strength of the metallic √ bonds increases from Na to AI √ due to increase in the number.of delocalized electrons hence increase in the melting points in that order.

(b) Nuclear charge increases across the period from Na to AI hence the outermost electrons are pulled closer to the nucleus// increase in number of protons fro Na to AI.

15.(a) $Ca^{+}(g) \longrightarrow Ca^{2+}(g) + é \quad I.E = +1145\ KJmol^{-1}$

(b) Once an electron has been removed from an atom, the overall positive charge √ (1mk) holds the remaining electrons more firmly hence difficult to removed.

(c) Strontium has a large atomic radius than calcium, the electrons in √ (1mk) the outermost energy level are loosely attracted by the positive nucleus hence easy to lose. √ (1mk).

16.a) J Alkaline earth metals✓ ½

D Noble gas elements✓ ½

b) (i) J_3B_2✓ 1

(ii) $J_3B_2(s) + 6H_2O(l) \longrightarrow 3J(OH)_2(aq) + 2BH_3(g)$ ✓ 1

c) E is more reactive than F✓ ½, across the period there is an increase nuclear charge due to increase in the number of protons✓ ½, thus E has a weaker nuclear charge than H✓ ½ and can easy lose its valence electron than H✓ ½ OR This is because of the increase in nuclear charge from E atom to F atom, which makes it easier to remove an electron from E atom to F atom.

d) See grid (Period 4) ✓ 1
Reason: It consists of 10 more transition metal elements✓ 1

e) Fe^{3+}✓ ½
$Fe \longrightarrow Fe^{3+} + 3e^{-}$✓ ½

17.(i) Write the chemical equation to show the rusting of iron. **(1 mark)**

$$\boldsymbol{4Fe_{(s)} + 3O_{2(g)} + xH_2O \longrightarrow 2Fe_2O_3 \cdot xH_2O_{(s)}}$$

(ii) Write the expression for an approximate percentage. **(1 mark)**

$$\frac{y-x}{4} \times 100$$

(iii) State two similarities between rusting and combustion.

(a) ***Both use oxygen*** **(1 mark)**
(b) ***Oxides are formed*** **(1 mark)**

18..(a) (i) green yellow

(ii) Slightly soluble/soluble rej. Highly soluble

(iii) violet/purple/grey/black solid.

19. (a) atoms of the same element with same atomic no differ Neutron/mass No.s

(b) 18 - 8 = 10 neutrons

20.(a) - O

- Has more protons that electrons ✓½

(b) – M ✓½

- Has more electrons than protons. ✓½

(c) - N and P. ✓½

- Same atomic number//equal number of protons but different mass number. ✓½