

# CHEMISTRY

## FORM 2

### MARKING SCHEME

#### END OF YEAR 2025 EXAM (OCTOBER) TIME: 2 HOURS

1) a.Y , V



2) a.E and H; both are alkaline earth metals

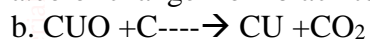
b.F; has a bigger ionic radius than atomic radius

c.EO

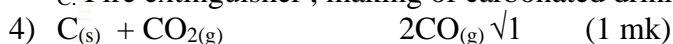
d.E and H, have same number of electrons in the outermost energy level

e.H has more energy levels than E which accounts for the difference in the size of the ionic radius

3) a.color change from black to brown due to reduction of CuO by carbon to copper



c. Fire extinguisher , making of carbonated drinks



(b) Burn charcoal in sufficient √1 oxygen Carbon (II) oxide

5) Difference forms of a substance at the same physical state;

(b) In graphite each carbon is bonded to 3 others and there are Vander waals forces between hexagonal

- In diamond each carbon atom is covalently bonded to four others making a rigid mass

8. a) Solvay process

b) Name the substances labelled: (2 mks)

X- **carbon (IV) oxide**

Y- **calcium hydroxide**

c) Name 2 substances being recycled in the process represented by the flow chart. (2 mks)

- **Ammonia gas** - **Water**

- **Carbon(IV) Oxide**

d) Name the process that takes place in: (2 mks)

S- **Thermal decomposition**

R – **Filtration**

e) Give 2 uses of calcium chloride. (1 mk)

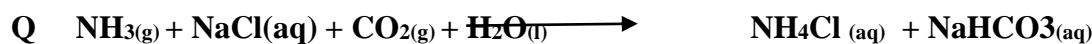
- **Used in extraction of sodium metal**

- **Used as a drying agent**

- **Used in countries which experience very low temperatures to aid in defrosting of ice**

- **Used in road construction because its highly deliquescent so as to minimize dust**

f) Write equations for the reaction that take place in: (2 mks)



(split two equations to be awarded full marks ie-1mk for each equation)



- g) To cool the carbonator. The reaction in the carbonator produces a lot of heat
- h) Other than softening of hard water give 2 other uses of sodium carbonate. (1 mk)
- **Manufacture of glass**
  - **Manufacture of detergents**
  - **Manufacture of bleaches used in paper industry.**(any two correct half a mark each)

7.a.

- Q has highest atomic radius
- Has 4 energy levels

b.

- U, most reactive non- metal
- In group VII

c.

- S 2:6
- Q 2:8:8:1

d. P is larger than R; extra electron enters the same energy level making the nuclear charge stronger across the period.

e)

- $n=12$
- $p=18$

f) i.P2S

ii.RT

g) i)  $\text{U}^{2-}$

ii)  $\text{P}^{2+}$

8.- Production cost is low



10.Protons and neutrons

11.(a)Mass increases as oxygen combines with copper ✓<sup>1</sup>

(b) Mass decreases as ✓<sup>1</sup> gases escape during decomposition ✓<sup>1</sup>

14. (a) (i) A ✓<sup>1/2</sup>

(ii) B ✓<sup>1/2</sup>

(b) A and B ✓<sup>1</sup>

Lead (II) oxide is amphoteric ✓<sup>1</sup>

15. - Experiment with magnesium ✓<sup>1</sup>

- Zinc reacts with oxygen only while ✓<sup>1</sup>

- Magnesium reacts with both oxygen and nitrogen. ✓<sup>1</sup>

3

16.(a) 2.8 ✓<sup>1</sup>

(b)  $\text{Na}^+$ ,  $\text{O}^{2-}$ ,  $\text{N}^{3-}$  ✓<sup>1</sup>

No of protons decrease to the right hence reducing the effective nuclear charge. ✓<sup>1</sup>

17. - PCl<sub>3</sub> has a simple molecular structure with ✓<sup>1/2</sup>  
 - Weak van der Waals inter-molecular forces ✓<sup>1</sup>  
 - MgCl<sub>2</sub> has a giant ionic structure with ✓<sup>1/2</sup>  
 - Strong electrostatic forces between the oppositely-charged ions. ✓<sup>1</sup>
18. (a)  $\text{Mg(s)} + \text{H}_2\text{O(g)} \rightarrow \text{MgO(s)} + \text{H}_2\text{(g)}$  ✓<sup>1</sup>  
 (b) Potassium would react explosively with steam. ✓<sup>1</sup>
19. Aluminium chloride is hydrolysed ✓<sup>1</sup> by water to produce H<sup>+</sup> ions ✓<sup>1</sup>  
 to produce HCl, a strong acid ✓<sup>1</sup>
20. (a) Ammonium chloride. ✓<sup>1</sup>  
 (b)  $\text{Al}_{(\text{aq})}^{3+} + 3\text{OH}_{(\text{aq})}^- \rightarrow \text{Al(OH)}_{3(\text{s})}$  ✓<sup>1</sup>  
 (c) Heat ✓<sup>1</sup>

21.(ai) A – Graphite ✓<sup>1/2</sup>

B – Diamond ✓<sup>1/2</sup>

ii) - Making tips of drills / drilling devices

- Making padlocks

- Glass cutters / cutting glass

- Jewellery

- Ornaments

Any 4 correct for one mark

iii) A / graphite ✓<sup>1</sup> – The fourth ✓<sup>1</sup> electron of each carbon is unbounded / free / delocalised

22(a)i)  $\text{C}_{(\text{s})} + \text{CO}_{2(\text{g})} \rightarrow 2\text{CO}_{(\text{g})}$  ✓<sup>1</sup>

Penalise 1/2 for wrong states.

If not balanced award 0

ii) Potassium hydroxide ✓ (KOH)<sub>(aq)</sub> Calcium hydroxide Ca(OH)<sub>2(aq)</sub>

iii) Pass the gas through limewater, Ca(OH)<sub>2(aq)</sub>; CO<sub>2</sub> forms ✓<sup>1</sup> a white precipitate but CO does not  
 give any precipitate // ✓<sup>1</sup> Burn the gases // CO burns with blue flame while CO<sub>2</sub> does not burn.

iv) - Fuel in water gas / synthetic petrol

- Extraction of metals

- Manufacture of methanol.

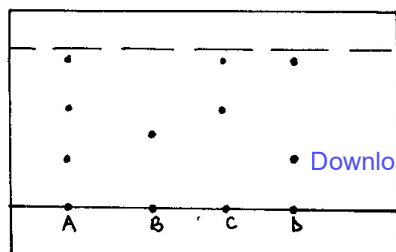
Any 1 correct answer

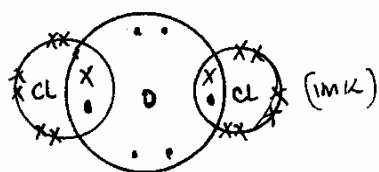
23. The middle part was not burnt because it was in the region of the unburnt gases. (1mk) The ends were burnt because of complete combustion of the gas at the ends which were hot. (1mk)

24. (a) C and D (1mk)

(b) B (1mk)

(c)





Has simple molecular structure (1mk) and weak van der waal's forces between molecules (1mk) that require little heat to break.

26.  $\xrightarrow{J \ K \ L \ M}$   
decreasing reactivity

All correct (2mks) 1<sup>st</sup> and last correct only (1mk)

