

**OPENER EXAMINATION: TERM 1 2024**

# CHEMISTRY MARKING SCHEME FORM 3

1a) fractional distillation b) sublimation c) solvent extraction

2 Add hot water to the mixture and stir. Filter to obtain B as residue. Allow the filtrate to cool and filter when cold to obtain C as residue and A as filtrate.

3a)- method of collection should be in a syringe  
 -delivery tube from the drying agent is dipped in the drying agent  
 b). Slightly soluble in water

4.  $C > A > D > B$

5.a) K and N .Have 2 electrons in their outermost energy level

b).  $L_2O$  or  $Cl_2O$

c) L. Ionic radius larger than atomic radius or form ion by gaining electrons or have more than for electrons in the outermost energy level

6. a).To produce steam that expels air initially in the tubes

b). A residue that is yellow when hot white when cold

c).. Calcium and Sulphuric acid react to form insoluble Calcium Sulphate and the reaction stops. The Calcium Sulphate Coat the Calcium metal.

8. (i) Electrons

(ii) Ions

9. React excess  $CaCO_3$  with dil  $HNO_3$ .Filter to obtain filtrate. React filtrate with  $Na_2SO_4$  (any soluble sulphate).Filter to obtain residue. Wash residue with distilled water. Dry it between filter paper.

10. Black solid turns brown.CuO reduced to Cu

OR colourless liquid forms on the cooler parts of the combustion tube. $H_2$  oxidized to water)

11 .a) Acidic b). R c).T

12. i) The second ionisation energy of Magnesium is greater than the 1<sup>st</sup> ionisation energy.

ii) After the first ionisation the ion ( $Mg^{+2}$ ) formed contain more proton than electrons.

Therefore it becomes difficult to remove the second electron.

13.  $X \longrightarrow 2.8.8.2$

$Y \longrightarrow 2.5$

.14. a) Luminous flame

b) Regulate amount of air entering the chimney

15i) Ionic bond formed when metals react with non-metals while covalent bond is formed usually between non-metals.

ii) Ionic compounds have higher melting point and boiling point than covalent compounds.

iii) Most ionic compounds conduct electricity in molten or aqueous state while covalent compounds don't.

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16 a) They have full duplet/octet state hence they can't gain or give or share their valence electrons/ full

Duplet/ octet state.

b) Elements react to achieve stability i.e. the configuration of noble gas and this happens during bond formation in chemical reactions.

17 a) As one moves from Li to Na to K, there is increase in the number of shells e.g. 2.1, 2.8.1, 2.8.8.1 and hence this increases the atomic radii.

b) Na – 2.8.1, Mg 2.8.2, Al – 2.8.3

The bond strength between the nucleus and the electrons in the last shell increase as one moves across the period. I.e. the nuclear charge increases across the breaking of this end, then MP increases across the period.

c) Cl – 2.8.7, S – 2.8.6

Chlorine needs only one electron to be in octet state. Hence it's easier to gain one electron than 2 electrons. Since reaction in non-metals involve gaining of electrons, then Cl will be more reactive than sulphur.

18.. i) P - 2.8.7

Valency 1.

ii) Since it gains two e<sup>-</sup>, N + 2e<sup>-</sup> → N<sup>2-</sup>

1 + has - 2 charge

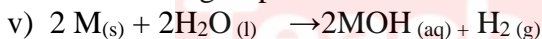
iii) M - valency 1

N - Valency 2

Formula of compound M<sub>2</sub>N

iv) Alkaline / basic

Since M is group 1 metal



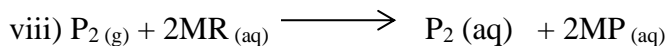
vi) R - Bromine

S - Iodine

vii) S > R > P

Most least

reactive reactive



19. a) B –Green –blue zone

C –Almost colourless region

(b) This is a zone of partial combustion due to insufficient air.

(c) The area marked A would diminish in size (become thinner) due to insufficient supply of air causing incomplete combustion as region B becomes bigger and more luminous.

20. Nail B will rust more than nail A. This is because nail B is covered by copper strip and copper is less reactive compared to iron and hence copper will not form a coating on the nail.

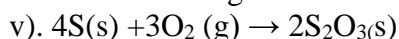
Nail A will rust less because magnesium will react with air to form a thick coating of magnesium oxide on the nail and this prevents the nail from being attacked by the air and water vapour.

21. i) P=2.8.8.2      Q=2.7

ii) P and R

iii) R

iv) X forms ion by gaining electrons. The incoming electrons are repelled by existing electrons thus ion bulge outward.



22. i) C - Because it conducts electricity in molten state but not in solid state.

It's also decomposed by current electricity showing that it's an electrolyte.

ii) B - Because of its low melting point and does not conduct electricity in both molten and solid state.

iii) A - because it has high melting point and conducts electricity in both molten and solid state.

b) Because in molten state the ions are free and hence can move to conduct electricity.

c) Because in A conduction of electricity is through delocalised electrons and not free ions.

d) B has simple molecular structure whose molecules are held by weak van der waals forces of attractions thus lower M.P while C has giant ionic structure where atoms are held by strong ionic bonds that require high energy to break thus high M.P.

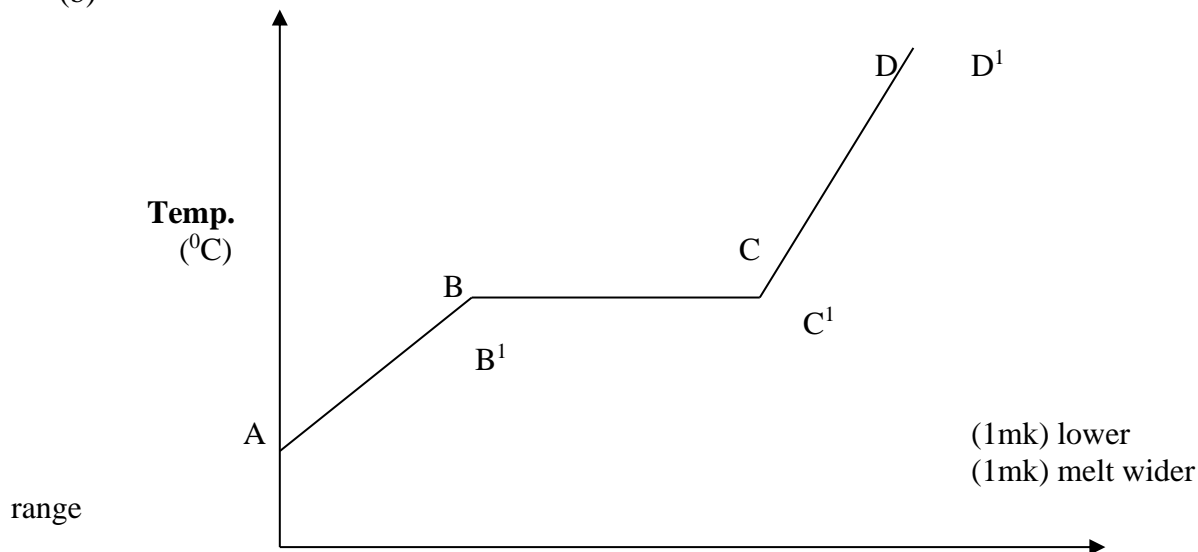
23. The salt lowers the freezing point of water. This maintains water in liquid form

24. Atoms in P are covalently bonded with a giant atomic structure.

Q has simple molecular structure with the molecules held together by weak van der waals forces.

25. (a) Heat energy being used to break the forces between Naphthalene molecules and hence melting the Naphthalene.

(b)



26. (a) Some elements contain isotopes.

(b) R.A.M =  $\frac{(60 \times 69) + (40 \times X)}{100}$

$$69.8 = \frac{3940 + 40x}{100}$$

$$6980 = \frac{3940 + 40x}{100}$$

$$6980 = 3940 + 40x$$

$$6980 - 3940 = 40x$$

$$\frac{3040}{40} = \frac{40x}{40}$$

$$76 = x$$

27(a) Valency is the combining power of an element that can combine with one atom of an element // Number of electrons lost, gained or shared by an element.

