**CHEMISTRY 233/2**

**MARKING SCHEME**

1. (a) (i) K **√1mk**

(ii) J or C **√1mk**

(iii) Group 4 , period i.e. below S in the grid

(iv) J and U are in the same period and across the period the nuclear charge increases hence nuclear

charge of U is greater than that of J hence it pulls the outermost electron more strongly reducing the radius.

(v) **Y** – is better conductor because it has more delocalized electrons. ***OR*** Y- has 3 delocalized

electrons while A how one delocalized electron.

(vi) The B.p of the elements increases **√1mk** down the group. This is because the intermolecular forces of attraction increase **√1mk** down the group with increase in the size of the molecules.

(b) (i) **V** and **G√1mk** because they are in the same group or loses 2 electrons / some number of electrons in the outer energy levels.

(ii) **X**, **√½mk** because its ionic radius is bigger tendency to donate its electron is high. **√½mk**

(iii) E, **√½mk** because its ionic radius is bigger than atomic radius so its tendency to donate its electron is high. **√½mk**

2. (a) Fractional distillation **√1mk**

(b) (i) Cracking – is the braking of long-chain alkane molecules into shorter alkanes and an alkene by

heating or use of catalyst. **√1mk**

(ii) - Heat or temperature 400oC – 700oC **Any two correct for√1mk each**

- Silica /SiO2 or Catalyst – silica /SiO2

- Aluminium oxide Al2O3

(iii) C10H22(l) → C5H12 + C5H10(g) **√1mk**

(iv)

H H H H √½mk

| | |

C = C – C – C – C – H

| | | |

H H H H H Pent-1-ene √½mk

H H H H √½mk

| | |

C = C – C – C – H  ***OR***

| |

H H H √½mk

H C H

|

H 2-methyl but- 1-ene

H H H H √½mk

| | |

H C = C – C – C – C – H

| | | |

H H H H H Pent-2-ene √½mk

H H H √½mk

| |

C = C – C – C – H

| |

H H H H √½mk

H C H

|

H 3-methylbut-1-ene

H H H √½mk

| |

H - C = C – C – C – H

| |

H H √½mk

H - C - H

|

H 2-methylbut-2-ene

*Any two; drawing ½mk naming ½mk*

(v) Shake a sample with;

Bromine C5H12 does not decolourise, C5H10 decolourise ***OR***. – Acidified Potassium

chromate (VI) with C5H12 the orange colour does not change but with C5H10 the orange

colour changes to green ***OR*** Burn a sample of C5H12 burns with a non-luminous flame;

while C5H10 burns with luminous

(c) (i) Soapy √1mk Detergent √1mk

(ii) Soapless detergent √1mk because it is non-biodegradable √1mk hence pollutes the

Environment.

3. (a) (i) Name – Aluminium hydroxide √½

Formula: Al(OH)3(s) √½ (1mk)

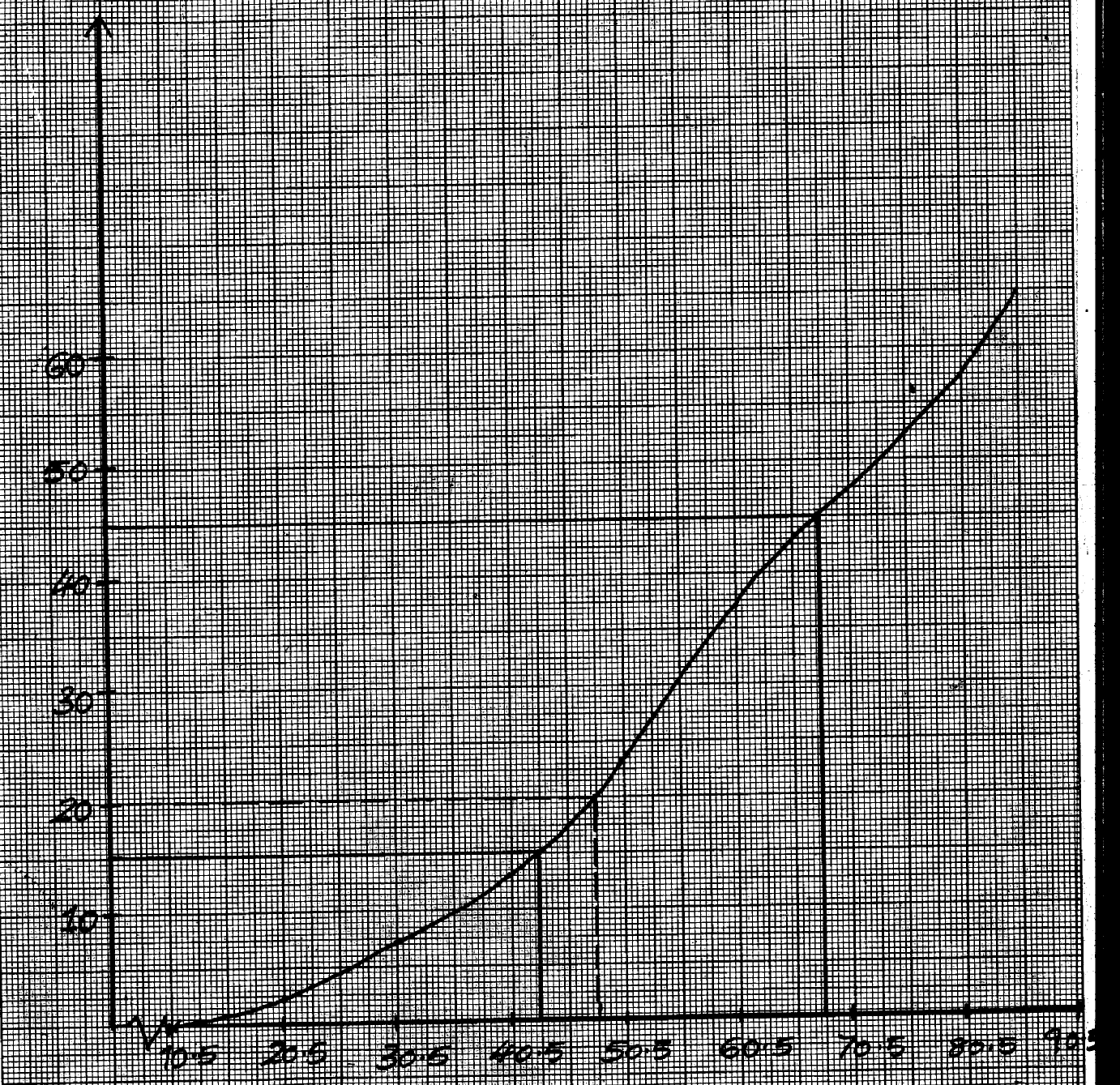
(ii) Name: Sodium aluminate / tetrahydroxo aluminate √1

Formular: NaAl(OH)4(aq) /[Al(OH)4]-(aq) √1 (2mks)

(b) Amphoterism

(c) Al(OH)3(s) + OH-(aq)→[Al(OH)4]-(aq) (1mk)

d) i)



(ii) I . 33/100g of H2O (must be on the graph)

II. 25oC √1

III. Solubility of X at 30oC = 19g/100g of water mass of crystals deposited 50-19 = 31g √½ (1mk)

4. (a) (i) Water

(ii) 6.5; √1 presence of Carbonic acid

i.e CO2 + H2O → H2CO3

(iii) 2 Na2O2(s) + 2H2O(l) →4NaOH(aq) + 2O2(s) √1

(b) (i) to lower the melting point of sodium chloride √1

(ii) sodium react with air and water vigorously/sodium would react with moist air √1

(c) (i) If CO2 is bubbled in lime water for a few minutes white ppt. is formed. No white ppt. forms

when CO is bubbled into lime water.

(ii) – Extraction of metals √1

(d) CO2 is highly soluble√½ in sodium hydroxide to form Na2CO3 √½soluble in water to form

Carbonic acid. √ (2mks)

5. (a) (i) A – Concentrated hydrochloric acid√1

B – water √ 1mk

(ii) Calcium oxide / CaO√ (1mk)

(iii) To absorb unreacted /excess chlorine √

(iv) 2KMnO4(s) + 16HCl(aq) →2KCl(aq) + 2MnCl(aq) + 8H2O(l) + 5Cl2(g) √1

(v) Solid C sublimes √ hence collects on a cooler place away fromheating.

(vi) Elements present Al Cl

Mass/volume 0.675 1800cm3

R.A.M/M.G.V 27 24000

No. of moles 0.675 √½ = 0.0025 √½ 1800 = 0.075

27 24100

Mole ratio 0.025 = 1 √½ 0.075 = 3

0.025 0.025

EF = AlCl3 √½

(AlCl3)n = 267 √½

(27 + 35.5 x 3 )n = 267

n = 267 =2 √½

133.5

M.F = (AlCl3)2 = Al2Cl6 √½

(b) (i) 6NaOH(aq) + 3Cl2(g) → NaClO3(aq) + 5NaCl(aq) + 3H2O(l)

(ii) Bleaching agent in paper pulp√1 // Used as herbicides √1

(c) Sulphur (IV) oxide bleaches by reduction√½ and removal of oxygen from the dye hence

temporary √½ while chlorine bleaches by oxidation√½/adding oxygen to the dye hence permanent. √½

6. A. (i) (a) Carbon (IV) oxide or CO2 or

Carbon (IV) oxide (CO2) √1 (Any)

(b) KOH(aq) + CO2(g) KHCO3(aq) √1

Wrong balanced = 0

State symbols wrong or missing ½ mark

(ii) Oxygen gas or O2(g) or oxygen (O2) gas √1

(iii) Nitrogen gas or N2(g) or nitrogen (N2) gas. √1

B. (i) Moles of nitrogen = 1.54 √ ½ = 0.11 √ ½

14

Moles of oxygen = 3.53 √ ½ = 0.22 √ ½

16

(ii) N O

Mole ratio 0.11 = 1 √ ½ 0.22 = 2 √ ½

0.11 0.11

Simplest formula NO2 √1

(iii) Compound has low melting and boiling points √1 because it has a

weak Van der wall forces √1

7. (a) copper oxide / CuO √1mk

(b) CuSO4(aq) + Na2CO3(aq) CuCO3(s) + Na2SO4(aq) √1mk

(c) (i) Sodium sulphate / Na2SO4  √1mk

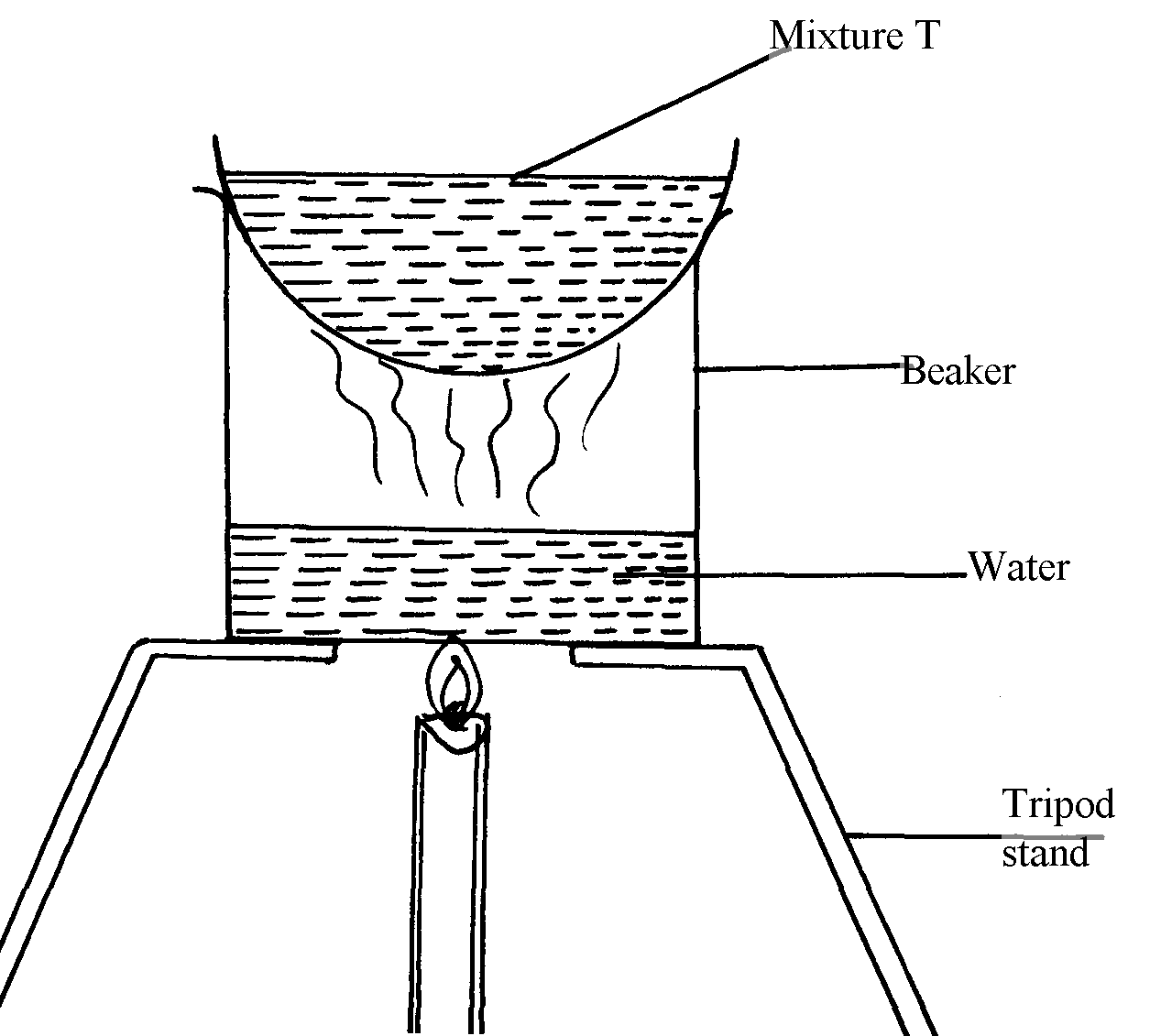
(ii) Copper carbonate √1mk

(d) CuO(s) + H2SO4(aq) CuSO4(aq) + H2O(l) √1

(e) Cu2+ (aq) + CO32-(aq) CuCO3(s) √1mk5

***heat***

(f) CuCO3(s) CuO(s) + CO2(g) √1mk

(g) Filtrate √ ½

Beaker √ ½

Water bath√ ½

Tripond stand √ ½

Workability √1mk

