Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) Percentage of oxygen is 42.5% **(M1)**

Allow if shown clearly in the calculation.

1

Co 13.0 / 58.9 = 0.221, N 18.6 / 14 = 1.329,

K 25.9 / 39.1 = 0.662, O 42.5 / 16 = 2.656 **(M2)**

Allow alternative method if chemically correct.

*If A_r has been divided by the percentage, chemical error, lose **M2** and **M3**.*

1

$CoN_6K_3O_{12}$ **(M3)**

Allow in any order.

Correct answer without working scores this mark only.

1

(b) $Co(NO_2)_6^{3-}$

Allow a correct diagram bonding through N or O

Do not allow $CoN_6O_{12}^{3-}$

Must have correct overall charge.

Allow consequential answer from part(a) if the charge on the anion is correct.

1

[4]

Downloaded from www.merit-minds.com

Q2.

(a) $FeSO_4 + Na_2C_2O_4 \rightarrow FeC_2O_4 + Na_2SO_4$

Allow multiples, including fractions.

Allow $Fe^{2+} + C_2O_4^{2-} \rightarrow FeC_2O_4$

Allow correct equation which includes water of crystallisation.

1

(b) M_r $FeSO_4.7H_2O = 277.9$

Allow if shown clearly in the calculation.

Allow 278

1

Moles = $6.95 / 277.9 = 2.5(0) \times 10^{-2}$

Do not penalise precision but must be to a minimum of two significant figures.

Allow correct calculation using incorrect M_r.

Correct answer without working scores this mark only.

1

(c) $3(.00) \times 10^{-2}$

1

(d) Theoretical mass = $2.50 \times 10^{-2} \times 179.8 = 4.50$g
as long as 2.50×10^{-2} is the smaller of parts (b) and (c) **(M1)**

Allow consequential answer from parts (b) and (c).

Allow theoretical mass = (smaller of parts (b) and (c)) × 179.8

*If larger of parts (b) and (c) used, lose **M1** but can score **M2**.*

Allow answers based on moles of reactant and product.

1

Yield = $3.31 \times 100 / 4.50 = 73.6\%$ **(M2)**

Award this mark only if answer given to 3 significant figures.

Correct answer without working scores this mark only, provided answer given to 3 significant figures.

1

(e) Some left in solution / some lost during filtration

Do not allow 'incomplete reaction'.

Do not allow 'reaction is reversible'.

1

(f) MnO_4^- will oxidise the iron(II) ion and the ethanedioate ion

1

MnO_4^- does not oxidise the Cu^{2+} ion / larger volume needed for iron(II) ethanedioate

1

[9]

Downloaded from www.merit-minds.com

Q3.

(a) (i) Two rings only around nitrogen or sulfur

Lose this mark if more than 2 atoms are ringed.

Do not allow two atoms at the same end of the ion.

1

(ii) 275.8

Accept this answer only. Do not allow 276

1

(iii) Carboxylate / COO^-

Allow salt of carboxylic acid or just carboxylic acid.

1

(b) (32.1 / 102.1) = 31.4%

Do not penalise precision but do not allow 1 significant figure.

1

(c) Zineb is mixed with a solvent / water

Max=2 if M1 missed

1

Use of column / paper / TLC

Lose M1 and M2 for GLC

1

Appropriate collection of the ETU fraction
OR Appropriate method of detecting ETU

Allow ETU is an early fraction in a column or collecting a range of samples over time, lowest retention time / travels furthest on paper or TLC (allow 1 mark for having the longest retention time in GLC).

1

Method of identification of ETU (by comparison with standard using chromatography)

If method completely inappropriate, only M1 is accessible

1

[8]

Downloaded from www.merit-minds.com