

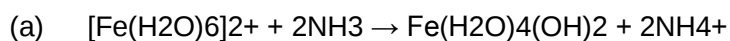
Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

Q1.

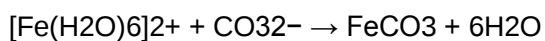


Allow equation with OH⁻ provided equation showing formation of OH⁻ from NH₃ given

1

Green precipitate

1



1

Green precipitate

effervescence incorrect so loses M4

1

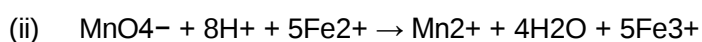


Do not allow pale pink to purple

1

Just after the end-point MnO_4^- is in excess / present

1



1

$$\text{Moles KMnO}_4 = 18.7 \times 0.0205 / 1000 = (3.8335 \times 10^{-4})$$

Process mark

1

$$\text{Moles Fe}^{2+} = 5 \times 3.8335 \times 10^{-4} = 1.91675 \times 10^{-3}$$

Mark for M2 × 5

1

Moles Fe^{2+} in $250 \text{ cm}^3 = 10 \times 1.91675 \times 10^{-3} = 0.0191675$ moles in 50 cm^3

Process mark for moles of iron in titration (M3) $\times 10$

1

Original conc $\text{Fe}^{2+} = 0.0191675 \times 1000 / 50 = 0.383 \text{ mol dm}^{-3}$

Answer for moles of iron (M4) $\times 1000 / 50$

Answer must be to at least 2 sig. figs. (0.38)

1

[11]

Q2.

(a) **Reaction 1**

General principles in marking this question

Square brackets are not essential

Penalise charges on individual ligands rather than on the whole complex

Reagent and species can be extracted from the equation

Ignore conditions such as dilute, concentrated, excess

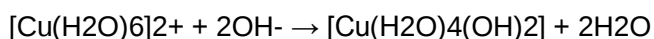
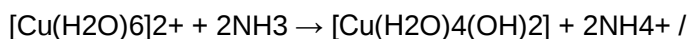
Reagent must be a compound NOT just an ion

Equations must start from $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ except in part (b)

Mark reagent, species and equation independently

ammonia (NH_3) (solution) / NaOH

1



Do not allow OH^- for reagent

Product 1, balanced equation 1

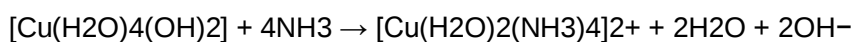
Allow either equation for ammonia

2

(b) **Reaction 2**

Ammonia (conc / xs)

1



Product 1, balanced equation 1

Note that the equation must start from the hydroxide $[\text{Cu}(\text{H}_2\text{O})_4(\text{OH})_2]$

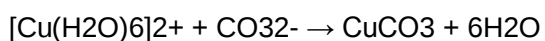
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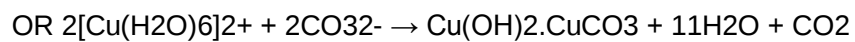
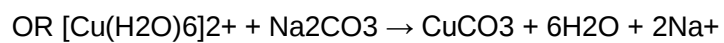
(c) **Reaction 3**

Na_2CO_3 / any identified soluble carbonate / NaHCO_3

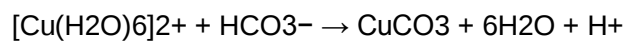
Do not allow NaCO_3 or any insoluble carbonate but mark on

1





OR with NaHCO_3



Product 1, balanced equation 1

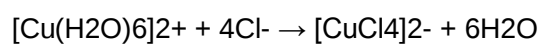
2

(d) **Reaction 4**

HCl (conc / xs) / NaCl

Allow any identified soluble chloride

1



Product 1, balanced equation 1

2

[12]