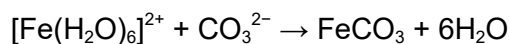


Allow equation with OH⁻ provided equation showing formation of OH⁻ from NH₃ given

1

Green precipitate

1



1

Green precipitate

effervescence incorrect so loses M4

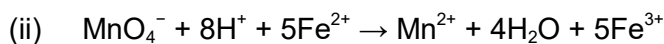
1

- (b) (i) Colourless / (pale) green changes to pink / purple (solution)
Do not allow pale pink to purple

1

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

1



1

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

Process mark

1

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

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) × 10

1

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

Answer for moles of iron (M4) × 1000 / 50

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

1

[11]

M3.(a) (i) M_r N-phenylethanamide = 135.0

1

$$\text{Theoretical yield} = 135.0 \times 2 (1.15 / 284.1) = 1.09 \text{ g}$$

1

Answer recorded to 3 significant figures.

1

(ii) $\frac{0.89}{\text{Ans to (a)}} \times 100$

$$= 81.4 \%$$

Mark consequentially to (a)

Allow 81 to 82

1

(b) (i) Dissolve the product in the **minimum** volume of water / solvent (in a boiling tube / beaker)

If dissolving is not mentioned, CE = 0 / 4

1

Hot water / solvent

Steps must be in a logical order to score all 4 marks

1

Allow the solution to cool and allow crystals to form.

1

Filter off the pure product under reduced pressure / using a Buchner funnel and side arm flask

Ignore source of vacuum for filtration (electric pump, water pump, etc.)

1

(ii) Measure the melting point

1

Use of melting point apparatus or oil bath

1

Sharp melting point / melting point matches data source value

1

(iii) Any **two** from:
Product left in the beaker or glassware
Sample was still wet

Sample lost during recrystallisation.
Do not allow "sample lost" without clarification.

2 Max

(c) An identified hazard of ethanoyl chloride

*E.g. "Violent reaction", "harmful", "reacts violently with water"
Do not allow "toxic", "irritant" (unless linked with HCl gas).*

1

HCl gas / fumes released / HCl not released when ethanoic anhydride used

1

[15]

M4. Pipette = $0.05 \times 100 / 25.0 = 0.2\%$

Ignore precision

1

Burette = $0.15 \times 100 / 24.25 \text{ cm}^3$

Must show working

Allow one mark for two correct answers with no working

1

[2]

M5.(a) As a droplet from the funnel could enter the burette / affect volume / readings / titre

1

(b) Air bubble in jet or wtte

Do not allow misreading burette or overshooting end point.

1

(c) Ensures **all** reagents are able to react / mix / come into contact

Accept no reagent is left unreacted on sides of flask

*Do not allow any reference to 'removal' of the solution unless
it is clear that it is added to the flask.*

1

- (d) The added water does not affect the mols / amount of reagents / reactants / solution Z

Do not allow mols of solution or mols in the flask.

Allow water does not react with the reagents / water is not one of the reactants

Do not allow 'water is not involved'

1

[4]