



## F325 Synoptic HW1

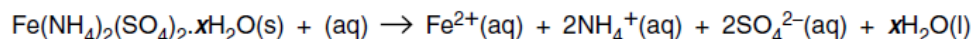
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Hydrated iron(II) ammonium sulphate has the formula  $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot x\text{H}_2\text{O}$ .

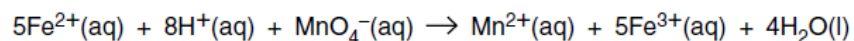
The value of  $x$  in  $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot x\text{H}_2\text{O}$  can be determined by its reaction with acidified manganate(VII) ions.

- **Stage 1** – A sample of hydrated iron(II) ammonium sulphate of known mass is added to a conical flask.
- **Stage 2** – The sample has  $25 \text{ cm}^3$  of  $1 \text{ mol dm}^{-3}$  sulphuric acid added to it.
- **Stage 3** – The contents of the flask are titrated against  $0.0200 \text{ mol dm}^{-3} \text{ MnO}_4^-$ .

In **stage 2**, the hydrated crystals dissolve.



In **stage 3**, the equation for the reaction between  $\text{Fe}^{2+}$  and acidified  $\text{MnO}_4^-$  is shown below.



In **stage 1**, a student used  $0.907 \text{ g}$  of  $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot x\text{H}_2\text{O}$ .

In **stage 3**, the titre was  $23.15 \text{ cm}^3$ .

Calculate the relative formula mass of  $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot x\text{H}_2\text{O}$ . Hence determine the value of  $x$ .

relative formula mass = .....

$x = \dots\dots\dots$  [4]

[Total: 6]