Answers to 3.2 Paper 2

1 Volumetric flask (standard flask)

2 Stops splashing and losing liquid when titration mixture is being swirled/shaken.

3 $n(Cr_2O_7^{2-}) = 0.0102 \text{ mol L}^{-1} \times 0.01542 \text{ L}$
$= 1.573 \times 10^{-4} \text{ mol}$

$$\frac{n(Fe^{2+})}{n(Cr_2O_7^{2-})} = \frac{6}{1}$$

$n(Fe^{2+})$ in 25 mL aliquot
$= 6 \times n(Cr_2O_7^{2-})$
$= 6 \times 1.573 \times 10^{-4} \text{ mol}$
$= 9.437 \times 10^{-4} \text{ mol}$

$n(Fe^{2+})$ in sample is × 10 (250 mL not 25 mL)
$= 9.437 \times 10^{-3} \text{ mol}$

$m(Fe^{2+}) = 55.85 \text{ g mol}^{-1} \times 9.437 \times 10^{-3} \text{ mol}$
$= 0.527 \text{ g}$

4 $$\frac{0.527 \text{ g}}{45.5 \text{ g}} \times \frac{100}{1} = 1.16\%$$

A = determines $n(Fe^{2+})$ in solution or $c(Fe^{2+})$ correctly, M = calculates % by mass of iron in fertiliser correctly, E = M plus all units correct and final answer to 3 sig fig

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