



Chem!stry

Name: ()

Class:

Date: / /

Redox Titration – Answers

Question 1:

- a) $7.39 - 5.74 = 1.65$ g
- b) i) Oxygen from the air would oxidise the iron(II) ions, Fe^{2+} , to iron(III) ions, Fe^{3+} .
Iron(III) ions, Fe^{3+} , will not react with the potassium manganate(VII), KMnO_4 .
- ii) $\text{Fe(s)} + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{H}_2(\text{g})$
- iii) A burning / lighted splint is extinguished with a squeaky “pop” sound.
- c)

Titration Number	First	Second	Third
Final Reading / cm^3	27.80	32.10	47.30
Initial Reading / cm^3	0.00	5.70	20.70
Volume of 0.020 mol/dm^3 potassium manganate(VII) used / cm^3	27.80	26.40	26.60
Best Titration Results (✓)		✓	✓

Average volume of 0.020 mol/dm^3 potassium manganate(VII) = $(26.40 + 26.60) \div 2 = 26.50 \text{ cm}^3$

- d) moles of KMnO_4 in solution = $c \times v \times 10^{-3}$
 $= 0.020 \times 26.50 \times 10^{-3}$
 $= 0.000530 \text{ mol}$
- e) from the ionic equation, 1 mol $\text{MnO}_4^- (\text{aq})$ reacts with 5 mol of $\text{Fe}^{2+} (\text{aq})$
 \therefore moles of Fe^{2+} in $25.0 \text{ cm}^3 = \frac{5}{1} \times 0.000530$
 $= 0.00265 \text{ mol}$
- f) moles of Fe^{2+} in $250 \text{ cm}^3 = (250 \div 25) \times 0.00265$
 $= 0.0265 \text{ mol}$
- g) mass of iron in grams = moles $\times A_r$
 $= 0.0265 \times 56.0$
 $= 1.484 \text{ g} \quad 1.48 \text{ g to 3 s.f.}$
- h) $(1.48 \div 1.65) \times 100 = 89.7 \%$ to 3 s.f.