CHEMISTRY 3.2 Paper 2 Write-on version

Determine the composition of
an oxidant or reductant by titration

Credits: Two

INSTRUCTIONS

Answer the question

You are advised to spend 20 minutes answering this question.

Bursary 2003 Question 10

Lawn fertiliser

A lawn fertiliser containing iron as Fe^{2+} was analysed by titration against acidified potassium dichromate solution.

A 45.5 g sample of fertiliser was dissolved in distilled water and the solution was made up to 250.0 mL with dilute sulfuric acid. 25.00 mL samples of this solution were pipetted into conical flasks and titrated against 0.0102 mol L^{-1} potassium dichromate solution. The average volume required to reach the end point of the titration was 15.42 mL. The equation for the reaction is:

$$6Fe^{2+} + Cr_2O_7^{2-} + 14H^+ \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$$
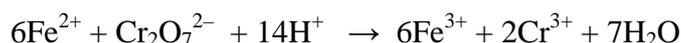
a   What piece of glassware would be used to make up the 250.0 mL of fertiliser solution?

b   Explain why it is preferable to use a conical flask in a titration procedure rather than a beaker.

c   Calculate the mass of Fe^{2+} in the 45.5 g sample of fertiliser.

e   Calculate the % mass of Fe in the fertiliser.

A M E