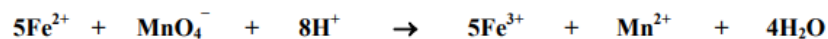


Q2

1. The  $\text{Fe}^{2+}$  content of iron tablets was determined by titration with a freshly standardised solution of potassium manganate(VII),  $\text{KMnO}_4$ .

The equation for the titration reaction is



- (a) Why are iron tablets sometimes medically prescribed? (5)
- (b) Why must potassium manganate(VII) solutions be standardised? Why was it necessary to standardise the potassium manganate(VII) solution *immediately* before use in the titration? What reagent is used for this purpose? (9)
- (c) Describe how exactly  $250 \text{ cm}^3$  of  $\text{Fe}^{2+}$  solution was prepared from five iron tablets, each of mass 0.325 g. Why was some dilute sulfuric acid used in making up this solution? (12)
- (d) Explain why additional dilute sulfuric acid must be added to the titration flask before each titration is carried out. (6)
- (e) On average,  $18.75 \text{ cm}^3$  of 0.01 M potassium manganate(VII) was required to react with  $25.0 \text{ cm}^3$  portions of the iron solution prepared from the five tablets.  
Calculate
- (i) the molarity of the  $\text{Fe}^{2+}$  solution,
- (ii) the total mass of iron in the  $250 \text{ cm}^3$  of solution,
- (iii) the percentage by mass of iron in the tablets. (18)