ANSWERS TO "TRY YOURSELF" PROBLEMS FROM STUDY SECTION 3.7 TO 3.9

Try Yourself 3.8

Assign an oxidation number to the underlined atom in each of the following molecules or ions.

a) $\underline{Fe}_2O_3$ **b)** $H_2\underline{S}O_4$ **c)** $\underline{C}O_3^{2-}$

Answer:

a) $\underline{Fe}_2O_3$ **2Fe + 3O = 0; 2Fe + 3(-2) = 0; 2Fe -6 = 0; 2Fe = +6; Fe = +3**

b) $H_2\underline{S}O_4$ **2H + S + 4(O) = 0; 2(+1) + S + 4(-2) = 0; +2 +S -8 = 0; S = +6**

c) $\underline{C}O_3^{2-}$ **C + 3(O) = -2; C + 3(-2) = -2; C -6 = -2; C= -2 +6; C = +4**

Try Yourself 3.9

For the reaction of the iron(II) ion with permanganate ion in aqueous acid,

$$5Fe^{2+}(aq) + MnO_4^-(aq) + 8H_3O^+(aq) \rightarrow 5Fe^{3+}(aq) + Mn^{2+}(aq) + 12H_2O(l)$$

Decide which atoms are undergoing a change in oxidation number and identify the oxidizing and reducing agents.

Answer:

$$5Fe^{2+}(aq) + MnO_4^-(aq) + 8H_3O^+(aq) \rightarrow 5Fe^{3+}(aq) + Mn^{2+}(aq) + 12H_2O(l)$$

Fe oxidation number changes from +2 to +3 and is therefore oxidized and acts as the reducing reagent.

Mn in MnO_4^- oxidation number changes from +7 to +2 and is therefore reduced and acts as the oxidizing reagent.