Al are two of the products, (c) SO_3, (d) CaO, (e) Na_2O, (f) N_2O_3.

8.7 What are the anhydrides of the following: (a) LiOH, (b) $Ba(OH)_2$, (c) $Ga(OH)_3$, (d) HOCl, (e) HNO_2, (f) $HClO_4$, (g) HNO_3, (h) H_3BO_3.

8.8 Complete and balance the following equations: (a) $CaO(s) + H^+(aq) \rightarrow$, (b) $SO_2(g) + OH^-(aq) \rightarrow$, (c) $BaO(s) + CO_2(g) \rightarrow$, (d) $H_2O_2(aq) + OH^-(aq) \rightarrow$.

8.9 Describe the structure and properties of (a) salt-like hydrides, (b) interstitial hydrides, (c) complex hydrides, (d) covalent hydrides.

8.10 Define the following: (a) disproportionation reaction, (b) allotrope, (c) hydride, (d) hydrate, (e) para hydrogen, (f) deuterium, (g) roasting.

8.11 State the oxidation number of:

(a) Sb in Sb_4O_6
(b) Ti in $K_2Ti_2O_5$
(c) I in H_5IO_6
(d) S in $S_2O_5Cl_2$
(e) Fe in $BaFeO_4$
(f) N in N_2H_4
(g) N in O_2NF
(h) Ge in Mg_2GeO_4

8.12 State the oxidation number of:

(a) Pb in $PbCl_6^{2-}$
(b) Sn in $Sn_2F_5^-$
(c) Re in ReO_4^-
(d) Xe in $HXeO_4^-$
(e) Bi in BiO^+
(f) N in $(NH_3OH)^+$
(g) Mo in $(Mo_6Cl_8)^{4+}$
(h) W in $(H_2W_{12}O_{40})^{6-}$

8.13 Balance the following equations for oxidation-reduction reactions by the oxidation-number method:

(a) $H_2O + MnO_4^- + ClO_2^- \rightarrow MnO_2 + ClO_4^- + OH^-$
(b) $H^+ + Cr_2O_7^{2-} + H_2S \rightarrow Cr^{3+} + S + H_2O$
(c) $H^+ + IO_3^- + SO_3^{2-} \rightarrow I_2 + SO_4^{2-} + H_2O$
(d) $H_2O + P_4 + HOCl \rightarrow H_3PO_4 + Cl^- + H^+$
(e) $OH^- + Cl_2 \rightarrow ClO_3^- + Cl^- + H_2O$

8.14 Balance the following equations for oxidation-reduction reactions by the oxidation-number method:

(a) $Cu + H^+ + NO_3^- \rightarrow Cu^{2+} + NO + H_2O$
(b) $H_2O + NiO_2 + Fe \rightarrow Ni(OH)_2 + Fe(OH)_3$
(c) $PbS + H_2O_2 \rightarrow PbSO_4 + H_2O$
(d) $PbO_2 + HI \rightarrow PbI_2 + I_2 + H_2O$
(e) $H_2O + CrI_3 + Cl_2 \rightarrow CrO_4^{2-} + IO_3^- + H^+$

8.15 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in acid solution.

(a) $ReO_2 + Cl_2 \rightarrow HReO_4 + Cl^-$
(b) $HgI_4^{2-} + N_2H_4 \rightarrow Hg + I^- + N_2$
(c) $Te + NO_3^- \rightarrow TeO_2 + NO$
(d) $UO^{2+} + Cr_2O_7^{2-} \rightarrow UO_2^{2+} + Cr^{3+}$
(e) $Zn + H_2MoO_4 \rightarrow Zn^{2+} + Mo^{3+}$

8.16 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in acid solution.

(a) $AsH_3 + Ag^+ \rightarrow As_4O_6 + Ag$

(b) $Sb + NO_3^- \rightarrow Sb_4O_6 + NO$
(c) $Mn^{2+} + BiO_3^- \rightarrow MnO_4^- + Bi^{3+}$
(d) $NO + NO_3^- \rightarrow N_2O_4$
(e) $MnO_4^- + HCN + I^- \rightarrow Mn^{2+} + ICN$

8.17 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in acid solution.
(a) $S_2O_3^{2-} + IO_3^- + Cl^- \rightarrow SO_4^{2-} + ICl_2^-$
(b) $Se + BrO_3^- \rightarrow H_2SeO_3 + Br^-$
(c) $H_3AsO_3 + MnO_4^- \rightarrow H_3AsO_4 + Mn^{2+}$
(d) $H_5IO_6 + I^- \rightarrow I_2$
(e) $Pb_3O_4 \rightarrow Pb^{2+} + PbO_2$

*8.18 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in acid solution.
(a) $Hg_5(IO_6)_2 + I^- \rightarrow HgI_4^{2-} + I_2$
(b) $MnO_4^- + Mn^{2+} + H_2P_2O_7^{2-} \rightarrow Mn(H_2P_2O_7)_3^{3-}$
(c) $CS(NH_2)_2 + BrO_3^- \rightarrow CO(NH_2)_2 + SO_4^{2-} + Br^-$
(d) $Co(NO_2)_6^{3-} + MnO_4^- \rightarrow Co^{2+} + NO_3^- + Mn^{2+}$
(e) $HClO_2 \rightarrow ClO_2 + ClO_3^- + Cl^-$

8.19 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in alkaline solution.
(a) $Cr(OH)_4^- + BrO^- \rightarrow CrO_4^{2-} + Br^-$
(b) $Al + NO_3^- \rightarrow Al(OH)_4^- + NH_3$
(c) $P_4 \rightarrow H_2PO_2^- + PH_3$
(d) $Bi(OH)_3 + Sn(OH)_4^{2-} \rightarrow Bi + Sn(OH)_6^{2-}$
(e) $Ni^{2+} + Br_2 \rightarrow NiO(OH) + Br^-$

8.20 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in alkaline solution.
(a) $MnO_4^- + CN^- \rightarrow MnO_2 + CNO^-$
(b) $S \rightarrow SO_3^{2-} + S^{2-}$
(c) $Al + OH^- \rightarrow Al(OH)_4^- + H_2$
(d) $HXeO_4^- + O_3 \rightarrow XeO_6^{4-} + H_2O$
(e) $I_2 + Cl_2 \rightarrow H_3IO_6^{2-} + Cl^-$

8.21 Complete and balance the following equations for oxidation-reduction reactions by the ion-electron method. All the reactions occur in alkaline solution.
(a) $As + OH^- \rightarrow AsO_3^{3-} + H_2$
(b) $S_2O_3^{2-} + I_2 \rightarrow SO_4^{2-} + I^-$
(c) $Br_2 \rightarrow Br^- + BrO_3^-$
(d) $S + HO_2^- \rightarrow SO_4^{2-} + OH^-$
(e) $CO(NH_2)_2 + OBr^- \rightarrow CO_2 + N_2 + Br^-$

*8.22 There are apparently several ways in which the equation for the reaction of XeF_4 and H_2O can be balanced. For example,