

4.49. Determine the oxidation number for the indicated element in each of the following substances. Show work for parts b, c, and d.

a) Sulfur in SO_2

b) Carbon in COCl_2

c) Manganese in KMnO_4

d) Bromine in HBrO

e) Arsenic in As_4

f) Oxygen in K_2O_2

4.50. Determine the oxidation number for the indicated element in each of the following substances. Show work for parts a, c, e, and f.

a) Cobalt in LiCoO_2

b) Aluminum in NaAlH_4

c) Carbon in CH_3OH (methanol)

d) Nitrogen in GaN

e) Chlorine in HClO_2

f) Chromium in BaCrO_4 .

20.13 (a) What is meant by the term *oxidation*? (b) On which side of an oxidation half-reaction do the electrons appear? (c) What is meant by the term *oxidant*? (d) What is meant by the term *oxidizing agent*?

a)

b)

c)

d)

20.14 (a) What is meant by the term *reduction*? (b) On which side of a reduction half-reaction do the electrons appear? (c) What is meant by the term *reductant*? (d) What is meant by the term *reducing agent*?

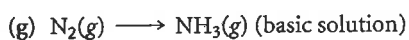
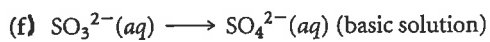
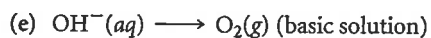
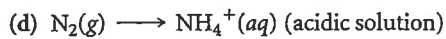
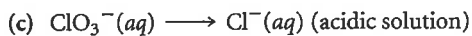
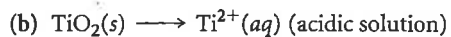
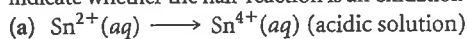
a)

b)

c)

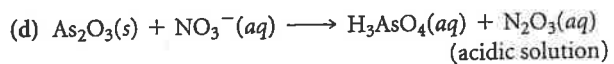
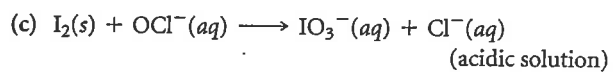
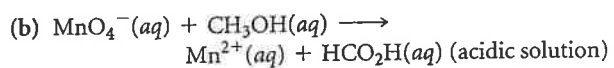
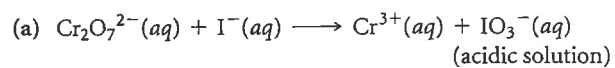
d)

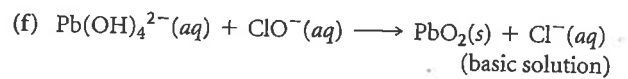
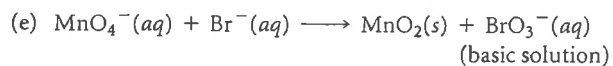
20.21 Complete and balance the following half-reactions. In each case indicate whether the half-reaction is an oxidation or a reduction.



20.23 Complete and balance the following equations, and identify
~~the oxidizing and reducing agents.~~

Also show the balanced half-rxns for each problem.





20.97 A *disproportionation* reaction is an oxidation-reduction reaction in which the same substance is oxidized and reduced. Complete and balance the following disproportionation reactions:

