These problems are intended to ***supplement*** the problems in the textbook, not ***replace*** them.

Questions

Balance the following equations:

1. $Fe(s) + H_2O(g) \rightarrow Fe_3O_4(s) + H_2(g)$
2. $Si(s) + NaOH(aq) + H_2O(l) \rightarrow Na_2SiO_3(s) + H_2(g)$
3. $Fe_2O_3(s) + H_2(g) \rightarrow Fe(s) + H_2O(l)$
4. $As_2S_3(s) + O_2(g) \rightarrow As_4O_6(s) + SO_2(g)$
5. $Ca_3P_2(s) + H_2O(l) \rightarrow PH_3(g) + Ca(OH)_2(aq)$
6. $B_2O_3(s) + CaF_2(aq) + H_2SO_4(aq) \rightarrow BF_3(g) + CaSO_4(s) + H_2O(l)$
7. $Pb(NO_3)_2(s) \rightarrow PbO(s) + NO_2(g) + O_2(g)$
8. $Mg_3N_2(s) + H_2O(l) \rightarrow NH_3(aq) + Mg(OH)_2(s)$
9. $PCl_5(s) + H_2O(l) \rightarrow HCl(aq) + H_3PO_4(aq)$
10. $H_2CrO_4(aq) + KOH(aq) \rightarrow H_2O(l) + K_2CrO_4(aq)$

Write complete balanced equations for the following reactions.

Note: complete combustion of a carbon compound means that the compound burns in the presence of oxygen to produce carbon dioxide and water.

11. complete combustion of liquid 1-pentanol, $C_5H_{11}OH$
12. decomposition of solid copper(II) nitrate into solid copper(II) oxide, nitrogen dioxide gas and oxygen
13. formation of solid ammonium dichromate from its elements
14. reaction between aqueous gold(III) iodide and hydrogen to produce aqueous hydroiodic acid, HI and solid gold
15. reaction between aqueous barium hydroxide and aqueous perchloric acid, $HClO_4$ to produce aqueous barium perchlorate and water
16. complete combustion of liquid benzene, C_6H_6
17. decomposition of solid silver oxide into its elements
18. formation of liquid dinitrogen pentoxide from its elements
19. reaction between solid lead and aqueous silver nitrate to produce aqueous lead(II) nitrate and solid silver
20. reaction between solid sodium bicarbonate and aqueous phosphoric acid, H_3PO_4 to produce carbon dioxide, water and aqueous sodium phosphate
21. complete combustion of liquid heptane, C_7H_{16}
23. formation of solid magnesium nitride from its elements
24. reaction between aqueous tin(II) acetate and solid chromium to produce solid tin and aqueous chromium(III) acetate
25. reaction between aqueous lithium phosphate and aqueous nickel(II) cyanide to produce aqueous lithium cyanide and solid nickel(II) phosphate

Answers

If you cannot figure out how to get the correct answer, go to your instructor, Science Tutoring Center, SI, etc.

1. $3\ Fe(s) + 4\ H_2O(g) \rightarrow Fe_3O_4(s) + 4\ H_2(g)$

2. $Si(s) + 2\ NaOH(aq) + H_2O(l) \rightarrow Na_2SiO_3(s) + 2\ H_2(g)$

3. $Fe_2O_3(s) + 3\ H_2(g) \rightarrow 2\ Fe(s) + 3\ H_2O(l)$

4. $2\ As_2S_3(s) + 9\ O_2(g) \rightarrow As_4O_6(s) + 6\ SO_2(g)$

5. $Ca_3P_2(s) + 6\ H_2O(l) \rightarrow 2\ PH_3(g) + 3\ Ca(OH)_2(aq)$

6. $B_2O_3(s) + 3\ CaF_2(aq) + 3\ H_2SO_4(aq) \rightarrow 2\ BF_3(g) + 3\ CaSO_4(aq) + 3\ H_2O(l)$

7. $2\ Pb(NO_3)_2(s) \rightarrow 2\ PbO(s) + 4\ NO_2(g) + O_2(g)$

8. $Mg_3N_2(s) + 6\ H_2O(l) \rightarrow 2\ NH_3(aq) + 3\ Mg(OH)_2(s)$

9. $PCl_5(s) + 4\ H_2O(l) \rightarrow 5\ HCl(aq) + H_3PO_4(aq)$

10. $H_2CrO_4(aq) + 2\ KOH(aq) \rightarrow 2\ H_2O(l) + K_2CrO_4(aq)$

11. $2\ C_5H_{11}OH(l) + 15\ O_2(g) \rightarrow 10\ CO_2(g) + 12\ H_2O(l)$

12. $2\ Cu(NO_3)_2(s) \rightarrow 2\ CuO(s) + 4\ NO_2(g) + O_2(g)$

13. $2\ N_2(g) + 8\ H_2(g) + 4\ Cr(s) + 7\ O_2(g) \rightarrow 2\ (NH_4)_2Cr_2O_7(s)$

14. $2\ AuI_3(aq) + 3\ H_2(g) \rightarrow 6\ HI(aq) + 2\ Au(s)$

15. $Ba(OH)_2(aq) + 2\ HClO_4(aq) \rightarrow Ba(ClO_4)_2(aq) + 2\ H_2O(l)$

16. $2\ C_6H_6(l) + 15\ O_2(g) \rightarrow 12\ CO_2(g) + 6\ H_2O(l)$

17. $2\ Ag_2O(s) \rightarrow 4\ Ag(s) + O_2(g)$

18. $2\ N_2(g) + 5\ O_2(g) \rightarrow 2\ N_2O_5(l)$

19. $Pb(s) + 2\ AgNO_3(aq) \rightarrow Pb(NO_3)_2(aq) + 2\ Ag(s)$

20. $3\ NaHCO_3(s) + H_3PO_4(aq) \rightarrow 3\ CO_2(g) + 3\ H_2O(l) + Na_3PO_4(aq)$

21. $C_7H_{16}(l) + 11\ O_2(g) \rightarrow 7\ CO_2(g) + 8\ H_2O(l)$

23. $3\ Mg(s) + N_2(g) \rightarrow Mg_3N_2(s)$

24. $3\ Sn(C_2H_3O_2)_2(aq) + 2\ Cr(s) \rightarrow 3\ Sn(s) + 2\ Cr(C_2H_3O_2)_3(aq)$

25. $2\ Li_3PO_4(aq) + 3\ Ni(CN)_2(aq) \rightarrow 6\ LiCN(aq) + Ni_3(PO_4)_2(s)$