Chapter 12 Review Book Problem answers/solutions:

a. MC 3. d, 4. b, 6. b, 8. d
b. True or False 10. F, heat, 11. false, exothermic, 12. true, 13. false, enthalpy, 16. don't worry about this one, 17. false, negative
c. Concept Mastery: 20. then delta H is negative and the reaction is exothermic, 24. if a series of reactions are added together to give a net reaction, then the sum of the enthalpy changes for the reactions equals the enthalpy change (delta H) of the net reaction, 25. indirect measure of energy change in a chemical reaction, measures the surroundings to learn about the reaction or process
d. Critical Thinking/Problem solving: 28. exo energy is released to the surroundings (burning Mg) and endo energy is absorbed by the surroundings (NH_4Cl in H_2O), 29. breaking requires energy (endo) and making releases energy (exo), 30. negative because energy is released and therefore then energy of the products will be lower than the energy of the reactants making delta H negative because it is calculated by taking product amount – reactant amount, 32. Skip this one too!!!
e. Problem Bank: 34. a and b are exo, cand d are endo, 35. a is exo, b, c, and d are endo, 36. a should start low and end high, b should start high and end low, 37. a, c, and d are exo, b is endo,

38. $\frac{6.0 \text{ g C}}{12.0 \text{ g C}} \left| \frac{1 \text{ mol C}}{1 \text{ mol C}} \right| \frac{-394 \text{ kJ}}{} = 197 \text{ kJ}$

40. $\frac{27.1 \text{ g } I_2}{} \left| \frac{1 \text{ mol } I_2}{} \right| \frac{26.5 \text{ kJ}}{} = 2.83 \text{ kJ}$

45. q = (5.0 g)(4.184 J/gC)(3.0 C) = 63 J

46. q = (21.0 g)(4.184 J/gC)(28.0 – 34.0 C) = -527 J

47. c = q/(m)(delta T) = 5.7 J/(18.7 g)(2.3 C) = 0.13 J/gC

52. Flip the second equation and divide coefficients and delta H by two…then add. Final delta H = -141 kJ

53. $q_{surroundings\ (water)}$ = (43.0 g)(4.184 J/gC)(20.2 – 18.3 C) = 342 J so…$q_{reaction}$ = -342J

$\frac{0.800 \text{ g } CuSO_4}{} \left| \frac{1 \text{ mol } CuSO_4}{159.6 \text{ g } CuSO_4} \right. = 0.00501 \text{ mol } CuSO_4$

Delta H = $q_{reaction}$/mol = -342 J/0.00501 mol = 68,263 J/mol

55. double the first equation and its delta H, triple the second equation and its delta H and then add the new delta H's, should equal 462 kJ

57. $q_{surroundings\ (water)}$ = (50.0 g)(4.184 J/gC)(16.0 – 17.4 C) = -293 J so…$q_{reaction}$ = 293J

$$\underline{1.10\ g\ KMnO_4} \left| \frac{1\ mol\ KMnO_4}{158.1\ g\ KMnO_4} \right. = 0.00696\ mol\ KMnO_4$$

Delta H = $q_{reaction}$/mol = 293 J/0.00696 mol = 42,098 J/mol