Chapter 19 Review Answer Key

Assignments:

- Chapter Review questions 1 - 42 on pages 704-706
- Written Assessment questions 43 - 49 on page 706
- Focus on Graphing questions 53 - 56 on pages 707

Chapter Review Assignment

1. aromatic hydrocarbons
2. isomer
3. alkanes
4. allotrope
5. substitution
6. functional group
7. condensation
8. polymer
9. ring structure
10. The triple bond is less stable than a single bond.
11.
    a. carbons in diamond are densely packed in a tetrahedral arrangement
    b. carbons in graphite form separate layers that can slide past one another
12. They are both carbon allotropes and both have complex geometric structures, however, fullerenes form spheres, while nanotubes cylinders.
13. $C_{14}H_{30}$
14. See page 682 of the online textbook - the two structures would have different locations for the double bonds.
15. 1) covalent bonds between carbon atoms are quite strong 2) carbon compounds are not extremely reactive 3) wide variety of possible compounds due to possibility of four covalent bonds per carbon
16. pentane has a chain structure while cyclopentane has a ring structure
17. they differ in structure - leading to different chemical and physical properties
18. butanol has a functional group (-OH) and butane is all hydrogen and carbon
19.
    a. alcohol
    b. carboxylic acid
    c. aldehyde
    d. ketone
20. alcohols
21. longest continuous chain

22. the numbers start so that the double or triple bond are attached to the carbon with the lowest possible number
23. Both show the structure of a hydrocarbon, but the skeletal structure shows the hydrocarbons as lines only
24. needs a number to identify the location of the triple bond
25. The amino group is attached to the first of three carbons
26. The advantages of skeletal structure shows arrangements of carbon atoms and is simple. The disadvantages are that it does not show actual shape or atom sizes and does not show all atoms or bonds.
27. addition and condensation reactions
28. Addition reactions are the reactions in which an atom or molecule is added to an unsaturated molecule, while a substitution reaction is a reaction in which one or more atoms replace another atom or group of atoms in a molecule.
29. must add a single bond (increase saturation)
30. Hydrogenation is a type of addition reaction where one or more hydrogen atoms are added to un unsaturated molecule.
31. The branches add flexibility
32. In a condensation reaction, a simple molecule is produced, whereas in an elimination reaction, a simple molecule is removed and replaced by a new compound.
33. the single covalent bonds are hard to break
34. oils are long chains of carbon atoms with many double bonds, while fats have fewer double bonds, but more hydrogens bonded to the carbon instead
35. they are both polymers, but polyethylene is formed by addition reactions and nylon is produced using condensation reactions
36.
    a. 2,4,4-trimethyl-2-pentene
    b. 4,4-dimethyl-2-hexyne
    c. 4-ethyl-3-hexene
    d. 3-propyl-2-heptene

37.
    a. $CH_2 - CH_2 - CH_2 - CH - CH_2 - CH_3$
       I I
       Cl Cl

    b. $CH_2 - CH_2 - CH_2 - CH - CH_2 - CH_2 - CH_3$
       I I
       Cl Br

38.
    a. 2-butanone
    b. butanal

39. see textbook page 693 for help with this
40.
    a. methanol
    b. 1,2-propanediol
    c. 2-butanol
    d. 2-hexanol
41. skeletal structures should look like the examples on page 693
42.
    a. 3-hexone
    b. 1,1-dichloro-3-bromo-butane
    c. benzanol
43. Answers will vary, but must include polarity as part of the explanation.
44. $CCl_2 = CH - CCl = CH_2$

45.
    a. $CH_3 - CH_2 - CH_3$
    b. propane
46.
    a. $CH_2 = CH - CH_3$
                I
              CH_3

    b. $CH_3 - CH_2 - I$
                I
              CH_3

47. See page 684 for the functional groups

48. $CH_3 - CH - CH_3$ $\quad$ $CH_2 - CH_2 - CH_3$
                I $\quad$ I
              OH $\quad$ OH

49.
    a. carboxylic acid
    b. ether
    c. ketone

d. amine
e. halide

53. a. 72/86 * 100% = **<u>83.7% carbon</u>** & 14/86 * 100% = **<u>16.3% hydrogen</u>**

    b. The circle should have a much smaller slice of hydrogen compared to the carbon.

54. a. hexane

    b. methane

55. increase

56. a. 72/84 * 100% = **<u>85.7% carbon</u>** & 12/84 * 100% = **<u>14.3% hydrogen</u>**

    b. The circle should have a much smaller slice of hydrogen compared to the carbon.

    c. hexene