**Oxford High School**

**Honors Chemistry**

**Mr. Urig**

**Ch. 25 Homework Packet**

1. **Matching**
2. \_\_\_\_\_ allotrope a. globe-shaped allotrope of carbon
3. \_\_\_\_\_ diamond b. has no predictable arrangement
4. \_\_\_\_\_ graphite c. allotrope that exists in sheets or layers
5. \_\_\_\_\_ amorphous carbon d. allotrope that has a tetrahedral bonding pattern
6. \_\_\_\_\_ bone black e. a form of an element that has a different

bonding pattern or arrangement

1. \_\_\_\_\_ fullerene f. produced from the decomposition of animal

bones

1. \_\_\_\_\_ carbon g. element that forms an unusually wide variety of

compounds

1. \_\_\_\_\_ hydrocarbon h. contains mostly the hydrocarbon methane
2. \_\_\_\_\_ natural gas i. contains only the hydrogen and carbon atoms
3. \_\_\_\_\_ petroleum j. formed from decomposed plants and animals
4. \_\_\_\_\_ fossil fuels k. complex mixture of several hydrcarbons
5. **True or False – correct false answers**
6. \_\_\_\_\_ The octet rule states that atoms are most stable with a full outer energy level
7. \_\_\_\_\_ The carbon atom is relatively large.
8. \_\_\_\_\_ Carbon has 4 valence electrons.
9. \_\_\_\_\_ A carbon atom needs six additional electrons to satisfy the octet rule.
10. \_\_\_\_\_ Boron may be more important to life than any other element.
11. \_\_\_\_\_Carbon has a unique bonding pattern due to its half-filled valence shell/ small size
12. \_\_\_\_\_ DNA contains short chains of carbon atoms
13. \_\_\_\_\_ Organic molecules are produced naturally by living organisms.
14. \_\_\_\_\_ Organic compounds cannot be formed synthetically.
15. \_\_\_\_\_ According to the vitalist theory, organic compounds are produced only in a lab
16. \_\_\_\_\_Chlorofluorocarbons are made by living organisms.
17. \_\_\_\_\_ Inorganic compounds never contain carbon atoms.
18. \_\_\_\_\_ Friedrich Wohler synthesized urea in his laboratory experiments.
19. \_\_\_\_\_ Organic chemistry is the study of living things.
20. \_\_\_\_\_Organic compounds are found only in living things.
21. \_\_\_\_\_ Natural gas is composed mostly of methane.
22. \_\_\_\_\_ A compound’s identity is slightly altered if it is generated in a lab setting.
23. \_\_\_\_\_ Hydrocarbons are polar molecules.
24. \_\_\_\_\_ Hydrocarbons contain only carbon-carbon bonds.
25. \_\_\_\_\_ Gasoline does not dissolve in water.
26. \_\_\_\_\_ The electronegativities of carbon and hydrogen make hydrocarbons nonpolar.
27. \_\_\_\_\_ An alkane with 22 carbons atoms has the molecular formula C22H44.
28. \_\_\_\_\_ An alkane contains double bonds.
29. \_\_\_\_\_ A branched alkane contains branched carbon atoms.
30. \_\_\_\_\_ A branched alkane has a lower boiling point than a straight-chain alkane.
31. \_\_\_\_\_When two structures differ by one or more bond rotations, they are structural isomers.
32. \_\_\_\_\_ A cycloalkane is a cyclic hydrocarbon with one double bond.
33. \_\_\_\_\_ Alkenes are unsaturated hydrocarbons.
34. \_\_\_\_\_ Hydrocarbons with triple bonds are alkenes.
35. \_\_\_\_\_Benzene is a cyclic arrangement of 6 carbons and 6 hydrogens.
36. **Fill in the blank with the correct term**

unsaturated hydrocarbon branched alkane structural isomer

straight chain alkane branch carbon cyclic hydrocarbon

parent chain conformation general formula

1. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a carbon atom bonded to more than two other carbons.
2. A(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shares its molecular formula with another compound but has a different chemical structure.
3. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for an alkane is CnH2n+2.
4. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ contains at least one double or triple bond between carbon atoms.
5. The longest continuous chain of carbon atoms in a compound is called the \_\_\_\_\_\_\_\_\_\_.
6. A hydrocarbon with a carbon ring is called a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. A hydrocarbon with a single line of bonds connecting its carbon atoms is a(n)\_\_\_\_\_\_\_\_.
8. **Short Answers – answer the following questions**
9. Draw the three different bonds that can occur between 2 carbon atoms in a hydrocarbon.
10. What is the difference between organic and inorganic compounds? Are there any exceptions to this?
11. Differentiate between molecular, structural, and condensed structural formulas.
12. Describe some special properties of hydrocarbons.
13. Write the molecular formula for each of the following hydrocarbons.
    1. butane
    2. hexane
    3. ethyne
    4. propane
    5. octyne
    6. 2-methlypentane
14. Write the condensed structural formula for the following
    1. 2-methlypropane
    2. 3-ethylhexane
    3. 4-propyloctane
15. Draw condensed structural formulas for three structural isomers of pentane.
16. What is the significance of resonance in a benzene molecule? Be sure to include a diagram of benzene.
17. **Write the condensed structural formulas for the following.**
18. 4-methyloctane
19. 4-ethyldecane
20. 3-ethylpentane
21. 3-ethylhexane
22. 5-butlydecane
23. 4-ethylheptane
24. 3-methylnonane
25. 2-methylheptane
26. 4-propylheptane
27. 5-butylnonane
28. **Draw the following structural formulas**
29. Draw the structural formula for the one structural isomer of butane. Name the compound.
30. Draw structural formulas for two structural isomers of octane that have only one branch. Name the two compounds.
31. Draw the structural formula for one structural isomer of pentane. Name the compound.
32. The molecule 2-methlyheptane is a structural isomer of which straight chain alkane? Draw its structural formula.
33. The molecule 2-methylbutane is a structural isomer of which straight chain alkane?

Draw its structural formula.

1. The molecule 3-methlyoctane is a structural isomer of which straight chain alkane?

Draw its structural formula.

1. The molecule 3-ethylhexane is a structural isomer of which straight chain alkane? Draw its structural formula.
2. The molecule 3-methylpentane is a structural isomer of which straight chain alkane? Draw its structural formula.
3. The molecule 3-propylheptane is a structural isomer of which straight chain alkane? Draw its structural formula.
4. The molecule 3-methylhexane is a structural isomer of which straight chain alkane? Draw its structural formula.
5. **Give the IUPAC name for the following molecules:**
6. CH3

CH3 CH CH2 CH2 CH2 CH2 CH2 CH3

1. CH2  CH3

CH3 CH2 CH2 CH CH2 CH2 CH2 CH2 CH3

CH2 CH2  CH2 CH­­3

CH3 CH2 CH CH2 CH2 CH2 CH3

1. CH2 CH3

CH3 CH CH2 CH3

1. CH3

CH3 CH2 CH CH2 CH2 CH3

1. CH3

CH3 CH2 CH CH2 CH2 CH2 CH3

1. CH2 CH3

CH3 CH2 CH2 CH2 CH CH2 CH2 CH2 CH­2 CH3

1. CH2 CH3

CH3 CH2 CH CH2 CH2 CH2 CH2 CH3

1. CH3

CH3 CH2 CH2 CH CH2 CH2 CH2 CH3

1. CH3

CH3 CH2 CH CH2 CH2 CH2 CH2 CH3