Name:\_\_\_\_\_

## Chapter 22 Self-Study Assignment: Hydrocarbons

Please complete the following questions on your own paper. Most answers can be found in your textbook, however other sources will be needed. <u>Please write on one side only</u> and attached this assignment to the front. (Value: / )

1. Read Chapter 22. Define or explain all of (approximately 20) the highlighted terms. In addition, define the term Organic Chemistry. (Value 20)

2. Prior to 150 years ago, what theory did scientists hold about the formation of carbon compounds? Who performed experiments to counter this theory? Briefly explain his experiment. How would we now define an organic compound? (Value 3)

3. What distinguishes alk<u>anes</u> from the other hydrocarbons? (Value 2)

4. How many bonds will carbon atoms almost always make? (Value 1)

5. Give the names, formulas and draw the structural formulas for the first ten straight-chain (or continuous chain) alkanes. <u>Memorize them!</u> (Value 10)

6. What organization recommends the use of the names that you found in question 5? (Value 1)

7. What is the difference between a continuous/straight chain alkane and a branched chain alkane? (Value 2)

8. What is a substituent? What does it usually take the place of on a hydrocarbon chain? What are some typical substituents (draw/name 3) mentioned on page 698? (Value 4)

9. What is a methyl group and ethyl group? What type of substituents are these examples of? Give the names and formulas for the next 5 alkyl groups. (Value 7)

10. How is: сн<del>3-</del>сн—сн<sub>3</sub> |

CH<sub>3</sub> different than

CH3-CH2-CH2-CH3

After all, both of them can be written as  $C_4H_{10}$ . (Value 2)

11. List all of the rules for naming branched-chain alkanes. Memorize them. (Value 6)

12. Draw structural formulas for (Value 3)

a) 2-methyl pentane

b) 3-methyl hexane

c) 3-ethyl-2-methyl octane

13. Complete the following questions: (Value 6)

## **Problems**

4. Name the following compounds according to the IUPAC system.

14. What are the alkenes and alkynes collectively known as? Why? (Value 2)

15. How do you name an alkene by the IUPAC system? (Value 4)

16. How are the following two structures different? How would you name them? (Value 2)  $CH_2=CH-CH_2-CH_3$  and  $CH_3-CH=CH-CH_3$ 

17. Look at the two versions of 2-butene at the top right hand side of page 705. How are they different from each other? What terms are used to distinguish between the two **isomers**? (Value 2)

18. Draw structural formulas for the following alkenes. If a compound has a geometric isomers, draw both the *cis* and *trans* forms. (Value 4)

- a. 1-pentene
- b. 2-hexene
- c. 2-methyl-2-hexene
- d. 2,3-dimethyl-2-butene

19. What is an assymetric carbon (section 22.3)? What do these compounds possess? What does nonsuperimposable mean? What are stereoisomers? Complete the following: (Value 4)

Problem

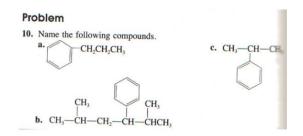
owing structures.			f the fill
0	b. CH <sub>3</sub> CHCHO	c. CH <sub>3</sub> CHOH	
	CH <sub>3</sub>	CI	
	0	. СН <sub>3</sub> СН <sub>2</sub> СНО <b>b.</b> СН <sub>3</sub> СНСНО . СН <sub>3</sub> СНСНО   СН <sub>3</sub>	. СН <sub>3</sub> СН <sub>4</sub> СНО <b>b.</b> СН <sub>3</sub> СНСНО <b>с.</b> СН <sub>3</sub> СНОН 

20. How are cyclic hydrocarbons different than alkanes, alkenes and alkynes? (sec. 22-4) (Value 1)

21. What are the arenes? What is the simplest one? What other term is applied to them? (Value 1)

22. Draw the resonance structures of benzene. (Value 3)

23. Complete the following: (Value 3)



24. Draw the structure for each compound (Value 4)a) p-diethylbenzenec) p-xyleneb) 2-methyl-3-phenylpentaned) toluene