

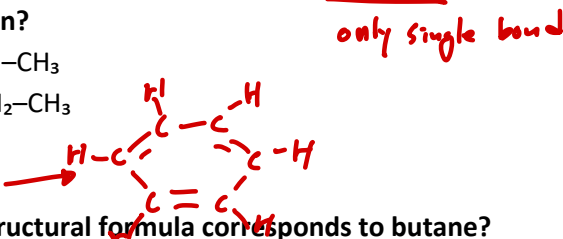
Exam 3

1. A hydrocarbon contains only the elements

- a) carbon and oxygen
- ☒ b) carbon and hydrogen
- c) carbon, hydrogen, and oxygen
- d) hydrogen and nitrogen

2. Which of the following represents a saturated hydrocarbon?

- a) $\text{CH}_2=\text{CH}-\text{CH}_3$
- ☒ b) $\text{CH}_3-\text{CH}_2-\text{CH}_3$
- c) $\text{CH}\equiv\text{CH}$
- d) C_6H_6



3. Which structural formula corresponds to butane?

- a) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3$
- ☒ b) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3$
- c) $\text{CH}_3-\text{C}\equiv\text{CH}$
- d) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{OH}$

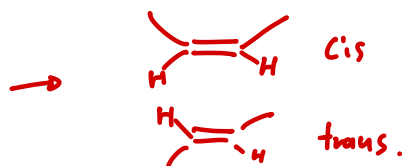
single

4. According to IUPAC rules, the main chain is

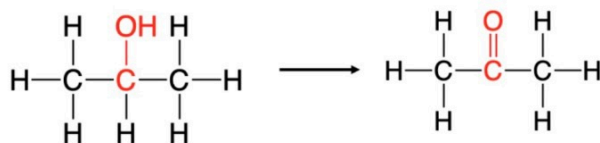
- a) the shortest chain
- b) the chain with the most substituents
- ☒ c) the longest continuous chain regardless of bends
- d) the most branched chain

5. Which one of the following compounds can show cis-trans isomerism?

- a) CH_4
- ☒ b) $\text{CH}_3\text{CH}=\text{CHCH}_3$
- c) C_6H_6
- d) $\text{CH}_3\text{C}\equiv\text{CH}$



6. What type of reaction is shown below?



- a) Combustion
- ☒ b) Oxidation
- c) Halogenation
- d) Dehydration

7. The structural formula of benzene is best represented as

- ☒ a) ring of six carbons with alternating double bonds
- b) six carbon ring with a circle in the center
- c) ring of five carbons with one double bond
- d) hexane

8. The functional group of an alcohol is

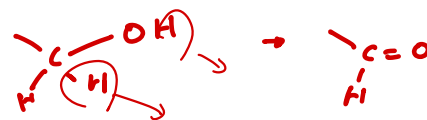
- a) $-\text{COOH}$
- b) $-\text{SH}$
- ☒ c) $-\text{OH}$
- d) $-\text{CO}-$

9. A secondary (2°) alcohol has the $-\text{OH}$ group attached to a carbon

- a) bonded to one alkyl group
- ☒ b) bonded to two alkyl groups
- c) bonded to three alkyl groups
- d) in a ring only

10. Which of the following represents the correct result from the oxidation of a primary alcohol?

- a) Alkene
- ☒ b) Aldehyde
- c) Ketone
- d) Carboxylic acid



11. Thiols contain the functional group

- ☒ a) $-\text{SH}$
- b) $-\text{OH}$
- c) $-\text{CHO}$
- d) $-\text{NH}_2$

12. Which of the following describes the general structure of an ether?

- a) $\text{R}-\text{OH}$
- b) $\text{R}-\text{COOH}$
- ☒ c) $\text{R}-\text{O}-\text{R}'$
- d) $\text{R}-\text{NH}_2$

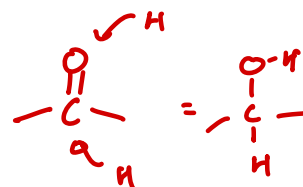
13. Which compound contains a carbonyl group at the end of the chain?

- a) ketone
- ☒ b) aldehyde
- c) ether
- d) carboxylic acid

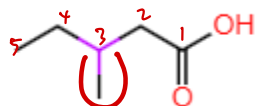


14. The reduction of a ketone produces

- a) a primary alcohol
- b) an aldehyde
- ☒ c) a secondary alcohol
- d) a tertiary alcohol



15. Provide the correct IUPAC name for the following compound:



- a) butanoic acid
- b) 2-methylpropanoic acid
- c) 3-methylpentanoic acid**
- d) pentanoic acid

16. Carboxylic acids are classified as acids according to which definition?

- a) Lewis
- b) Arrhenius**
- c) Brønsted–Lowry
- d) None of the above

17. What is the name of the following compound?



- a) 3-methylphenol**
- b) 3-hydroxytoluene
- c) 3-methyl-1-cyclohexanol
- d) 1-hydroxy-3-methylbenzene

18. How does the solubility of carboxylic acids in water change as the hydrocarbon chain length increases?

- a) Increases
- b) Decreases**
- c) Remains the same
- d) Fluctuates irregularly

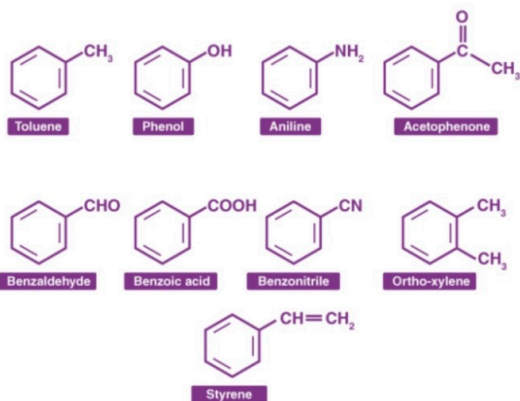
*less polar
= less soluble*

19. Which of the following is a tertiary amine?

- a) $\text{CH}_3\text{CH}_2\text{NH}_2$
- b) $(\text{CH}_3)_2\text{NH}$
- c) $(\text{CH}_3)_3\text{N}$**
- d) NH_3

20. Which structure represents an amide?

- a) $\text{R}-\text{CO}-\text{NH}_2$**
- b) $\text{R}-\text{COOH}$ ✗
- c) $\text{R}-\text{O}-\text{R}$ ✗
- d) $\text{R}-\text{NH}_2$ ✗

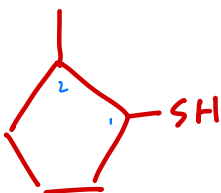


Substituent (Group)	Parent name when principal	Priority
$-\text{COOH}$	benzoic acid	Highest
$-\text{OH}$	phenol	High
$-\text{NH}_2$	aniline	Medium
$-\text{CH}_3$	toluene	Low
$-\text{Br}, -\text{Cl}$	halo- (e.g., bromobenzene, chlorobenzene)	Lowest

21. Draw line-angle formulas for the following compounds:

3 pts each

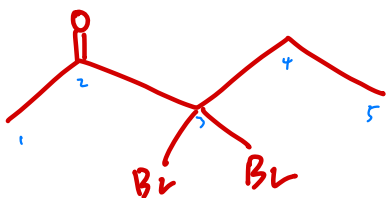
a) 2-Methylcyclopentanethiol



Name

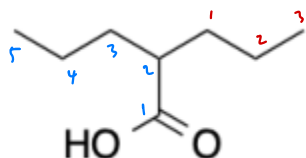
Key.

b) 3,3-Dibromo-2-pentanone

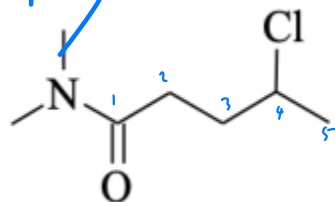


	A	B	C	D	E		A	B	C	D	E
1	☒	☐	☐	☐	☐	11	☒	☐	☐	☐	☐
2	☐	☒	☐	☐	☐	12	☐	☐	☒	☐	☐
3	☐	☒	☐	☐	☐	13	☐	☒	☐	☐	☐
4	☐	☐	☒	☐	☐	14	☐	☐	☒	☐	☐
5	☐	☒	☐	☐	☐	15	☐	☐	☒	☐	☐
6	☐	☒	☐	☐	☐	16	☐	☒	☐	☐	☐
7	☒	☐	☐	☐	☐	17	☒	☐	☐	☐	☐
8	☐	☐	☒	☐	☐	18	☐	☒	☐	☐	☐
9	☐	☒	☐	☐	☐	19	☐	☐	☒	☐	☐
10	☐	☒	☐	☐	☐	20	☒	☐	☐	☐	☐

22. Provide the IUPAC name for the following compounds:



2-propylpentanoic acid



4-chloro-N,N-dimethylpentanamide

24. Explain why tertiary alcohols do not undergo oxidation.



oxidation removes
1 H⁺ from O, 1 H⁺ from C.
but tertiary alcohols do not
have H in C.