Organic Chemistry - Chapter 20 Prep Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____  1. How many valence electrons does a carbon atom have?
   a. 3  b. 4  c. 5  d. 6

____  2. Carbon is usually found in __________ compounds?
   a. non-metallic  b. metallic  c. inorganic  d. organic

____  3. Hydrocarbons are named based upon ________.
   a. number of carbon atoms.  b. isotope of carbon.  c. bonds between hydrogen atoms.  d. mass of the compounds.

____  4. Which of the following is an alkane?
   a. propyne  b. propane  c. propene  d. propyl bromide

   A.  
   \[\text{H}_3\text{C}-\text{C}-(\text{C}_3\text{H})\]
   \[\text{H}_2\text{H}_{\text{H}_3}\]

   B.  
   \[\text{H}_3\text{C}-\text{C}-(\text{C}_3\text{H})\]
   \[\text{H}_2\text{H}_{\text{H}_3}\]

   C.  
   \[\text{H}_3\text{C}-\text{C}-(\text{C}_3\text{H})\]
   \[\text{H}_2\text{H}_{\text{H}_3}\]

   D.  
   \[\text{H}_3\text{C}-\text{C}-(\text{C}_3\text{H})\]
   \[\text{H}_2\text{H}_{\text{H}_3}\]

____  5. In the figure above, what is the structural formula for 2-methylbutane?
6. In the figure above, name the compound in diagram C.
   a. diethylpentane  b. 3-isoheptane  c. 3-methylpentane  d. 3-ethylpentane

7. In the figure above, name the compound in diagram A.
   a. 1,3-butadiene  b. ethene  c. ethyne  d. ethane

8. In the figure above, name the compound in diagram B.
   a. 1,3-dimethylcyclohexane  b. ethylcyclopentane  c. cycloheptane  d. propylcyclohexane
9. In the figure above, what is the structural formula for propyne?

10. Which hydrocarbons always have triple bonds?
    a. alkanes  b. alcohols  c. alkynes  d. halogenated hydrocarbons

11. Which hydrocarbons have triple covalent bonds?
    a. alkanes  b. alkynes  c. alkenes  d. aromatic hydrocarbons

12. Name the alkene in the figure above.
    a. ethene  b. propene  c. butyl propanoate  d. propyl butanol

13. Name the figure above.
    a. ethanamide  b. pentane  c. pentanamide  d. None of the above

14. Alkenes are hydrocarbons that contain what type of bonds?
    a. single covalent bonds only  b. at least one double bond  c. at least one triple bond  d. ionic bonds

15. What is the simplest alkene?
    a. butene  b. ethene  c. methene  d. pentene

16. What is the name of the alkane having eight carbons?
    a. propane  b. methane  c. octane  d. pentane

17. The names of the straight-chain alkenes all end with the suffix ____.
    a. -ene  b. -ine  c. -ane  d. -ino

18. What is the general formula for a straight-chain alkane?
    a. \( C_nH_n \)  b. \( C_nH_{n+2} \)  c. \( C_nH_{2n} \)  d. \( C_nH_{2n+2} \)
19. What is the condensed structural formula for 2,2-dimethylbutane? Hint - Draw it out.
   a. \( \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3 \)  
   b. \( \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \)  
   c. \( (\text{CH}_3)_3\text{CCH}_2\text{CH}_3 \)  
   d. \( \text{C}_6\text{H}_4(\text{CH}_3)_2 \)

20. The condensed structural formula for 2,2,3-trimethylbutane is _____. Hint - Draw it out.
   a. \( \text{CH}_3\text{CH}_2(\text{CH}_3)\text{CH}(\text{CH}_3)_2 \)  
   b. \( \text{CH}_3\text{C}(\text{CH}_3)_2\text{C}(\text{CH}_3)_3 \)  
   c. \( \text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}(\text{CH}_3)_2 \)  
   d. \( \text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{C}(\text{CH}_3)_3 \)

21. A saturated straight-chain hydrocarbon with two carbons is _____.
   a. ethene  
   b. decane  
   c. propane  
   d. ethane

22. Which of these compounds is an alkyne?
   a. methane  
   b. nonene  
   c. butyne  
   d. propanone

23. What is the name of the following compound?
   ![Chemical structure](image)
   a. butanoic acid  
   b. methyl propanoate  
   c. ethyl methyl ether  
   d. ethanoic acid

24. Which of the following compounds is tetrachloromethane?
   ![Chemical structures]
   a.  
   c.  
   b.  
   d.  

25. The functional group in \( \text{CH}_3\text{O}\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \) is a(n) _____.
   a. ester  
   b. ether  
   c. carbonyl  
   d. carboxyl

26. Name the compound \( \text{CH}_3\text{CH}_2\text{O} \text{CH}_2\text{CH}_2\text{CH}_3 \).
   a. diethyl propane  
   b. dipropyloxyether  
   c. ethoxypropane  
   d. pentoxy ether

27. Name the following compound?
   ![Chemical structure](image)
   a. butanol  
   b. butanoic acid  
   c. isobutanol  
   d. 2-butane
28. What type of compound is this?

\[ \text{CH}_3-\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \]

a. ketone  b. alkane  c. alkene  d. carboxyl

29. Which carbon skeleton represents an ester?

-  \[ \text{C}-\text{C}-\text{C}-\text{C}=\text{O} \]
-  \[ \text{C}-\text{C}-\text{C}-\text{O} \]
-  \[ \text{C}-\text{C}-\text{C}-\text{C} \]
-  none of the above

30. Organic acids have the general structure __________.

-  \[ \text{R-C-C}=\text{O} \]
-  \[ \text{R-C-OH} \]
-  \[ \text{R-C-H} \]
-  \[ \text{R-C-OR} \]

31. What is the name of the following compound?

\[ \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3 \]

a. butane  b. 3-methyl butanal  c. butanol  d. butanone

32. Which of the following carbon skeletons represents a ketone?

-  \[ \text{C}-\text{C}-\text{C}-\text{C}-\text{O} \]
-  \[ \text{C}-\text{C}-\text{C}-\text{C}=\text{O} \]
-  \[ \text{C}-\text{C}-\text{C}-\text{C} \]

33. The IUPAC name for a carboxylic acid with 3 carbon chain would be __________.

a. propanoic acid  b. dimethylamine acid  c. butanoic acid  d. methanoic acid
34. Name the following molecule.

\[ \text{NH}_2 \]
\[ \text{Cl} \]

a. m-nitrobenzene b. p-nitrochlorobenzene c. o-aminochlorobenzene d. m-aminochlorobenzene

35. Name the following molecule.

\[ \text{F} \]
\[ \text{OH} \]
\[ \text{F} \]

a. p-difluorohydroxylbenzene b. 1-hydroxyl-3,5-difluorobenzene c. 1,3-difluoro-5-hydroxybenzene d. m-hydroxylbenzene

36. Name the following molecule.

\[ \text{CH}_2 - \text{CH}_3 \]
\[ \text{CH}_2 - \text{CH}_3 \]

a. m-diethylbenzene b. p-diethylbenzene c. 1,3-dimethylbenzene d. p-dichlorobenzene