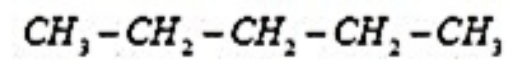
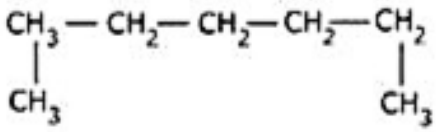
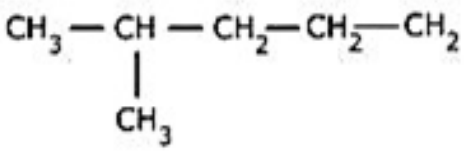
CBSE Test Paper-02

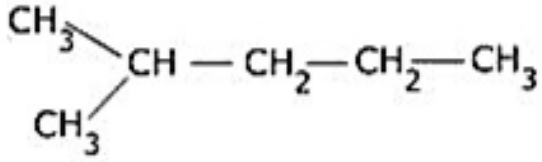
Chapter 04 Carbon and its Compound

1. Which of the following are not straight chain compounds? **(1)**

A 

B 

C 

D 

   a. A, B and D
   b. C and D
   c. A and B
   d. A and C

2. The odour of ethanoic acid resembles which one of the following**: (1)**

   a. Kerosene
   b. Pungent
   c. Rose
   d. Vinegar

3. What is denatured spirit? **(1)**

   a. None of these
   b. Ethanol only
   c. Methanol only
   d. Ethanol + Methanol (5%)

4. Which of the following statements are usually correct for carbon compounds?
   A. They are good conductors of heat and electricity.
   B. They are poor conductors of heat and electricity.
   C. They have strong forces of attraction between their molecules.

D. They do not have strong forces of attraction between their molecules. **(1)**

a. B and C
b. All of these
c. B and D
d. A, B and D

5. Alcohols can be produced by the hydration of**: (1)**

a. Alkenes
b. Alkanes
c. Acids
d. Alkynes

6. Which of the following will turn blue litmus solution red? CH_3OH, CH_3COOH, CH_3COOCH_3 **(1)**

7. Why is pure ethanoic acid called glacial ethanoic acid (or glacial acetic acid)? **(1)**

8. What is a detergent? **(1)**

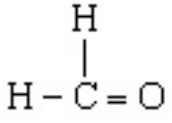
9. State the general formula of carboxylic acids. **(1)**

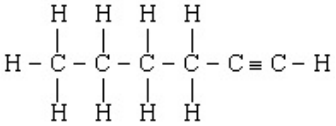
10. Out of sodium chloride (NaCl) or methyl chloride (CH_3 Cl), which has higher melting and boiling points? Why? **(3)**

11. Write the molecular formula and structural formula of acetaldehyde. **(3)**

12. How would you name the following compounds? **(3)**

i. CH_3-CH_2 -Br

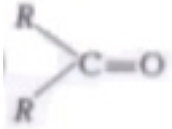
ii. 

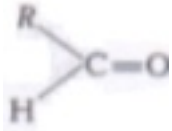
iii. 

13. How would you distinguish experimentally between an alcohol and a carboxylic acid? **(3)**

14. Define structural isomer and draw the isomeric structures of butane. Compare the structure of benzene and cyclohexane by drawing them. **(5)**

15. i. Write the names of the functional groups in

    1. 

    2. 

    ii. Describe a chemical test to distinguish between ethanol and ethanoic acid.

    iii. Write a chemical equation to represent what happens when hydrogen gas is passed through an unsaturated hydrocarbons in the presence of nickel as a catalyst? **(5)**

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Chapter 04 Carbon and its Compound

Answers

1. b. C and D

   Explanation: A and B are straight chain compounds. A has a straight chain of 5 carbon atoms. B has a straight chain of 7 carbon atoms. C and D are not straight chain compounds.

2. d. Vinegar

   Explanation: The odour of ethanoic acid (CH_3COOH) resembles vinegar. A dilute solution of ethanoic acid in water is called vinegar. Vinegar contains about 5 to 8 % ethanoic acid.

3. d. Ethanol + Methanol (5%)

   Explanation: Alcohol meant for industrial purposes is made unfit for human consumption by adding small amounts (about 5%) of methanol to ethanol. The mixture is known as **denatured spirit** or **denatured alcohol**. Addition of small amount of copper sulphate is added to impart a blue colour to denatured spirit so that it can be identified easily.

4. c. B and D

   Explanation: Carbon compounds are usually poor conductors of heat and electricity. Carbon compounds are covalent compounds that have been formed by the sharing of electrons. They do not have strong forces of attraction between their molecules. They have weak interactions between their molecules. This leads to low melting points and boiling points.

5. a. Alkenes

   Explanation: Alcohols can be produced by the **hydration of alkenes**. Hydration of alkenes is an addition reaction. The reaction is highly exothermic. E.g. Ethanol is manufactured by reacting ethene with steam.

6. Blue litmus paper turns red under acidic conditions. CH_3COOH will turn blue litmus solution red because it is acidic.

7. The melting point of pure ethanoic acid is 290 K. When ethanoic acid (acetic acid) is cooled below 10 °C, it freezes to form a colourless, ice-like solid. The solid looks like glacier and hence pure ethanoic acid is called glacial ethanoic acid (or glacial acetic acid).

8. Detergents are ammonium or sulphonate salts of long chain carboxylic acids. Detergent is also known as soapless soap. Soap cannot form lather in hard water. To overcome this problem, detergents were introduced.

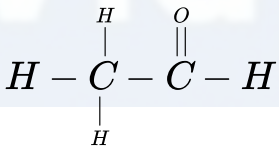
9. The general formula of carboxylic acids is $C_nH_{2n+1}COOH$.

10. The intermolecular forces are small in the covalent compounds.So, These bonds break easily. Hence, covalent compounds have low melting and boiling point.The intermolecular forces are small in the covalent compounds. These bonds break easily. Hence, covalent compounds have low melting and boiling point.

    Sodium chloride (Na^+Cl^-) is an ionic compound, therefore it's melting and boiling points are higher than methyl chloride (CH_3Cl) which is a covalent compound.

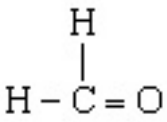
11. Molecular formula of acetaldehyde : CH_3CHO

    Structural formula of acetaldehyde:

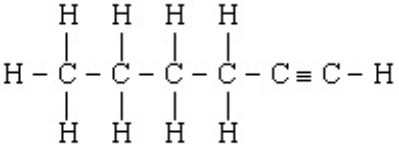


12. i. CH_3-CH_2 -Br : Bromoethane

    ii. Methanal:



    iii. Hex-1-yne:

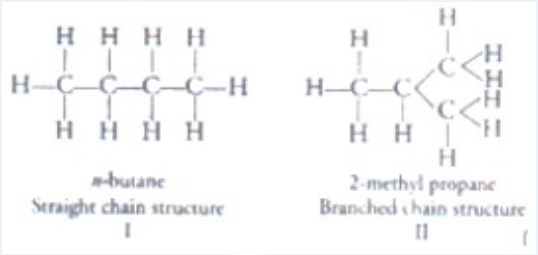


13. The following two tests are used:

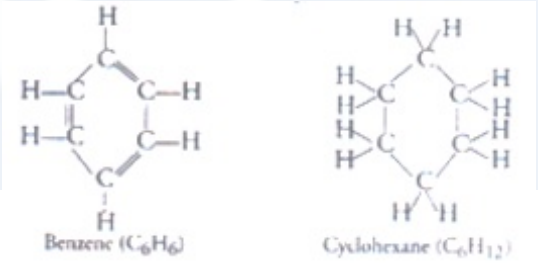
i. **Litmus test**: Treat the given compound with blue litmus solutions. If the blue litmus solution turns red, it is a carboxylic acid and if does not turn red, it is an alcohol.

ii. **Sodium bicarbonate test:** Add some sodium bicarbonate solution to the given compound. If there is a brick evolution of a colourless and odourless gas (CO_2) which turns freshly prepared lime water milk, it is carboxylic acid and if there is no effervescence, it is an alcohol.

14. Compounds having same molecular formula but different structural formula are called structural isomers.
e.g. butane (C_4H_{10}) shows the following two structural isomers. One of which is straight chain n-butane and other is iso-butane.



Structure of benzene and cyclohexane are:



Benzene (C_6H_6) has six C-atoms and six H-atoms, it contains three double bonds alternately between two Carbon atoms and each carbon atoms bonds with one hydrogen. Cyclohexane (C_6H_{12}) has six C-atoms each possessing two H-atoms, thus, 12 H-atoms in total. It does not consist of any double bond it is saturated compound.

15. i. a. Ketone (R-CO-R)
b. Aldehyde (R-CHO)

ii. Distinguish between ethanol and ethanoic acid:
a. Ethanol does not react with metal carbonate while ethanoic acid reacts with metal carbonates to form salt, water and CO_2.
e.g. $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + CO_2 + H_2O$

b. Ethanol does not react with NaOH while ethanoic acid reacts with NaOH to form sodium ethanoate and water
e.g. $CH_3COOH+NaOH \rightarrow CH_3COONa + H_2O$

c. Ethanol can undrergo oxidation to produce aldehyde and futher it can oxidize to produce acid.

iii. saturated hydrocarbon is obtained as hydrogen gas passed through unsaturated hydrocarbon. The reaction is an example of addition reaction better known by the name of hydrogenation reaction.

$$\underset{\substack{Ethene\\(Unsaturated\\hydrocarbon)}}{CH_2=CH_2} + H_2 \xrightarrow[Catalyst]{Ni} \underset{\substack{Ethane\\(Saturated\\hydrocarbon)}}{CH_3-CH_3}$$