



CHEMISTRY

BOOKS - BAL BHARTI

CARBON COMPOUNDS

Can You Recall

1. Answer the following questions in one word :

What are the types of compounds?



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2. Answer the following questions in one word :

Objects in everyday uses such as foodstuff, fibers,paper, medicines, wood

fuels are made of various compounds. Which constituent elements are common in these compounds?

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3. Answer the following questions in one word :

To which group in the periodic table does the element carbon belong?

Write down the electronic configuration of carbon and deduce the valency of carbon.

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4. Answer the following questions in one word :

Which is the component of biogas that makes it useful as fuel.

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5. Answer the following questions in one word :

Which product is formed by the combustion of elemental carbon?

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6. Answer the following questions in one word :

Is the biogas combustion reaction endothermic or exothermic.

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Can You Tell

1. Answer the following questions in one word :

What is meant by a chemical bond?

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2. Answer the following questions in one word :

What is the number of chemical bonds that an atom of an element forms called?



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3. Answer the following questions in one word :

What are the two important types of chemical bond?



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4. What are the chemical names of the nutrients that we get from the food stuff, namely cereals, pulses and meat?



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5. What are the chemical substances that make cloth, furniture, and elastic objects?

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Use Your Brain Power

1. Atomic number of Chlorine is 17. What is the number of electrons in the valence shell of Chlorine?

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2. Molecular formula of chlorine is Cl_2 . Draw an electron dot and line structure of a chlorine molecule.

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3. The molecule formula of water is H_2O Draw electron dot and line structure of this triatomic molecule (use dots for electron of oxygen atom and cross for electrons of hydrogen atom)

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4. The molecular formula of Ammonia is NH_3 Draw electron dot structure and line structure of ammonia molecule.

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5. The molecular formula of carbon-dioxide is CO_2 - Draw the electron dot structure (without showing cricle) and line structure of CO_2 .

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6. Answer the following questions in one word :

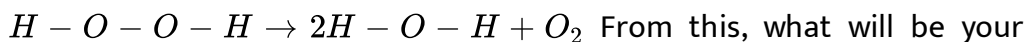
With which bond C atom in CO_2 is bonded to each of the O atoms?

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7. The molecular formula of sulphur is S_8 in which eight sulphur atoms are bonded to each other to form a ring. Draw an electron-dot structure of S_8 without showing circles.

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8. Hydrogen peroxide decomposes on its own by the following reaction.



From this, what will be your inference about the strength of O-O, Covalent bond.

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9. Tell from the above example whether oxygen has catenation power or not?

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10. The molecular formula of ethyne is C_2H_2 . From this, draw its structural formula and electron-dot structure.

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11. How many bonds have to be there in between the two carbon atoms in ethyne so as to satisfy their tetravalency?

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12. Draw electron dot structure of cyclohexane.

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13. Answer the following questions: By how many $-CH_2-$ (methylene) units do the formulae and the first two members of homologous series of alkane, methane (CH_4) and ethane (C_2H_6) differ? Similarly, by how many $-CH_2-$ units do the neighboring members ethane (C_2H_6) and propane (C_3H_8) differ from each other?

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14. How many methylene units are extra in the formula of the fourth member than the third members of the homologous series of alcohols?

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15. How many methylene units are less in the formula of the second member than the third member of two homologous series of alkenes?

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16. Inspect the molecular formulae of the members of Alkenes. Do you find any relationship in the number of carbon atoms and the number of hydrogen atoms in the molecular formulae.

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17. If the number of carbon atoms in the molecular formulae of alkenes is denoted by 'n' what will be the number of hydrogen atoms?

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18. Use your brain power! Can you tell :

Write down structural formulae of the first four members of the various homologous series formed by making use of the functional groups.

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19. General formula of the homologous series of alkanes is C_nH_{2n+2} .

Write down the molecular formula of the 8th and 12th member using this.

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20. Draw three structural formulae having molecular formula C_5H_{12} .

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21. Give the names n-pentane, and Neo-pentane to the above structural formulae.

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22. Draw all the possible structural formulae having molecular formula C_6H_{14} . Give names to all the isomers. Which difficulties were faced by you while naming? As the time progressed, the carbon compounds

became very large in number and their common names caused confusion. A need was felt to have a logical system acceptable to all for naming the carbon compounds.

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23. Answer the following questions in one word :

Propane (C_3H_8) is one of the combustible component of LPG. Write down the reaction for propane (C_3H_8)

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24. In the Chlorination, substitution reaction of propane, two isomeric products containing one chlorine atom are obtained. Draw their structural formula and give their IUPAC names.

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25. Explain by writing a reaction, what will happen when pieces of sodium metal are put in n-propyl alcohol.

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26. Use your brain power! Can you tell :

Explain by writing a reaction , which product will be formed on heating n-butyl alcohol with concentrated sulphuric acid.

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27. Answer the following questions in one word :

Which one of ethanoic acid and hydrochloric acid is stronger?

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28. Answer the following questions in one word :

Which indicator paper out of blue litmus paper and pH paper is useful to distinguish between ethanoic acid and hydrochloric acid?



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29. Use your brain power! Can you tell :

Explain why does the lime water turns milky in the reaction of acetic acid with sodium carbonate.



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30. Explain the reaction that would take place when a piece of sodium metal is dropped in ethanoic acid.

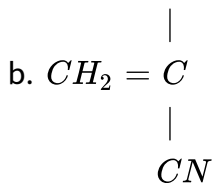
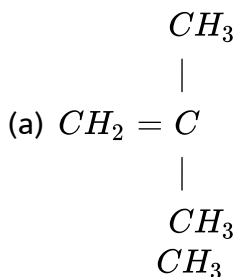


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31. When fat is heated with sodium hydroxide solution, soap and glycerin are formed. Which functional group might be present in fat and glycerin?

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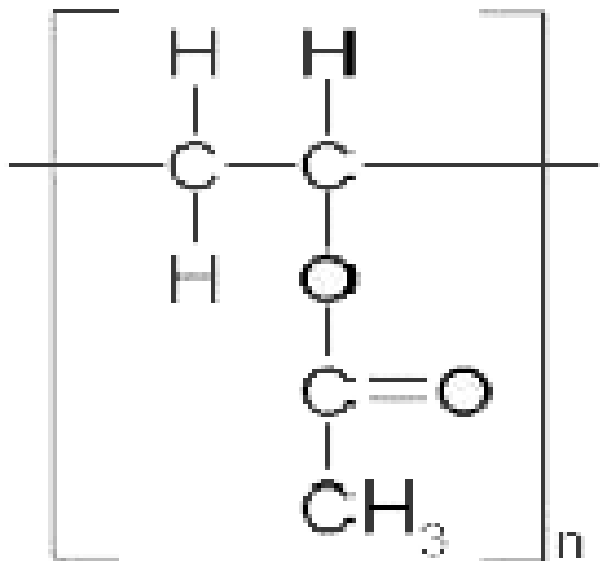
32. Structural formulae of some monomers are given below. Write the structural formula of the homopolymer formed from them.



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33. From the given structural formula of polyvinyl acetate, that is used in paints and glues, deduce the name and structural formula of the

corresponding monomer.



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Complete The Table

1. Fill in the gaps in the table a, b and c of homologous series.

a. Homologous Series of Alkanes

Name	Molecular formula	Condensed Structural formula	Number of carbon atoms	Number of $-CH_2-$ units	Boiling point $^{\circ}C$
Methane	CH_4	CH_4	1	1	- 162
Ethane	C_2H_6	CH_3-CH_3	2	2	- 88.5
Propane	C_3H_8	$CH_3-CH_2-CH_3$	3	3	- 42
Butane	C_4H_{10}	$CH_3-CH_2-CH_2-CH_3$	...	...	0
Pentane	C_5H_{12}	$CH_3-CH_2-CH_2-CH_2-CH_3$	...	...	36
Hexane	C_6H_{14}	$CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$	...	...	69

b. Homologous Series of Alcohols

Name	Molecular formula	Condensed Structural formula	Number of carbon atoms	Number of $-CH_2-$ units	Boiling point $^{\circ}C$
Methanol	CH_4O	CH_3-OH	1	1	63
Ethanol	C_2H_6O	CH_3-CH_2-OH	2	2	78
Propanol	C_3H_8O	$CH_3-CH_2-CH_2-OH$	...	...	97
Butanol	$C_4H_{10}O$	$CH_3-CH_2-CH_2-CH_2-OH$	...	...	118

c. Homologous Series of Alkenes

Name	Molecular formula	Condensed Structural formula	Number of carbon atoms	Number of $-CH_2-$ units	Boiling point $^{\circ}C$
Ethene	C_2H_4	$CH_2=CH_2$	2	0	- 102
Propene	C_3H_6	$CH_3-CH=CH_2$	3	1	- 48
1-Butene	C_4H_8	$CH_3-CH_2-CH=CH_2$	- 6.5
1-Pentene	C_5H_{10}	$CH_3-CH_2-CH_2-CH=CH_2$	30

9.17 Some Homologous Series



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2. The table shows common names and structural formulae of a few carbon compounds. Complete the table by writing their IUPAC names in

the third column.

Sr. No.	Common name	Structural formula	IUPAC Name
1	ethylene	$\text{CH}_2=\text{CH}_2$	
2	acetylene	$\text{HC} \equiv \text{CH}$	
3	acetic acid	$\text{CH}_3\text{-COOH}$	
4	methyl alcohol	$\text{CH}_3\text{-OH}$	
5	ethyl alcohol	$\text{CH}_3\text{-CH}_2\text{-OH}$	
6	acetaldehyde	$\text{CH}_3\text{-CHO}$	
7	acetone	$\text{CH}_3\text{-CO-CH}_3$	
8	ethyl methyl ketone	$\text{CH}_3\text{-CO-CH}_2\text{-CH}_3$	
9	ethyl amine	$\text{CH}_3\text{-CH}_2\text{-NH}_2$	
10	n-propyl chloride	$\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-Cl}$	

9.21 Common and IUPAC names of some carbon compounds

Chemical Properties of Carbon Compounds

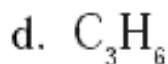
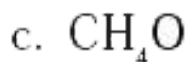
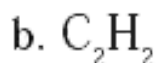
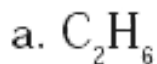


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Exercise

1. Match the pairs.

Group 'A'



Group 'B'

1. Unsaturated hydrocarbon

2. Molecular formula of an alcohol

3. Saturated hydrocarbon

4. Triple bond



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2. Draw an electron-dot structure of the following molecules (without showing the circles).

i. Methane



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3. Draw an electron-dot structure of the following molecules (without showing the circles).

ii. Ethene

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4. Draw an electron-dot structure of the following molecules (without showing the circles).

iii. Methanol

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5. Draw an electron-dot structure of the following molecules (without showing the circles).

iv. Water

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6. Draw all possible structural formulae of compounds from their molecular formulae given below.

i. C_3H_8

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7. Draw all possible structural formula of compounds from their molecular formula given below: C_4H_{10}

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8. Draw all possible structural formulae of compounds from their molecular formulae given below.

iii. C_3H_4

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9. Explain the term with example : Structural isomerism



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10. Explain the term with example : Covalent bond



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11. Explain the following terms with example.

Hetero atom in a carbon compound



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12. Explain the term with example : Functional group



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13. Explain the term with example : Alkane



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14. Explain the term with example : Unsaturated hydrocarbon

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15. Explain the terms with example : Homopolymer

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16. Explain the term with example : Monomer

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17. Answer the following questions :

Explain the term with example : Reduction

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18. Explain the following terms with example.

Oxidant

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19. Answer the following questions :

Write the IUPAC names of the following structural formulae :

CH₃-CHOH-CH₃

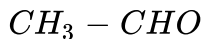
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20. Write the IUPAC names of the following structural formulae.

$CH_3 - CH_2 - NH_2$

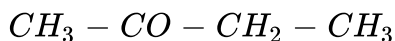
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21. Write the IUPAC names of the following structural formula:



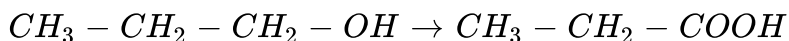
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22. Write the IUPAC names of the following structural formulae.



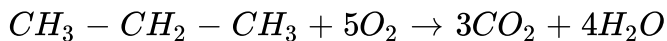
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23. Identify the type of the following reaction of carbon compounds.



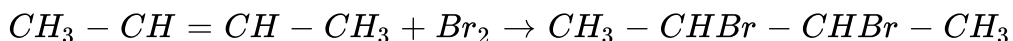
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24. What is the type of reaction of the given below reaction of carbon compounds.



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25. What is the type of the following given reaction of carbon compounds.



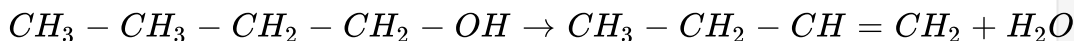
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26. Identify the type of the following reaction of carbon compounds.



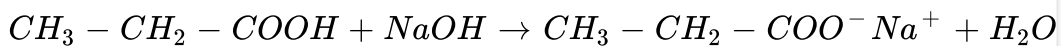
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27. Identify the type of the following reaction of carbon compounds.



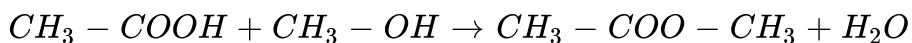
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28. Identify the type of the following reaction of carbon compounds.



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29. Identify the type of the following reaction of carbon compounds.



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30. Write structural formulae for the following IUPAC names.

pentan -2-one

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31. Write structural formulae for the following IUPAC names.

2- chlorobutane

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32. Write structural formulae for the following IUPAC names.

propan - 2- ol

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33. Write structural formulae for the following IUPAC names.

methanal

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34. Answer the following questions :

Write the structural formulae for the following IUPAC names:

Butanoic acid

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35. Write structural formulae for the following IUPAC names: 1-bromopropane: Molecular formula- C_3H_7Br

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36. Write structural formulae for the following IUPAC names: Ethanamine : Molecular formula- $C_2H_5 - NH_2$

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