



# **CHEMISTRY**

## **BOOKS - U-LIKE CHEMISTRY**

### **(HINGLISH)**

## **CARBON AND ITS COMPOUNDS**

**N C E R T Questions A Questions Given On Page  
Number 61 Of The Textbook**

1. What would be the electron dot structure of carbon dioxide which has the formula  $CO_2$  ?



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2. What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur ?



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## N C E R T Questions B Questions Given On Page Number 68 Of The Textbook

1. How many structural isomers can you draw for pentane?



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2. What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?



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3. What will be the formula and electron dot structure of cyclopentane?



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4. Draw the structures for the following compounds:

(i) Ethanoic acid (ii) Bromopentane

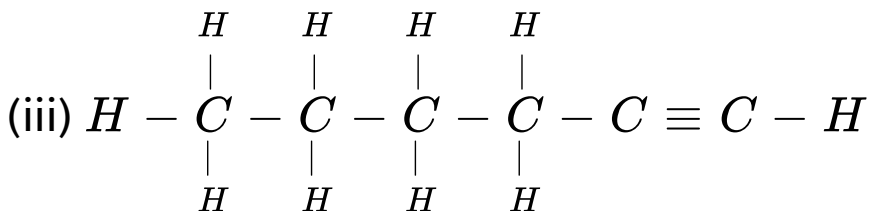
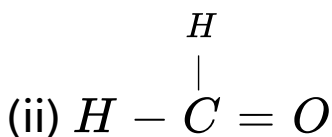
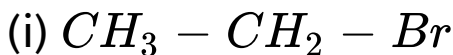
(iii) Butanone (iv) Hexanal

Are structural isomers possible for bromopentane?



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5. How would you name the following compounds ?



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1. Ethane, with the molecular formula  $C_2H_6$  has

A. 6 covalent bonds.

B. 7 covalent bonds

C. 8 covalent bonds

D. 9 covalent bonds.

**Answer:**



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2. Butanone is a four-carbon compound with the functional group

A. carboxylic acid.

B. aldehyde

C. ketone

D. alcohol

**Answer:**



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3. Explain the nature of the covalent bond using the bond formation in  $CH_3Cl$ .



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4. Draw the electron dot structures for

A. ethanoic acid

B.  $H_2S$

C. propanone

D.  $F_2$



**Answer:**



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5. What is an homologous series ? Explain with an example.



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**Case Based Source Based Integrated Questions**

1. Answer question numbers (a)-(d) on the basis of your understanding of the following paragraph and related studied concepts.

Carbon has the unique ability to form bonds with other atoms of carbon giving rise to large molecules. This property is called catenation.

These compounds may have long chains of carbon, branched chains of carbon or even carbon atoms arranged in rings. Since carbon has a valency of four, it is capable of bonding with four other atoms of carbon or atoms of some monovalent element. The bond that

carbon forms with most other elements are very strong making them exceptionally stable.

The reason for the formation of strong bonds by carbon is its small size.

(a) Name the property which enables carbon to form bonds with other atoms of carbon.



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2. Answer question numbers (a)-(d) on the basis of your understanding of the following paragraph and related studied concepts.

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(b) Draw the structure of a cyclic compound of carbon having six carbons and twelve hydrogens.



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3. Answer question numbers (a)-(d) on the basis of your understanding of the following paragraph and related studied concepts.

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These compounds may have long chains of carbon, branched chains of carbon or even carbon atoms arranged in rings. Since carbon has a valency of four, it is capable of bonding with four other atoms of carbon or atoms of some monovalent element. The bond that carbon forms with most other elements are very strong making them exceptionally stable. The reason for the formation of strong bonds by carbon is its small size.

(c) If only oxygen is to be bonded to carbon, how many of them will be bonded to one atom of carbon ?



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4. Answer question numbers (a)-(d) on the basis of your understanding of the following paragraph and related studied concepts.

Carbon has the unique ability to form bonds with other atoms of carbon giving rise to large molecules. This property is called catenation.

These compounds may have long chains of carbon, branched chains of carbon or even carbon atoms arranged in rings. Since carbon has a valency of four, it is capable of bonding

with four other atoms of carbon or atoms of some monovalent element. The bond that carbon forms with most other elements are very strong making them exceptionally stable. The reason for the formation of strong bonds by carbon is its small size.

(d) How does small size of carbon help in forming stable bonds with other atoms ?

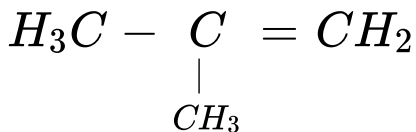
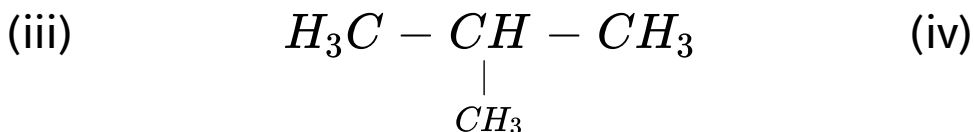
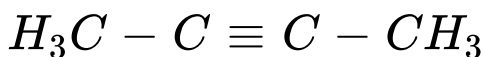
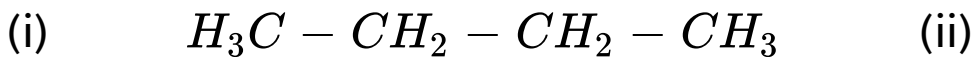


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**Multiple Choice Questions One Mark Each**



1. Which among the following are unsaturated hydrocarbons ?



- A. (i) and (iii)
- B. (ii) and (iii)
- C. (ii) and (iv)
- D. (iii) and (iv)

**Answer: c**



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2. The first member of alkyne homologous series is

A. ethyne

B. ethene

C. propyne

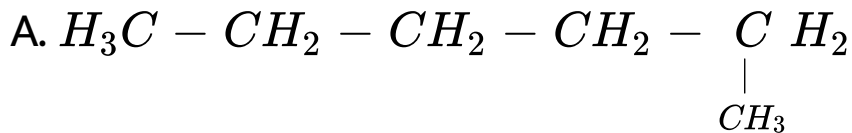
D. methane

Answer: a

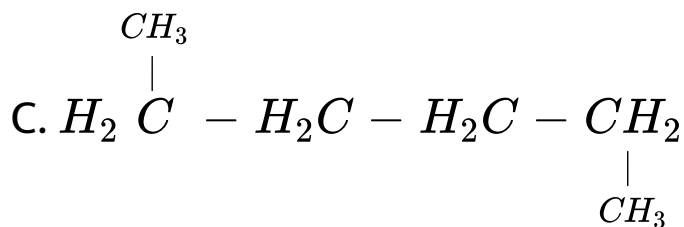
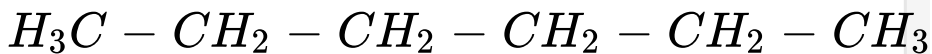


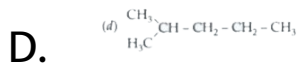
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3. Which of the following is not a straight chain hydrocarbon ?



B.



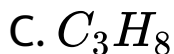
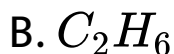


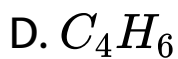
**Answer: d**



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4. Which of the following does not belong to the same homologous series?



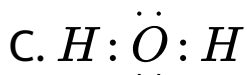
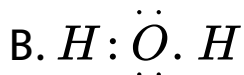
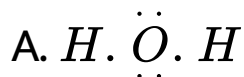


**Answer: d**



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5. The correct electron dot structure of a water molecule is



D.  $H:O:H$

**Answer: c**



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6. Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms, e.g., hydrogen. After the formation of four bonds, carbon attains the electronic configuration of

A. helium.

B. neon

C. argon.

D. krypton.

**Answer: B**



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7. The name of the compound

$CH_3 - CH_2 - CHO$  is

A. propanal

B. propanone

C. ethanol

D. ethanal

**Answer: a**



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**8. Most carbon compounds**

A. are poor conductors of electricity and have high boiling points.



B. are good conductors of electricity and have high boiling points.

C. are poor conductors of electricity and have low boiling points.

D. are good conductors of electricity and have low boiling points.

**Answer: c**



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9. Ethane with the molecular formula  $C_2H_6$  has

A. 6 covalent bonds.

B. 7 covalent bonds.

C. 8 covalent bonds.

D. 9 covalent bonds.

**Answer: b**



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10. Butanone is a four-carbon compound with the functional group

A. carboxylic acid.

B. aldehyde

C. ketone

D. alcohol

**Answer: c**



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**11.** Carbon forms bonds with other atoms

A. by gaining electrons

B. by losing electrons.

C. by sharing electrons

D. none of the above

**Answer: C**



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**12.** In the formation of nitrogen molecule.

- A. one pair of electrons are shared
- B. two pairs of electrons are shared.
- C. three pairs of electrons are shared.
- D. four pairs of electrons are shared

**Answer: c**



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**13.** Which of the following are allotropes of carbon ?

A. Graphite

B. Diamond

C. Fullerene

D. All of the above

**Answer: d**



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**14.** Buckminsterfullerene is an allotropic form of  
of

A. phosphorus

B. sulphur

C. carbon

D. tin

**Answer: c**



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**15.** The heteroatoms present in

$CH_3 - CH_2 - O - CH_2 - CH_2Cl$  are

(i) oxygen (ii) carbon

(iii) hydrogen (iv) chlorine

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iv)

**Answer: d**



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16. Which of the following is not an organic compound ?

A. Acetic acid

B. Chloroform

C. Water

D. Ethanol

**Answer: c**



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17. Which of the following is an allotrope of carbon ?

A. Diamond

B. Graphite

C. Buckminster Fullerene

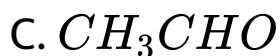
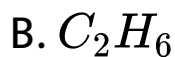
D. All the above

**Answer: d**



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18. Next higher homologue of formaldehyde has the formula



Answer: c



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## True Or False One Mark Each

1. Carbon forms ionic compounds by losing four electrons.



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2. A nitrogen molecule is formed by sharing of two pairs of electrons.



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3. Carbon has the unique ability to form bonds with other atoms of carbon.



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4. The neighbouring homologues of carbon compounds differ by-  $CH_3$ .



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**Fill In The Blanks**

1. \_\_\_\_\_ are substances that cause a reaction to proceed at a different speed without the reaction itself being affected.



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2. Substances that are capable of adding oxygen to others are called \_\_\_\_\_ agents.



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3. As the molecular mass increases in any \_\_\_\_\_ series, a gradation, in physical properties is



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## Assertion Reason Questions One Mark Each

1. Assertion (A): Acetic acid has a molecular mass of 50 u.

Reason (R) : Food, clothes, medicines, books, etc., contain carbon as an element.

- A. Both (A) and (R) are true and (R) is correct explanation of the assertion.
- B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

**Answer:**



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2. Assertion (A) : All living structures are carbon based.

Reason (R) : Carbon compounds are good conductors of electricity.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

**Answer:**



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3. Assertion (A) : There is a double bond in the molecule of nitrogen.

Reason (R) : Carbon shares its valance electrons with other atoms of carbon or with atoms of other elements.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

**Answer:**



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4. Assertion (A) : Hexagonal arrays are placed in layers one above the other in the structure of graphite.

Reason (R) : Fullerenes form another class of carbon allotropes.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

**Answer:**



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5. Assertion (A) : Carbon has the ability to form bonds with other carbon atoms, giving rise to large molecules.

Reason (R) : Carbon-carbon is a stable bond.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is not the correct explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

**Answer:**



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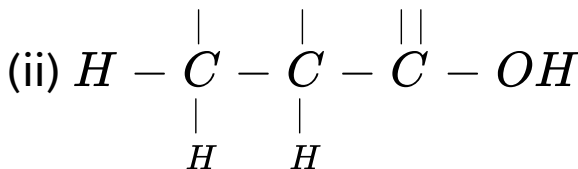
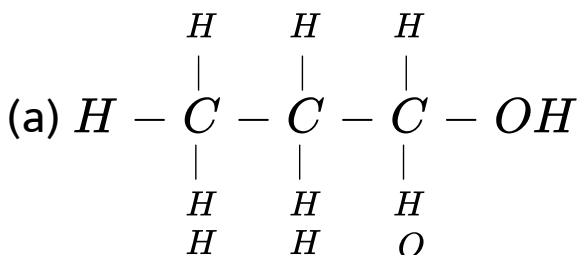
## Very Short Answer Questions One Mark Each

1. Draw the electron dot structure of ethyne and also draw its structural formula.



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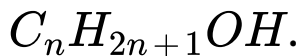
2. Identify and name the functional groups in the following compounds :



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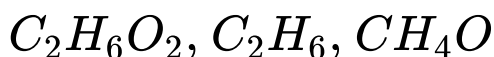
3. Write the molecular formula of the third member of the homologous series of carbon

compounds with general formula



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4. Which two of the following compounds could belong to the same homologous series ?



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5. What is catenation ?



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6. Give the names of the following functional groups :

(i) –  $OH$  (ii) –  $COOH$

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7. Name the fourth member of alkene series.

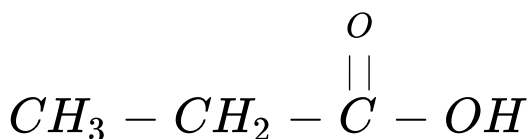
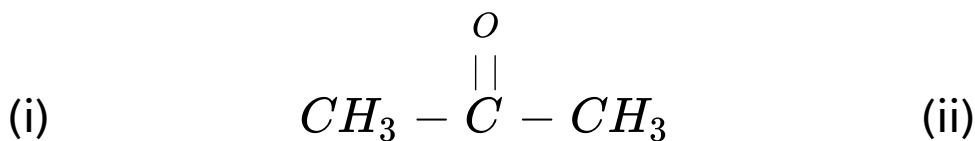
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8. Name an element, other than carbon, which exhibits the property of catenation upto seven or eight atoms. Are these compounds stable ?



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9. Write the names of functional groups in :



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**10.** List two characteristic features of carbon which when put together give rise to a number of carbon compounds.



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**11.** Write the name and molecular formula of an alkyne having four carbon atoms.



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12. "Carbon tetrachloride is not a good conductor of electricity." Give reason to justify this statement.



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13. Apart from organic beings, where else do we find carbon ? Mention the form in which it is available there and also its percentage.



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14. Write the number of covalent bonds in the molecule of ethane.



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15. Write the name and formula of the 2nd member of homologous series having general formula  $C_nH_{2n}$ .



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**16.** Write the next homologue of each of the following:

(i)  $C_2H_4$  (ii)  $C_4H_6$



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**17.** Write the name and structure of an alcohol with three carbon atoms in its molecule.



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**18.** Write the molecular formula of (i) methane and (ii) ethanol.



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**19.** Which type of compounds can be formed by carbon ?



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**Short Answer Questions Three Marks Each**

1. Write the structural formula of three isomers of pentane  $C_5H_{12}$ .



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2. Give two examples of covalent compounds which you have studied. State any four properties in which covalent compounds differ from ionic compounds.



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3. What are covalent compounds ? Why are they different from ionic compounds ? List their three characteristic properties.



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4. What is homologous series of carbon compounds ? List its any two characteristics. Write the name and formula of next higher homologue of  $\text{HCOOH}$ .



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## Long Answer Questions

1. Why does carbon form compounds mainly by covalent bonding ?



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2. Why do covalent compounds have low melting and boiling points ?



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3. What is homologous series. State any two characteristics of homologous series.



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4. Explain why carbon forms compounds mainly by covalent bond. Explain in brief two main reasons for carbon forming a large number of compounds. Why does carbon form strong bonds with most other elements ?



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