

## Practice Challenge - Subjective

Subject: Chemistry

Topic : Carbon and its Compounds\_Revision

Class: X

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

In covalent compounds, the atoms are linked by covalent bonds formed by electron sharing. Since no ions are present in these, the attractive forces are quite weak. As a result, the covalent compounds have low melting and boiling points.

2. Give the name and structural formula of next homologue of  $\text{HCOOH}$ .

Homologue of  $\text{HCOOH}$  is ethanoic acid with molecular formula  $\text{CH}_3\text{COOH}$ .

## Practice Challenge - Subjective

3. Explain about the following.

(a) Single bond

(b) Double bond

(c) Triple Bond

(a) Single bond: The bond formed by sharing one pair of electrons is known as single bond. For example: Hydrogen molecule.



(b) Double bond: The bond formed by sharing two pairs of electrons is known as double bond. For example: Oxygen molecule.



(c) Triple bond: The bond formed by sharing three pairs of electrons is known as triple bond. For example: Nitrogen molecule.



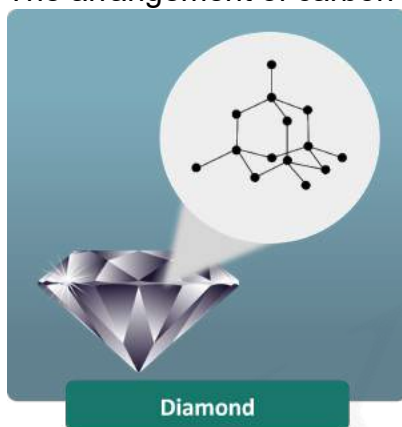
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4. Describe the structure of diamond. Draw a simple diagram to show the arrangement of carbon atoms in it.

A crystal of diamond is a molecule of carbon atoms in which each carbon atom is connected to four other carbon atoms by strong covalent bond forming a regular tetrahedron shape.

As the carbon atoms are held together firmly by covalent bonds, diamond forms a very rigid structure.

The arrangement of carbon atoms in a diamond crystal is shown below:



5. (a) Explain why diamond has a high melting point.  
(b) State any two uses of diamond.

(a) Diamonds have a very high melting point, as a huge amount of heat energy is required to break the strong covalent bonds in one crystal of a diamond. The melting point of diamond is above  $3500^{\circ}C$ .

(b) Uses of diamonds:

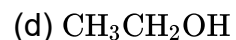
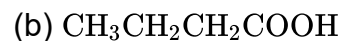
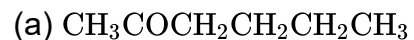
- (i) As diamonds have an extraordinary shine, they are used in making jewellery.
- (ii) Diamonds, due to their hardness, are used in instruments like glass cutters, grinders. They are also used as abrasives for polishing.

## Practice Challenge - Subjective

6. An element E exists in three allotropic forms A, B and C. In allotrope A, the atoms of element E are joined to form spherical molecules. In allotrope B, each atom of element E is surrounded by three other E atoms to form a sheet-like structure. In allotrope C, each atom of element E is surrounded by four other E atoms to form a rigid structure.
- Name the element E.
  - What is allotrope A?
  - What is allotrope B?
  - What is allotrope C?
  - Which allotrope is used in making jewellery?
  - Which allotrope is used in making the electrode of a dry cell?
- (a) Carbon is the element 'E' which exists in three allotropic forms A, B and C.
- (b) Buckminsterfullerene is the allotrope 'A' of carbon in which the atoms are joined to form spherical molecules.
- (c) Graphite is the allotrope 'B' of carbon which is surrounded by three other carbon atoms to form a sheet-like structure.
- (d) Diamond is the allotrope 'C' of carbon in which each atom is surrounded by four other carbon atoms to form a rigid structure.
- (e) The allotrope C (Diamond) is used to make jewellery.
- (f) The allotrope B (Graphite) is used in making electrode of a dry cell.

## Practice Challenge - Subjective

7. Name the functional groups present in the following compounds:



The functional groups present in the following compounds are as follows:-

1.  $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ : Since  $>\text{CO}$  (carbonyl) group is present and it is of the form  $\text{R}-\text{CO}-\text{R}$ , it is a ketone.
2.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ : Since  $-\text{COOH}$  group is present, it is a carboxylic acid.
3.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CHO}$ : Since  $-\text{CHO}$  group is present, it is an aldehyde.
4.  $\text{CH}_3\text{CH}_2\text{OH}$ : Since  $-\text{OH}$  group is present, it is an alcohol.

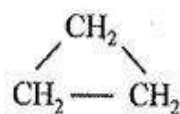
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8. Name a compound of each type and draw the figure.

(a) Cyclic compound with single bond.

(b) Cyclic compound with triple bond.

(a) Cyclic compound with single bond

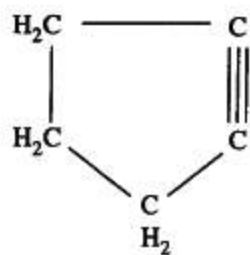


Cyclopropane

Or



(b) Cyclic compound with triple bond



Cyclopentyne  
( $\text{C}_5\text{H}_6$ )