

CBSE TEST PAPER 04
CLASS XI CHEMISTRY (The p-Block Elements)

General Instruction:

- All questions are compulsory.
 - Marks are given along with each question.
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1. Why carbon differs from rest of the members of its group? [2]
2. Why carbon cannot expand its covalence beyond four? [2]
3. Why does the heavier elements do not form $p\pi - p\pi$ multiple bond as carbon do? [1]
4. Why does carbon show different allotropic forms? [2]
5. What is the name of C_{60} molecule? [1]
6. Silicon has no allotropic form analogous to graphite. Why? [2]
7. Why does graphite conduct electricity? [2]
8. How are fullerenes prepared? [1]
9. Diamond is a hardest substance on the earth. Why? [1]
10. Graphite is used as a lubricant. Give reason. [2]

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[ANSWERS]

Ans 1. Carbon differs from rest of the members of its group due to its smaller size, higher electronegativity, higher ionisation enthalpy and unavailability of d-orbitals.

Ans 2. In carbon, only s and p orbitals are available for bonding and therefore it can accommodate only four pairs of electrons around it. This limit the maximum covalence to four whereas other members can expand their covalence due to the presence of d-orbitals.

Ans 3. Heavier elements do not form $p\pi - p\pi$ multiple bonds like carbon because their atomic orbitals are too large and diffuse to have effective overlapping.

Ans 4. Carbon shows different allotropic forms due to property of catenation and $p\pi - p\pi$ bond formation.

Ans 5. C_{60} molecule is called as Buckminsterfullerene.

Ans 6. In graphite, carbon atom forms $p\pi - p\pi$ multiple bonds due to its smaller size. Si cannot form $p\pi - p\pi$ multiple bonds due to larger size, hence it does not exhibit graphite-like structure.

Ans 7. The layered structure of graphite is composed of hexagonal rings and each carbon atom undergoes sp^2 hybridisation. The electrons are mobile and delocalized over the whole sheet, therefore graphite conducts electricity.

Ans 8. Fullerenes are prepared by the heating of graphite in an electric arc in the presence of inert gases such as helium or argon.

Ans 9. Diamond is a hardest substance on the earth because it is very difficult to break extended covalent bonds present throughout the lattice.

Ans 10. Graphite has layered structure and layers are held by weak van der Waals forces. Graphite cleaves easily between the layers and, therefore, it is very soft and slippery. For this reason graphite is used as a lubricant.