

CBSE TEST PAPER 03
CLASS XI CHEMISTRY (The p-Block Elements)

General Instruction:

- All questions are compulsory.
 - Marks are given along with each question.
-

1. What is the valence shell electronic configuration of group 14 elements? [1]
2. Name a metalloid present in group 14? [1]
3. In group 14, carbon and sulphur mostly show +4 oxidation state but in heavier members the tendency to show +2 oxidation state increases. Why? [2]
4. Which of the following can be easily hydrolysed by water and finally forms an acid: SiCl_4 , CCl_4 [1]
5. Why carbon does not form ionic compounds? [2]
6. Halides of group 14 elements except carbon can form complexes of the type $[\text{MX}_6]^{2-}$. Give reason. [2]
7. Why CCl_4 is an electron precise molecule? [1]
8. Why is lead unaffected by water? [1]
9. $[\text{SiF}_6]^{2-}$ is known whereas $[\text{SiCl}_6]^{2-}$ not. Give reasons. [2]
10. PbI_4 does not exist. Why? [2]

CBSE TEST PAPER 03
CLASS XI CHEMISTRY (The p-Block Elements)
[ANSWERS]

Ans 1. The valence shell electronic configuration of group 14 elements is ns^2np^2 .

Ans 2. Germanium is a metalloid present in group 14.

Ans 3. In group 14 among heavier members the tendency to show +2 oxidation state increases due to the inability of ns^2 electrons of valence shell to participate in bonding (inert pair effect).

Ans 4. $SiCl_4$.

Ans 5. The electronic configuration of carbon atom is $1s^2 2s^2 2p_x^1 2p_y^1$ and has four valence electrons. In order to form ionic compound, it has to either lose four electrons or gain four electrons. Since very high energy is involved in doing so, carbon does not form ionic compounds. It completes its octet by sharing of electrons and forms covalent compounds.

Ans 6. Elements of group 14 except carbon have vacant d-orbitals and can form complexes like $[MX_6]^{2-}$ because in such a case the central atom can increase its coordination number from 4 to 6 due to availability of vacant d-orbitals.

Ans 7. In tetravalent state the number of electrons around the carbon atom in a CCl_4 molecule is eight and thus it is an electron precise molecule.

Ans 8. Lead is unaffected by water, probably because of a protective oxide film formation.

Ans 9. The main reasons are:

(i) six large chloride ions cannot be accommodated around Si^{4+} due to limitation of its size.

(ii) interaction between lone pair of chloride ion and Si^{4+} is not very strong.

Ans 10. PbI_4 does not exist because Pb – I bond initially formed during the reaction does not release enough energy to unpair $6s^2$ electrons and excite one of them to higher orbital to have four unpaired electrons around lead atom.