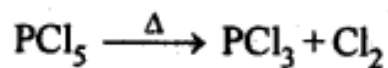




7.9. What happens when  $\text{PCl}_5$  is heated?

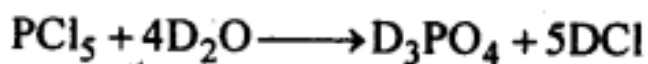
Ans:



On heating, the less stable axial bonds break to form  $\text{PCl}_3$ .

7.10. Write a balanced equation for the hydrolytic reaction of  $\text{PCl}_5$  in heavy water.

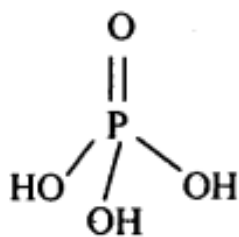
Ans:



7.11. What is the basicity of  $\text{H}_3\text{PO}_4$ ?

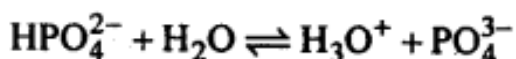
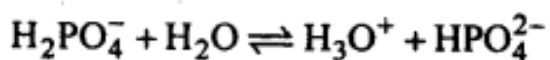
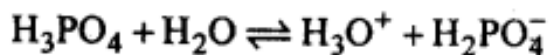
Ans:

$\text{H}_3\text{PO}_4$  is tribasic as shown below :



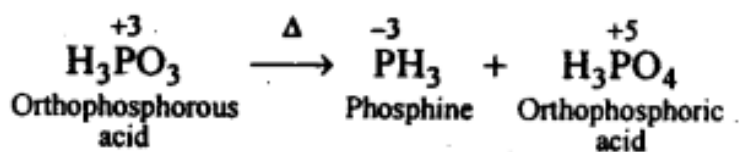
Due to three ionizable P—OH

bonds,  $\text{H}_3\text{PO}_4$  is tribasic.



7.12. What happens when  $\text{H}_3\text{PO}_3$  is heated?

Ans: On heating,  $\text{H}_3\text{PO}_3$  disproportionates to form  $\text{PH}_3$  and  $\text{H}_3\text{PO}_4$  with O.S. of -3 and +5.



7.13. List the important sources of sulphur.

Ans: Sulphur mainly occurs in the combined states in earth's crust in the form of sulphates and sulphides.

Sulphates: gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ); epsom ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ); baryte ( $\text{BaSO}_4$ ), etc.

Sulphides: Galena ( $\text{PbS}$ ); zinc blende ( $\text{ZnS}$ ); copper pyrites ( $\text{CuFeS}_2$ ); iron pyrites ( $\text{FeS}_2$ ), etc. Traces of sulphur occur as  $\text{H}_2\text{S}$  and in organic materials such as eggs, proteins, garlic, onion, mustard, hair and wool.

7.14. Write the order of thermal stability of the - hydrides of Group 16 elements.

Ans: The thermal stability of hydrides of group 16 elements decreases down the group. This is because down the group, size of the element (M) increases, M-H bond length increases and thus, stability of M-H bond decreases so that it can be broken down easily. Hence, we have order of thermal stability as  $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te} > \text{H}_2\text{PQ}$

7.15. Why is  $\text{H}_2\text{O}$  a liquid and  $\text{H}_2\text{S}$  a gas ?

Ans: Due to high electronegativity of O than S,  $\text{H}_2\text{O}$  undergoes extensive intermolecular H-bonding. As a result,  $\text{H}_2\text{O}$  exists as an associated molecule in which each O is tetrahedrally surrounded by four  $\text{H}_2\text{O}$  molecules. Therefore,  $\text{H}_2\text{O}$  is a liquid at room temperature.

On the other hand,  $\text{H}_2\text{S}$  does not undergo H-bonding. It exists as discrete molecules which are held together by weak van der Waals forces of attraction. A small amount of energy is required to break these forces of attraction. Therefore,  $\text{H}_2\text{S}$  is a gas at room temperature.

7.16. Which of the following does not react with oxygen directly?

Zn, Ti, Pt, Fe

Ans: Pt being a noble metal does not react with oxygen directly. In contrast, Zn, Ti and Fe are active metals and hence they react with oxygen directly to form their oxides.

\*\*\*\*\* END \*\*\*\*\*