***Chemistry - II***

**Chapter-1: Water**

1. How does hard water differ from soft water? How do you remove hardness of water?
2. How many types of hardness of water are you familiar with and what are these due to? Give two methods for the removal of each type of hardness.
3. What do you mean by hardness of water? How is it possible to remove the permanent hardness of water?
4. Describe the Permutit process for removal of both temporary and permanent hardness of water also give the reaction inn regeneration of the Permutit.
5. Explain why the water containing soluble salts of calcium and magnesium does not produce lather with soap? What are essential characteristics of potable water.
6. What are the causes of temporary and permanent hardness of water? Explain the two methods for the removal of permanent hardness of water.
7. What is Permutit? How does it remove hardness of water?
8. What are hard and soft water? What are the requirements of drinking water?
9. Describe any one method used for removing both temporary and permanent hardness of water.
10. Why does hard water consume a lot of soap? Explain how you can remove temporary hardness of water.
11. Why is hard water being suitable for washing purposes?
12. What are the salts responsible for temporary and permanent hardness of water? What are the disadvantages of hard water?
13. Distinguish between temporary and permanent hardness of water. How is permanent hardness of water removed by the addition of washing soda?
14. Why is hard water not used in laundries? What are the advantages of Permutit process?
15. Why water containing dissolved salts of calcium and magnesium does not produce lather with soap.
16. Why water containing dissolved CaCl2 does not give lather with soap
17. What happens when
18. Soap is treated with metallic iron.
19. Soap is treated with hard water containing calcium chloride.

Chapter 1 Water solution:

1. How does hard water differ from soft water? How do you remove hardness of water?

* Hardwater contains some of the dissolved salts like HCO3-, Cl-, SO4 – of calcium and magnesium and does not produce lather with soap but soft water does produce lather with soap and contains little or none of dissolved salts like HCO3-, Cl-, SO4 – of calcium and magnesium.
* If the hardness is temporary then we can easily remove that hardness by boiling process and adding slaked lime [Ca(OH)2] or Clark’s method and if the hardness is permanent then we use Permutit method and by the addition of washing soda.

1. How many types of hardness of water are you familiar with and what are these due to? Give two methods for the removal of each type of hardness.

* There are two types of hardness of water and they are:

1. Temporary hardness of water
2. Permanent hardness of water

Temporary hardness of water causes due to presence of soluble or dissolving bicarbonates of calcium and magnesium in water it is also called carbonate hardness of water.

Permanent hardness of water causes due to presence of soluble or dissolving chlorides and sulphates of calcium and magnesium. It is also called non-carbonate hardness of water.

1. We can remove temporary hardness of water by:
2. By the addition of slaked lime [Ca(OH)2] or Clark’s method.
3. Boiling method.
4. We can remove permanent hardness of water by following methods:
5. By adding washing soda
6. Permutit method
7. What do you mean by hardness of water? How is it possible to remove the permanent hardness of water?

* Large amount of soluble or dissolving salts presence in the water is can considered as hardness of water.

Hardness of water causes due to the presence of soluble or dissolving salts like bicarbonates, chlorides, and sulphates of calcium and magnesium. There are two types of hardness of water temporary hardness of water and permanent hardness of water.

* There are two ways to make possible to remove the permanent hardness of water and they are:

1. By addition of washing soda.
2. By Permutit process.
3. By addition of washing soda:

* When the calculated amount of washing soda is treated with permanent hardness of water containing soluble or dissolving chlorides and sulphates of magnesium and calcium it converted into insoluble carbonates of calcium and magnesium as well as soluble salt sodium chloride and sodium sulphate insoluble carbonates are removed by filtration process and soluble salts are removed by distillation process.

CaCl2 + Na2CO3 🡺 CaCO3+ 2NaCl

Mgcl2 + Na2CO3 🡺 MgCO3 + 2NaCl

1. By Permutit process:

* When the permanent hard water is treated with sodium zeolite the Ca++ and Mg++ ions of the hard water are precipitates as Ca-zeolite and Mg-Zeolite.

In General:

Na2Z + Ca++ 🡺 2Na+ + CaZ

(sodium zeolite) (calcium zeolite)

Na2Z + Mg++ 🡺 2Na+ + MgZ

(Magnesium zeolite)

1. Describe the Permutit process for removal of both temporary and permanent hardness of water also give the reaction inn regeneration of the Permutit.