Question 6

6. **In each pair of ionic compounds, which is more likely to have the more negative enthalpy of hydration?**

   A) LiCl or CsCl

   B) $NaNO_3$ or $Mg(NO_3)_2$

   C) $Ni(NO_3)_2$ or RbCl

   Answer:

   A) LiCl or CsCl

   The Li^+ cation is much smaller than the Cs^+ cation, therefore, the ion-dipole interactions between Li^+ and water will be stronger as compared to the ion-dipole interaction between Cs^+ and water. As a result, the interaction of LiCl with water will release more heat. Therefore, **LiCl will have more negative enthalpy of hydration**

   B) $NaNO_3$ or $Mg(NO_3)_2$

   The Mg^{2+} cation has a larger charge (+2 as compared to +1 in Na^+) and is smaller than the Na^+ cation, therefore, the ion-dipole interactions between Mg^{2+} and water are significantly stronger than those between Na^+ and water. Therefore, **$Mg(NO_3)_2$ will have more negative enthalpy of hydration.**

   C) $Ni(NO_3)_2$ or RbCl

   The Ni^{2+} cation has a larger charge (+2 as compared to +1 in Rb+) and is smaller than the Rb^+ cation, therefore, the ion-dipole interactions between Ni^{2+} and water are significantly stronger than those between Rb^+ and water. Therefore, **$Ni(NO_3)_2$ will have more negative enthalpy of hydration.**