Solubility Rules for Common Ionic Compounds in Water at 25°C

Ionic Compounds containing the following ions are soluble in water at 25°C:

1. Alkali metal ions (Li⁺, Na⁺, K⁺, Rb⁺, Cs⁺) & the ammonium ion, NH₄⁺.

2. Nitrates (NO₃⁻), acetates (CH₃COO⁻, C₂H₅O₂⁻), chlorates (ClO₃⁻), perchlorates (ClO₄⁻).

3. The halides Cl⁻, Br⁻, I⁻ except those of Ag⁺, Hg₂²⁺, and Pb²⁺.

4. Sulfates (SO₄²⁻) except the sulfates of Ca²⁺, Sr²⁺, Ba²⁺, and Pb²⁺.

Ionic Compounds containing the following ions are insoluble in water at 25°C:

5. Carbonates (CO₃²⁻), oxalates (C₂O₄²⁻), phosphates (PO₄³⁻), and sulfides (S²⁻) except those with alkali metal ions or the ammonium ion.
   MgS, CaS, BaS are sparingly soluble.

6. Hydroxides (OH⁻) except those with alkali metal ions.
   Ba(OH)₂, Sr(OH)₂, Mg(OH)₂ are slightly soluble.

For tests and quizzes, know the first three rules. You may assume that other ionic compounds are insoluble, although there are many exceptions, especially for the sulfate ion, SO₄²⁻.