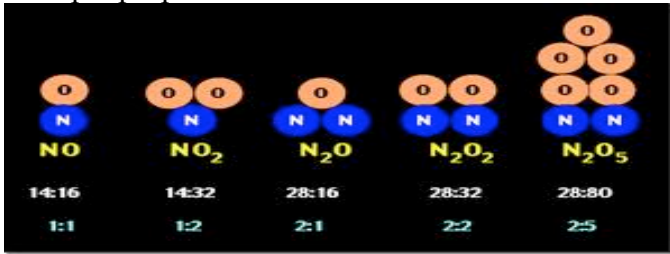
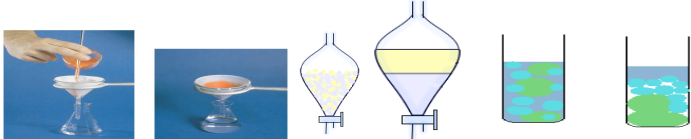
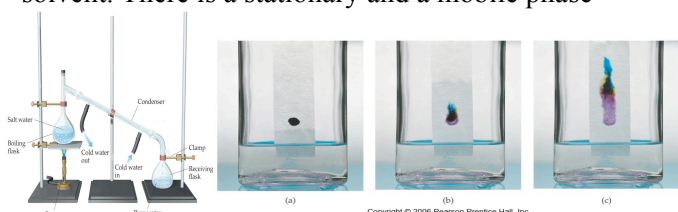


Chapter 1 Summary Notes

| Main Concepts | Explanations | | | | | | | | | | | | | | | |
|---|---|------------------|-------------------|-------------------|-------------------|-------------------|-------|-------|-------|-------|-------|-----|-----|-----|-----|-----|
| <ul style="list-style-type: none"> • <i>Elements</i>: substances that cannot be decomposed into simpler substances • <i>Compounds</i>: substances composed of two or more elements <ul style="list-style-type: none"> • Law of Constant Composition or law of definite proportions: the relative masses of elements are fixed in a given chemical substance. • Law of Multiple Proportions: Applies ONLY when two elements combine to form two or more compounds. The masses of one element which combine with a fixed mass of the second element are in a ratio of whole numbers • <i>Mixtures</i>: combinations of two or more substances <ul style="list-style-type: none"> • <i>Techniques for separating mixtures</i>: filtration, distillation, chromatography • <i>Properties</i>: <ul style="list-style-type: none"> • <i>Physical vs. chemical</i>: Did the sample (really) change? • <i>Intensive vs. extensive</i>: Does the measurement depend on quantity of sample? | <p>-<i>Law of Constant Composition</i>: Ex. In pure H₂O, H and O combine in a 1:8 mass ratio. Does law of constant composition hold good for CuSO₄·5H₂O? Why or why not?</p> <p>-<i>Law of Multiple Proportions</i>: Explain the following in terms of multiple proportions:</p> <div style="text-align: center;">  <table style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;"><chem>NO</chem></td> <td style="text-align: center;"><chem>NO2</chem></td> <td style="text-align: center;"><chem>N2O</chem></td> <td style="text-align: center;"><chem>N2O2</chem></td> <td style="text-align: center;"><chem>N2O5</chem></td> </tr> <tr> <td style="text-align: center;">14:16</td> <td style="text-align: center;">14:32</td> <td style="text-align: center;">28:16</td> <td style="text-align: center;">28:32</td> <td style="text-align: center;">28:80</td> </tr> <tr> <td style="text-align: center;">1:1</td> <td style="text-align: center;">1:2</td> <td style="text-align: center;">2:1</td> <td style="text-align: center;">2:2</td> <td style="text-align: center;">2:5</td> </tr> </table> </div> <p>-<i>Separation Techniques</i>:</p> <p>Hand Separation- for mixtures that can be visually differentiated based on mass, color, shape etc.</p> <p>Filtration: Filtrate, precipitate, heterogeneous mixtures</p> <div style="text-align: center;">  </div> <p>Separating Funnel: For immiscible liquids, layers separate with lesser density layer on top.</p> <p>Centrifugation: Separates particles of different masses based on centrifugal force. Heavier particles at the bottom and the lighter particles on top.</p> <p>Distillation- uses differences in the boiling points to separate a homogeneous mixture.</p> <p>Chromatography- separates homogenous mixtures (mostly inks) based on the differences in solubility of the mixture in a solvent. There is a stationary and a mobile phase</p> <div style="text-align: center;">  </div> | <chem>NO</chem> | <chem>NO2</chem> | <chem>N2O</chem> | <chem>N2O2</chem> | <chem>N2O5</chem> | 14:16 | 14:32 | 28:16 | 28:32 | 28:80 | 1:1 | 1:2 | 2:1 | 2:2 | 2:5 |
| <chem>NO</chem> | <chem>NO2</chem> | <chem>N2O</chem> | <chem>N2O2</chem> | <chem>N2O5</chem> | | | | | | | | | | | | |
| 14:16 | 14:32 | 28:16 | 28:32 | 28:80 | | | | | | | | | | | | |
| 1:1 | 1:2 | 2:1 | 2:2 | 2:5 | | | | | | | | | | | | |

Summary of the Chapter and Important things to remember: