1. (5 points) Identify each of the following as a physical change or a chemical change.
   a. An ice tray full of water freezes
   b. Nitrogen and hydrogen are combined to form ammonia, a key fertilizer component
   c. A dime is cut in half
   d. A standing puddle of water freezes
   e. The element calcium is combined with bromine to form a salt

2. (5 points) Classify all of the properties in the following description as either a chemical property or a physical property.

Sodium may be obtained from caustic soda (NaOH) by using a technique known as electrolysis. It is a metal that is silvery in appearance and is soft enough to be easily cut with a knife. Sodium may react vigorously with water producing hydrogen gas and flames and also reacts violently with aqueous acids. The density of sodium is 0.968 g/cm³, it melts at 370.95 K, and boils at 1156 K. On a typically used hardness scale, it rates at 0.4 Mohs.

<table>
<thead>
<tr>
<th>Chemical Properties</th>
<th>Physical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula from NaOH</td>
<td>SOLUBLE</td>
</tr>
<tr>
<td>React vigorously with water</td>
<td></td>
</tr>
<tr>
<td>React violently with aqueous acids</td>
<td></td>
</tr>
</tbody>
</table>
3. (5 points) Identify the following as pure substances or mixtures. Further, classify each pure substance as to whether it is an element or a compound and each compound as to whether it is a homogeneous or heterogeneous mixture.

a. 40 g of salt dissolved in 100 mL of water (one can dissolve at most 35 g in 100 mL of water)  
   \[ \text{NaCl, } \text{H}_{2}\text{O} \]

b. 22 g of salt dissolved in 100 mL of water (one can dissolve at most 35 g in 100 mL of water)  
   \[ \text{NaCl, } \text{H}_{2}\text{O} \]

c. The air in this room  
   \[ \text{N}_{2}, \text{O}_{2}, \text{Ar}, \text{etc.} \]

d. The contents of a beaker containing water and gasoline  
   \[ \text{H}_{2}\text{O}, \text{gasoline} \]

e. The contents of a hydrogen balloon  
   \[ \text{H}_{2}\text{O}, \text{H}_{2} \]

4. (5 points) Make the following conversions.

a. \( 7.02 \times 10^8 \text{s} = \text{ } \frac{7.02 \times 10^{\underline{5}}}{\underline{}} \text{ ks} \)

b. \( 10.5 \text{ kg} = \text{ } \frac{10^{\underline{7}}}{\underline{}} \text{ mg} \)

c. \( 26.5 \text{ mL} = \text{ } \frac{26.5}{\underline{}} \text{ cm}^3 \)

d. \( 15.5 \text{ cm} = \text{ } \frac{15.5}{\underline{}} \text{ m} \)

e. \( 0.0294 \text{ cm} = \text{ } \frac{0.0294}{\underline{}} \text{ mm} \)