1) Classify the following reactions in one of the four categories: addition, elimination, substitution and rearrangement.

   a) \[ \text{Br} \rightarrow \text{ } + \text{HBr} \]

   b) \[ \text{O} \rightarrow \text{HOMe} \rightarrow \text{O} \text{Me} \]

   c) \[ \rightarrow \rightarrow \]

2) Indicate the positive and negative centers using $\delta^+$ and $\delta^-$ in the following compounds. (Hint: draw the Lewis structure first with the appropriate bond angles)

   \[ \text{CH}_2\text{O} \quad \text{NH}_3 \quad \text{H}_2\text{O} \]

3) Classify the following as Lewis acids or Lewis bases. (Hint: look for high electron densities)

   \[ \text{NH}_3 \quad \text{BH}_3 \quad \text{CH}_3^+ \quad \text{NH}_2^- \quad \text{CH}_2=\text{CH}_2 \]

4) Label the following as carbocation, carbonanion, carbene or radical.

   \[ :\text{CH}_2 \quad \text{CH}_2 \quad + \quad \text{CH}_3^- \]

5) Give the description of the following graph, i.e. endothermic, $E_a$, two steps/one step?

   \[ \text{free energy, kJ/mol,} \]
   \[ \text{reaction coordinate} \]