1. Name the following compounds using the IUPAC system of nomenclature.

   a. \( \text{CH}_3\text{C}=\text{C-CH}_2\text{-CH}_2\text{-CH-CH}_3 \)

   b. [Chemical structure image]

   c. [Chemical structure image]

   d. \( \text{CH}_2=\text{C-CH}=\text{C-H} \)

2. What are the starting monomers for the following polymers?

   a. [Polymer image]

   b. [Polymer image]

3. Explosives used in mining contain TNT or 2,4,6-trinitrotoluene.
   a. If the functional group nitro is \(-\text{NO}_2\), what is the structural formula of TNT?
   b. TNT is actually a mixture of isomers of trinitrotoluene. Draw two possible isomers.

4. Write the cis and trans isomers for each of the following:
   a. 2-pentene
   b. 3-hexene
   c. 2-butene
   d. 2-hexene

5. Acetylene gas reacts with oxygen and burns at high temperature in an acetylene torch.
   a. Write the balanced equation for the complete combustion of acetylene.
   b. How many grams of \( \text{O}_2 \) are needed to react with 8.5 L acetylene at STP? (hint 1 mol \( \text{O}_2 \) (STP)=22.4 L of \( \text{O}_2 \))
c. How many liters of CO\(_2\) (at STP) are produced when 30.0 g of acetylene undergoes combustion? (\textbf{hint} 1 mol CO\(_2\) (STP)=22.4 L of CO\(_2\))

6. Identify the following acid/base as strong, weak, or neutral
   a. NaCl   b. H\(_2\)SO\(_4\)   c. Mg(OH)\(_2\)   d. NH\(_3\)   e. HCN

7. Calculate the following pH, pOH, [H\(^+\)], and [OH\(^-\)] conc.

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8. a. What is the pH if the [OH\(^-\)] = 5.83*10\(^{-6}\)?
   b. What is the pH if the [H\(^+\)] = 7.38*10\(^{-11}\)?
   c. What is the pOH if the pH = 6.79?

9. a. The titration of a 330mg sample of a weak acid requires 23.6mL of .100M NaOH. What is the equivalent weight of the acid?
   b. The titration of a sample of a weak acid with an equivalent weight of 108 grams requires 38.2mL of 0.100M NaOH. What is the sample mass in mg?
   c. What volume in mL of .100M NaOH would be required to titrate a 297mg sample of a weak acid with an equivalent weight of 126 grams?

10. Complete the following hydrolysis reactions and label the 2 conjugated pairs:
   a. HI+H\(_2\)O=>$\underline{\underline{\text{+}}}\

   b. C\(_6\)H\(_5\)O\(^-\)+H\(_3\)O\(^+\)=>$\underline{\underline{\text{+}}}\

   c. $\underline{\underline{\text{+}}}=>$F\(^-\)+H\(_3\)O\(^+\)

   d. HSO\(_3\)\(^-\)+H\(_3\)O\(^+\)=>$\underline{\underline{\text{+}}}