1. Draw all the possible structural isomers of C₅H₉Cl.

2. Draw the structure of:
   (a) 2,4-dimethylpent-2-ene
   (b) \((Z)\)-3-chloro-2,4,5-trimethylhex-3-ene

3. Name the following compounds
   (a)
   (b)

4. Balance the following reactions by half-reaction method:
   (a) \(\text{Mn}^{2+}(aq) + \text{NaBiO}_3(aq) \rightarrow \text{Bi}^{3+}(aq) + \text{MnO}_4^-(aq)\) (acidic medium)
   (b) \(\text{NO}_2^-(aq) + \text{Al}(s) \rightarrow \text{NH}_3(g) + \text{AlO}_2^-(aq)\) (basic medium)
5. A 48.8 mg mixture of two monoprotic carboxylic acids, benzoic acid (molar mass 122 g/mol) and 2-bromobenzoic acid (molar mass 201 g/mol), was dissolved in 10.0 mL of distilled water. 29.2 mL of 0.01 M NaOH solution was required to titrate the acid solution. What is the percentage composition by mass of the two acids in the mixture?

6 Calculate the number of stages required to change a mixture of $^{13}\text{CO}_2$ and $^{12}\text{CO}_2$ that is originally 0.10% (by moles) $^{13}\text{CO}_2$ to a mixture that is 0.010% $^{13}\text{CO}_2$ by a gaseous diffusion process. (The mass of $^{13}\text{C}$ is 13.003355 amu).

7. Consider the following diagram and explain which one is the heaviest gas.