1. (8) Draw the resonance contributing structures indicated by the curved arrows. Assign formal charges and show unshared electron pairs as appropriate (2 pts each contributor).

2. (3) Which of the following structures contains an sp²-hybridized nitrogen atom?

   - H₂C=CH-N(CH₃)₂
   - (CH₃)₃N
   - H₂NNH₂
   - (CH₃)₂NH
   - H₂C=NCH₃

3. (3) Which atomic orbitals of carbon atoms overlap to form C–C σ-bonds in the molecule of CH₃COCH₃?

   - (s and sp³)
   - (sp³ and sp³)
   - (s and s)
   - (sp² and sp³)
   - (sp³ and sp³)
   - (sp and sp³)
   - (sp and sp²)

4. (6) Give either the IUPAC name or the correct structure for each of the following compounds:

   - 3-ethyl-2,2,4-trimethylpentane

   - 2,2,3,3-tetramethylbutane (line-angle formula):

5. (3) Circle the correct molecular formula for the following line-angle structure:

   - C₅H₁₂
   - C₆H₁₄
   - C₆H₁₂
   - C₇H₁₂
   - C₇H₁₄
   - C₈H₁₆
   - C₈H₁₈
   - C₉H₂₀

6. (2) Circle the structure of the compound that has the tertiary carbon atom:

   - C₂H₆
   - CH₃CH₂C(CH₃)₃
   - C(CH₃)₄
   - CH₃CH(CH₃)₂
   - C₃H₈
   - CH₄