1. Draw structures as indicated.
   (a) Lewis structure of
   (b) an isomer of
   (c) condensed formula for
   (d) a bond-line formula for

2. Consider the molecule below. Give:
   (a) the hybridization of C2 $sp$
   (b) the hybridization of C4 $sp^2$
   (c) the O-C4-C5 bond angle $120^\circ$

3. Draw the structure of an example (do not use R) of each of the following classes of compounds.
   (a) $1^\circ$ amine
   (b) acyl chloride
   (c) ether
   (d) $2^\circ$ alkyl bromide

4. Name the functional group or groups present in each of the following molecules. Indicate $1^\circ$, $2^\circ$, or $3^\circ$ when appropriate.
   (a) nitrile
   (b) thiol, $2^\circ$
   (c) Ketone
Multiple Choice

(1) An oxygen-containing compound which shows no IR absorption at 1630-1780 cm\(^{-1}\) or 3200-3500 cm\(^{-1}\) is likely to be what type of compound?
(A) an amide   (B) an alcohol   (C) a ketone   (D) an ether

(2) Which of these compounds has a peak in its IR spectrum at 1630-1780 cm\(^{-1}\)?
(A)   (B)   (C)   (D) 

(3) Which of the following compounds has the highest boiling point?
(A) CH\(_3\)CH\(_2\)CH\(_2\)CH\(_3\)
(B) CH\(_3\)CH\(_2\)CH\(_2\)CH\(_2\)OH
(C) CH\(_3\)OCH\(_2\)CH\(_3\)
(D) CH\(_3\)CH\(_2\)CH\(_2\)OH

(4) Which of the following compounds is least soluble in water?
(A) CH\(_3\)CH\(_2\)CH\(_2\)Br
(B) CH\(_3\)CH\(_2\)CH\(_2\)OH
(C) (CH\(_3\))\(_2\)CHCH\(_2\)CH\(_2\)OH
(D) (CH\(_3\))\(_2\)CHCH\(_2\)CH\(_2\)Br

5. Indicate which of the four compounds below is responsible for the IR spectrum shown below. **Explain your answer.**

![IR Spectrum](image_url)

(A) CH\(_3\)CH\(_2\)CH\(_2\)C≡CCH\(_3\)  (B) CH\(_3\)CH\(_2\)CH\(_2\)CH\(_2\)OH
(C) CH\(_3\)CH\(_2\)CH\(_2\)C≡CH  (D) CH\(_3\)CH\(_2\)CH\(_2\)COH