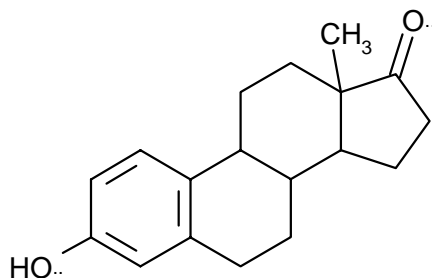


YOUR NAME _____

1. Draw all of the possible geometric isomers of 1,3-dimethylcyclohexane.

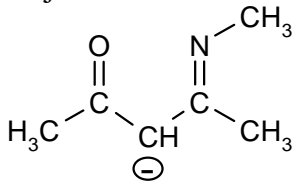
2. (a) In the structure below, indicate next to each of the carbon and oxygen atoms whether they are sp , sp^2 or sp^3 hybridized:



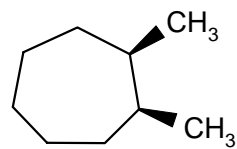
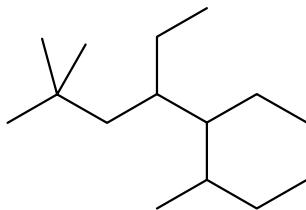
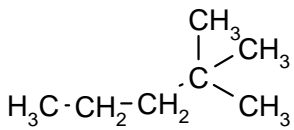
(b) Acrylonitrile, $H_2C=CH-CN$, is an important industrial intermediate for the manufacture of Nylon and of acrylic paints. Draw a full structural formula for acrylonitrile, then show all of the bond angles. [Hint: Consider the hybridization of each of the carbon atoms].

3. Draw the six main conformations (along the C2-C3 bond) of 2-methylbutane using Newman projections. Which are the two least stable conformations?

4. Draw all significant resonance forms of the structure shown, and indicate which is the major contributor.

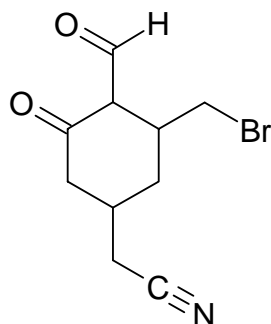
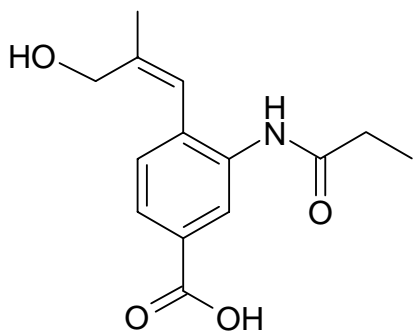


5. Give a systematic name for each of the following structures:



6. Draw a chair, half chair, twist boat and boat form of cyclohexane. Draw an energy curve for the flipping of one chair form of cyclohexane to the other chair form, showing all of the intermediate conformations.

7. Indicate (next to each group) all of the functional groups present in the following two compounds:



8. For each of the following pairs, indicate whether these are identical, structural isomers, geometric isomers or resonance forms.

