

PreLab assignments are due at 1 pm before lecture - Jan 13 TR section; Jan 14 WF section.

- (1 pt) Draw  $\gamma$ -chlorobutyronitrile and circle the hydrogens that are the most acidic.
- (1 pt) Why are these particular hydrogens more acidic than the other hydrogens in this molecule? (Provide a brief coherent explanation.)
- (1 pt) Draw the structure of the major organic product formed immediately after the Grignard reagent is added to the dry ice.
- (1 pt) Circle the name for the mechanism that best represents the first step of the cyclopropyl carboxylic acid ("P") synthesis, i.e., the generation of cyclopropyl cyanide:

Polymerization	E1	E2	S <sub>N</sub> 1	S <sub>N</sub> 2	No one knows!
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- (3 pts) Pandora combined 21.7 mL cyclohexyl chloride ( $d = 1.000 \text{ g/mL}$ ) and 5.47 g Mg(s) in anhydrous Et<sub>2</sub>O. After the Grignard reagent is formed, it was added dropwise to 310 g of dry ice and the resulting solution was acidified with 40% H<sub>2</sub>SO<sub>4</sub> solution. (a) What is the theoretical yield in **grams** for the cyclohexane carboxylic acid ("H") that Pandora made and (b) what is the limiting reagent here? Show all your work and use proper significant figures.
- (3 pts) Mark combined 31.9 mL 4-chlorobutyronitrile ( $d = 1.158 \text{ g/mL}$ ) and 67.8 g NaOH. After one hour of heating, 325 mL of water was slowly added and the contents refluxed for another 1.5 hrs. The resulting solution was acidified with 9 M HCl. After separatory funnel workup and purification via distillation, 15.9 mL ( $d = 1.081 \text{ g/mL}$ ) cyclopropane carboxylic acid was recovered. What is Mark's actual percent yield of cyclopropane carboxylic acid? Show all your work and use proper significant figures.