## Chemistry 3331-100 Organic Chemistry/Dr. Barney Ellison Tuesday: Nov. 12<sup>th</sup> @ **7:00pm** ® **9:00**/3<sup>rd</sup> Exam/Hale Science 230-270)

Name:	 (please	print

1. (10 pts) When the following molecules are treated with NaOD/ $D_2$ O, which protons will be exchanged?

$$H_3C$$
 $H_2$ 
 $CH_3$ 
 $C$ 
 $CH_3$ 
 $C$ 
 $CH_3$ 

2. (10 pts) Predict the products of the following reactions.

CH<sub>3</sub>
CHO
+
CH<sub>3</sub>
CH<sub>3</sub>
1) NaOH/H<sub>2</sub>O
2) dilute 
$$H_3O^+$$

b) 
$$H_2$$
  $H_2$   $H_2$  1) NaOH/ $H_2$ O  $CH_3$  2) dilute  $H_3$ O+

3. (10 pts) What products are expected when the following ester is treated with EtONa/EtOH and then worked up in dilute acid?

EtO 
$$C$$
 2) dilute  $H_3O^+$ 

4. (20 pts) Devise a synthesis of each of the following.

COOEt

$$CH_2CH_3$$
 $COOEt$ 

COOH

c)  $CH_3CH_2COOCH_2CH_3 \rightarrow CH_3CH_2-CO-CH(CH_3)_2$ 

d)  $CH_3COCH_2COOEt \rightarrow CH_3COCH_2CH_2-C_6H_5$ 

5. (10 pts) What is the product of the following reaction?

$$\begin{array}{c} O \\ CH_3 \\ \hline \\ Br_2 \end{array}$$

6. (10 pts) What are the products of the following reactions?

CH<sub>3</sub>

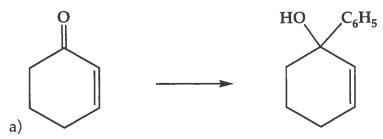
$$C(CH_3)_3 \xrightarrow{\text{Li}^+N(CHMe}_2)_2^- C_6H_5CHO \qquad \text{dilute } H_3O^+$$

$$(\text{this is LDA})$$

b) C(CH<sub>3</sub>)<sub>3</sub> Li<sup>+</sup>N(CHMe<sub>2</sub>)<sub>2</sub> 
$$C_6H_5CH_2Br$$

$$C(CH_3)_3 \longrightarrow C(CH_3)_3$$
(this is LDA)

7. (10 pts) Devise a synthesis to carry out the following transformations.



## 8. (10 pts)

a) If you attempt to methylate ethylphenyl amine, the reaction fails. Why?

b) If the ethylphenyl amine is treated with  $CH_2=O$  in the presence of  $Na^+BH_3CN^-$  / $CH_3COOH$ , what is the product? What is the mechanism?

9. (10 pts) What is the product of the following reactions?