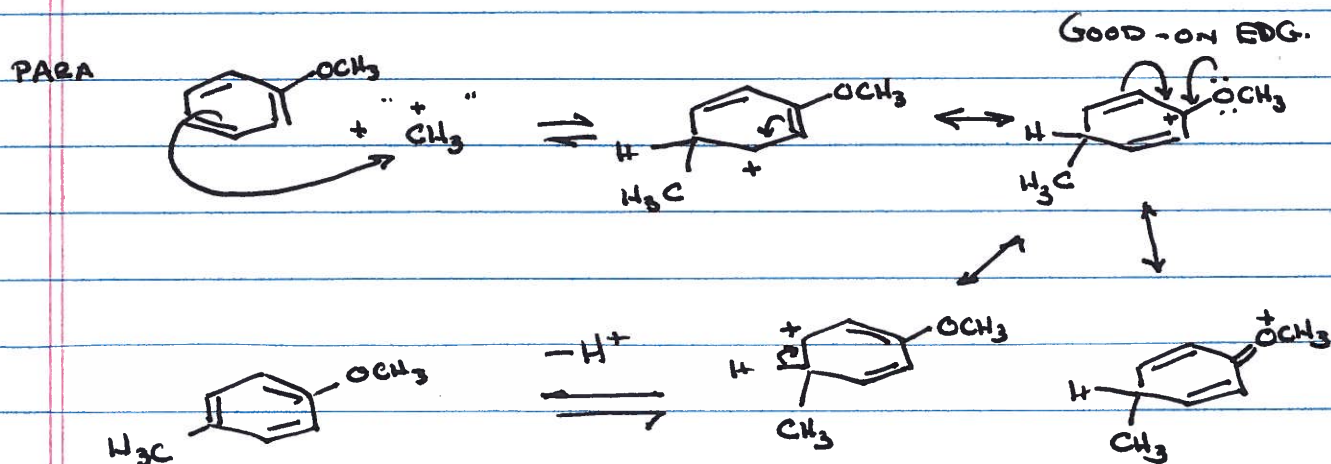
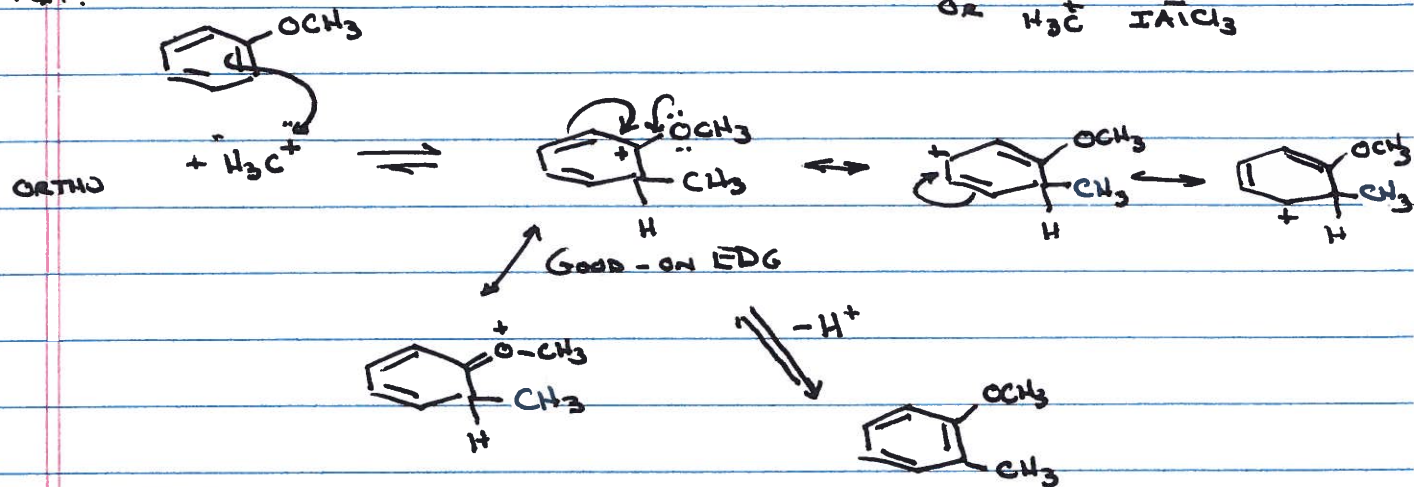
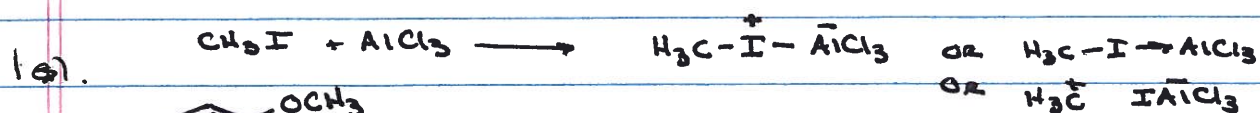
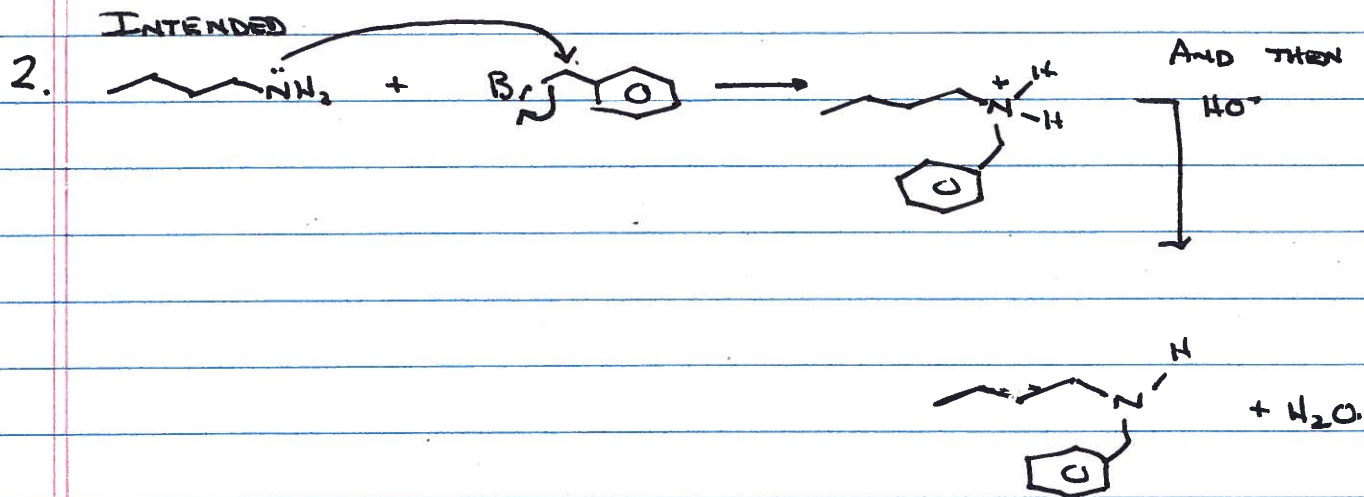


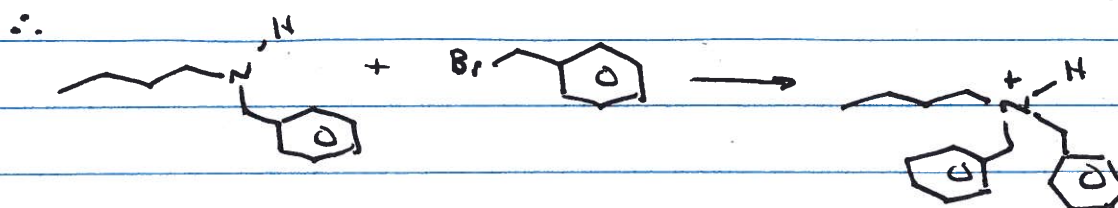
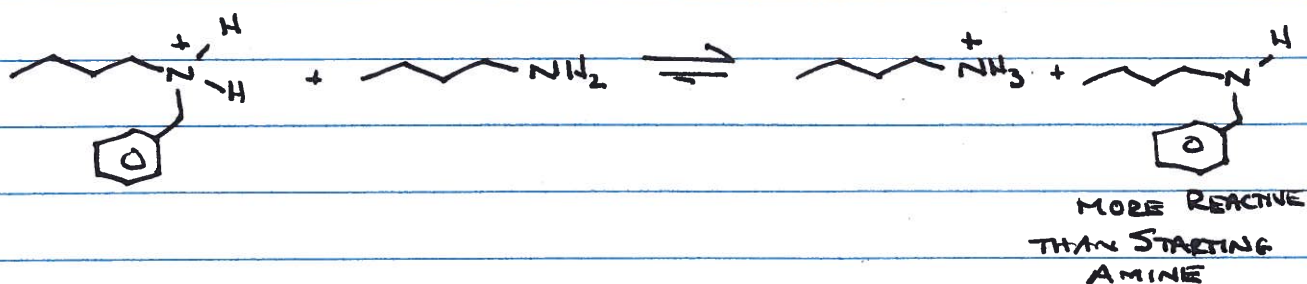
59. 235
FINAL EXAM - SUGGESTED SOLNS

W'2015

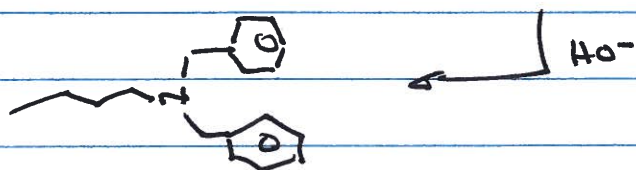


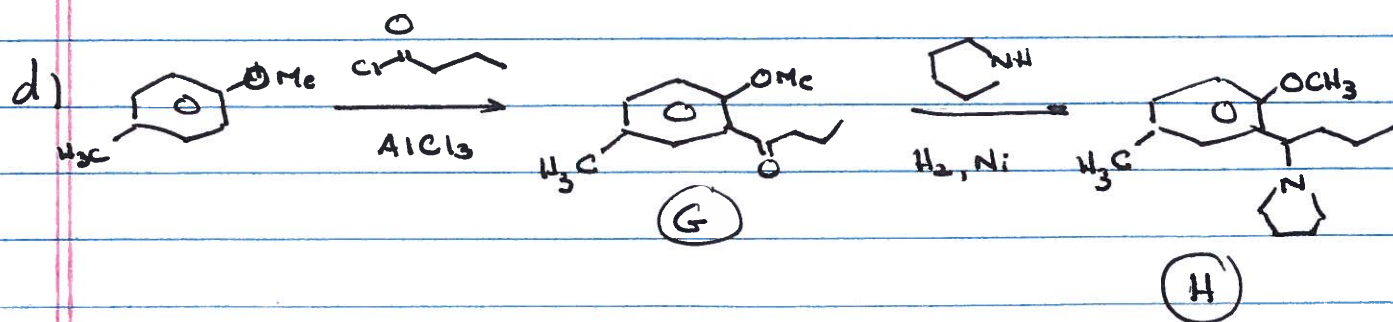
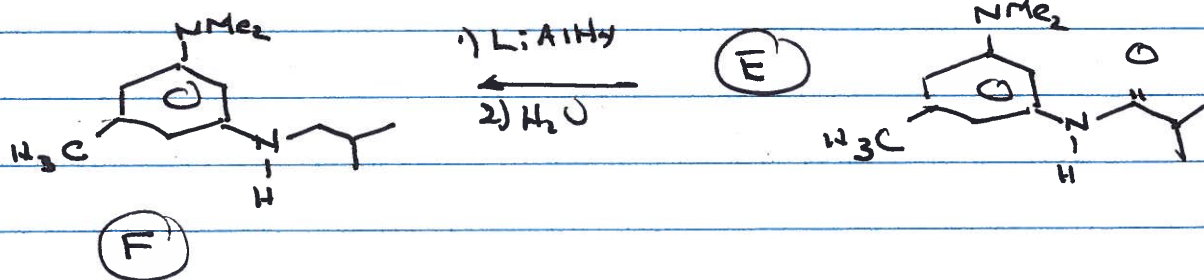
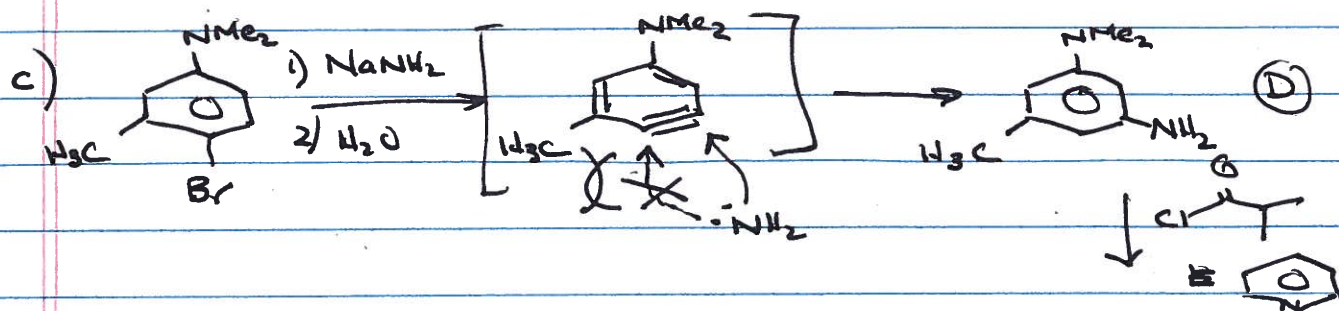
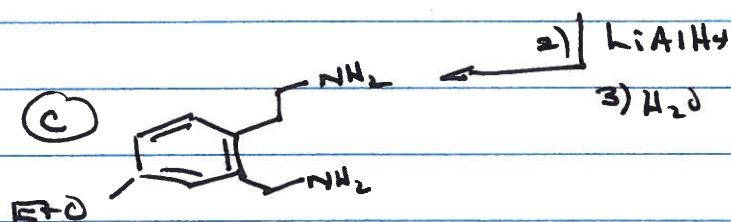
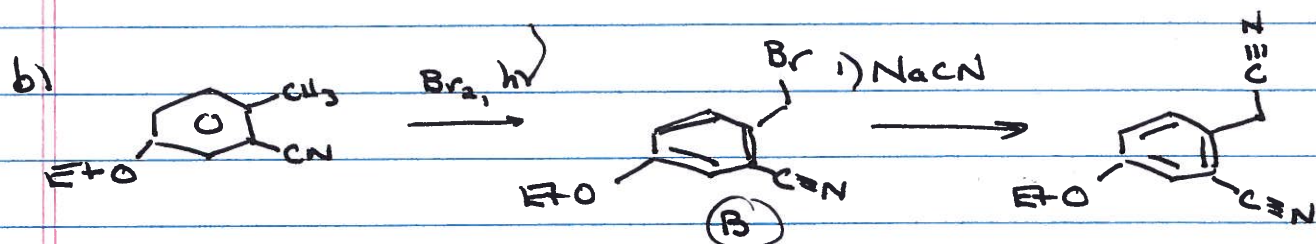
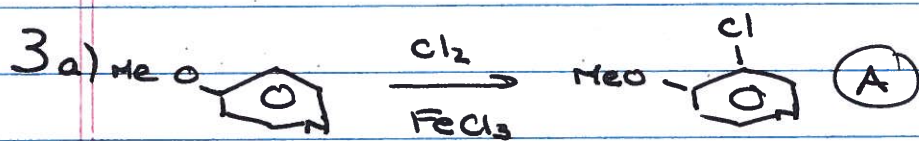


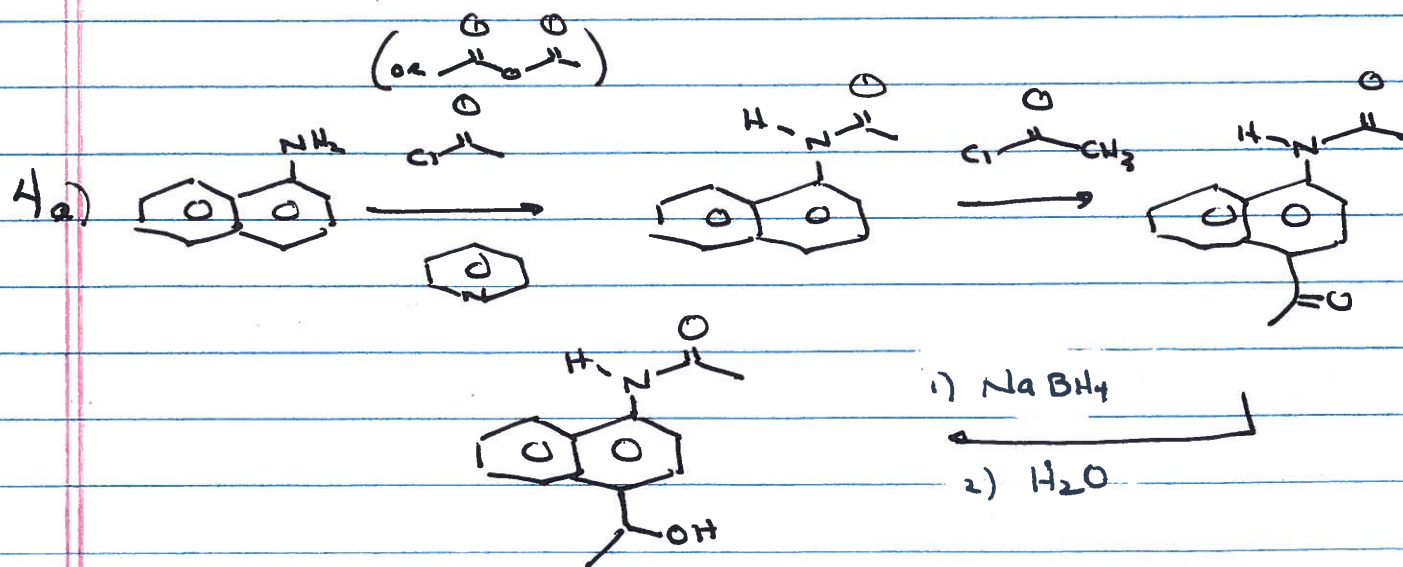
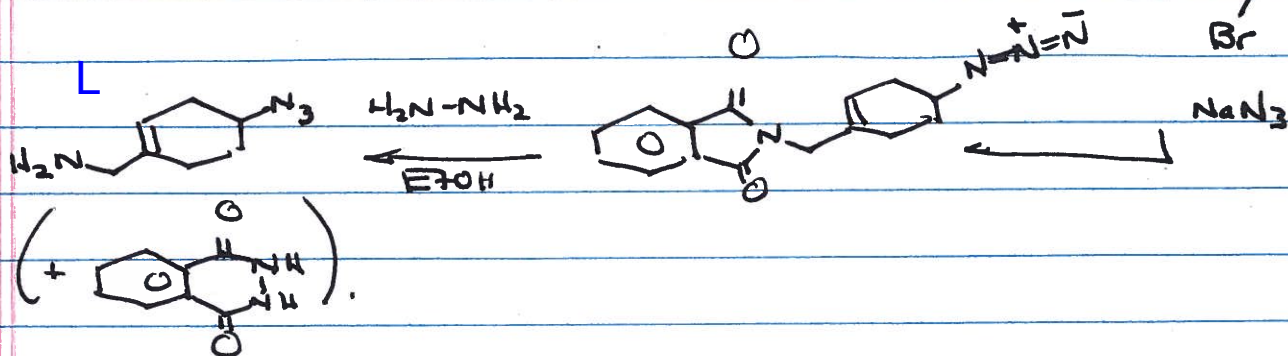
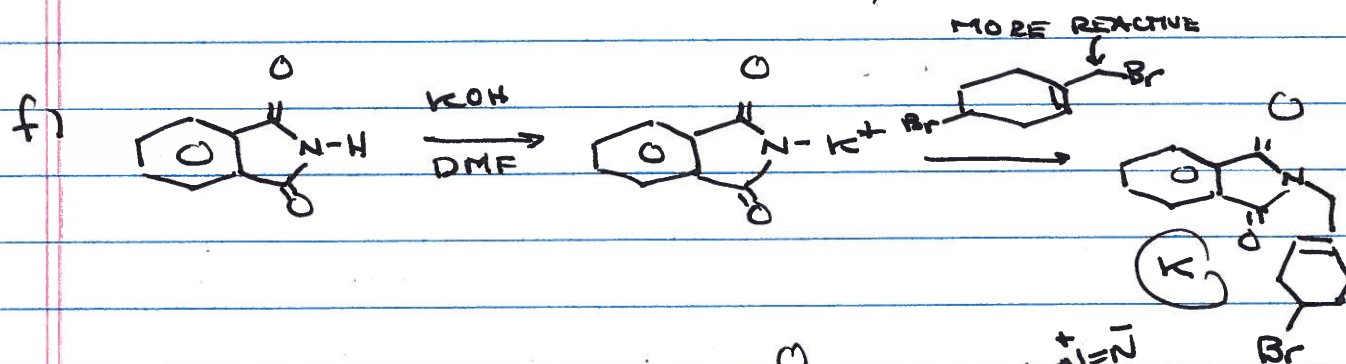
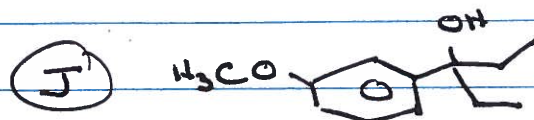
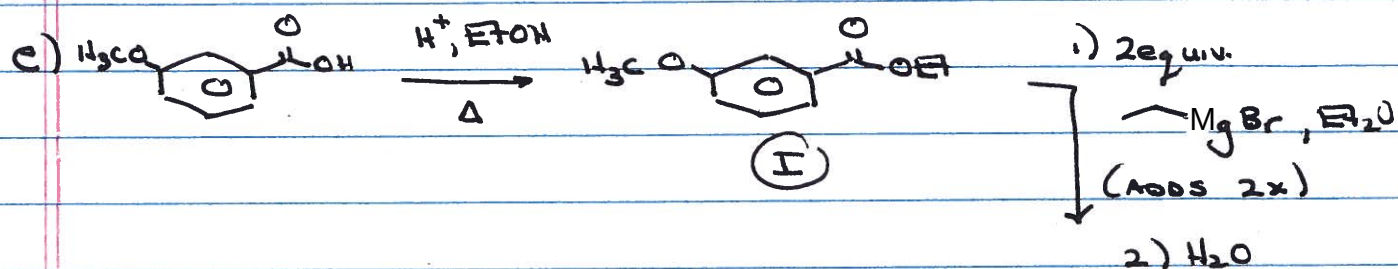
UNINTENDED

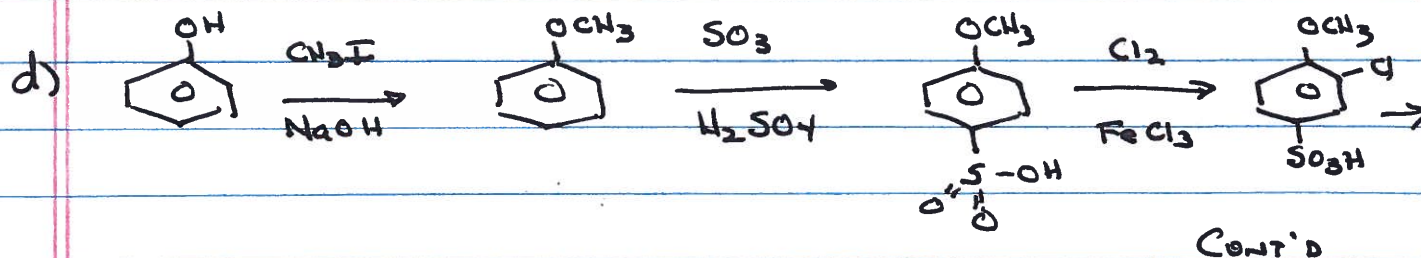
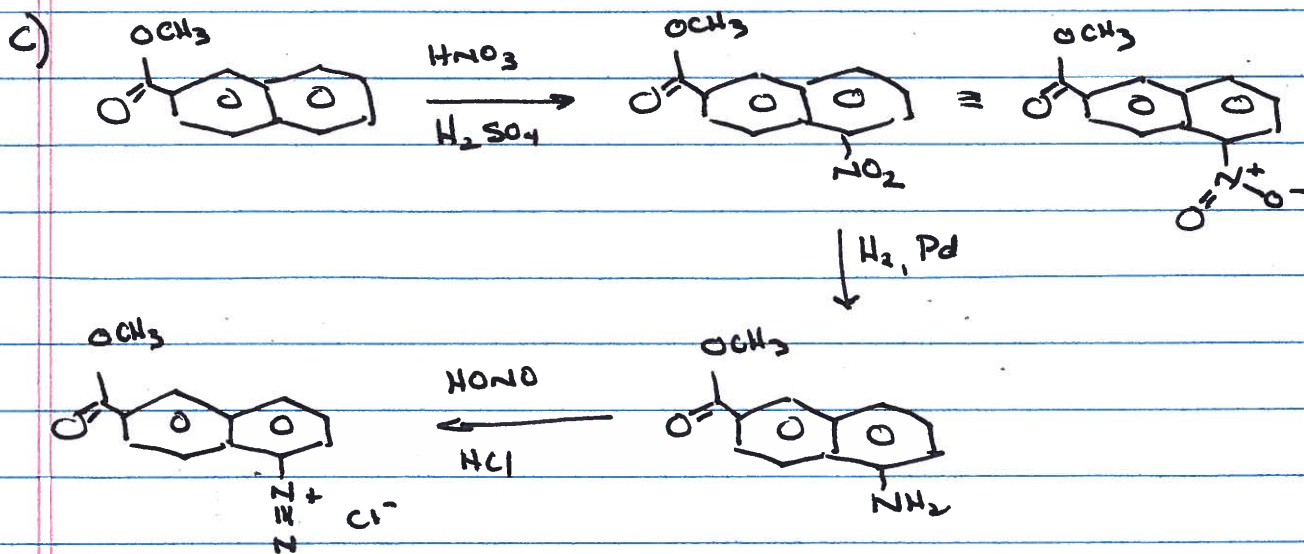
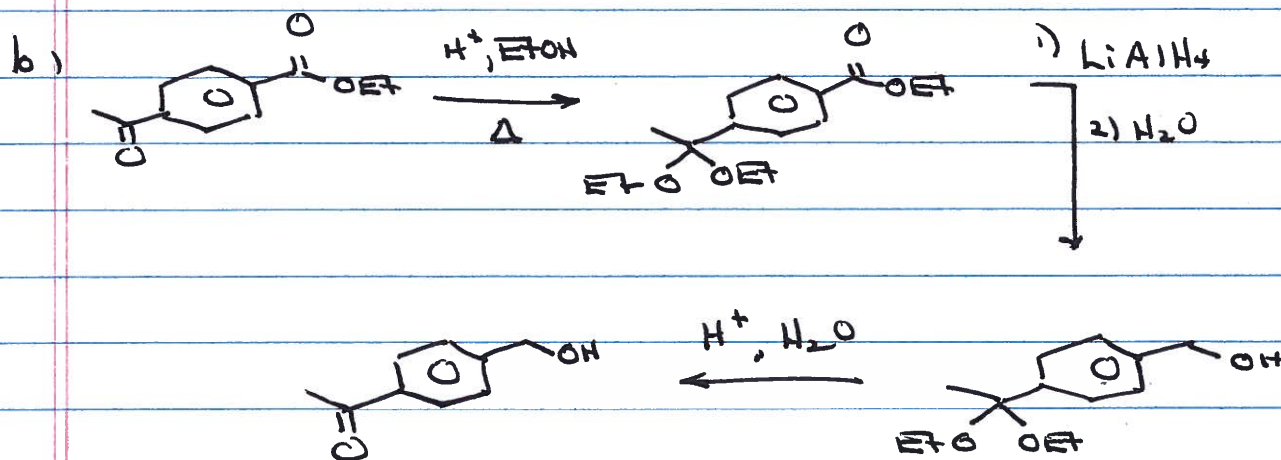


POLYALKYLATION ALSO
TENDS TO
HAPPEN

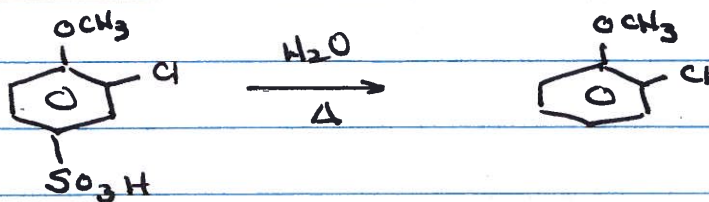




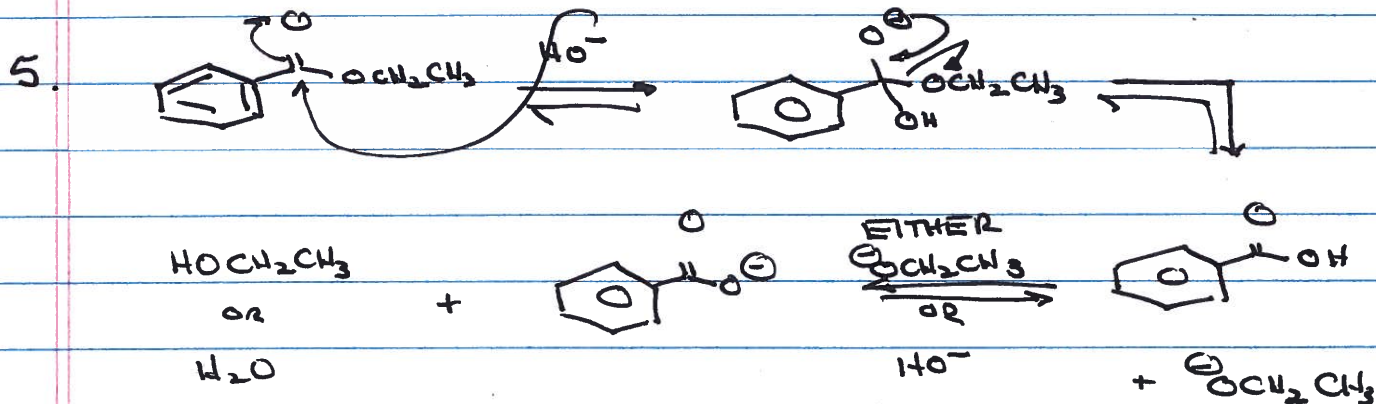




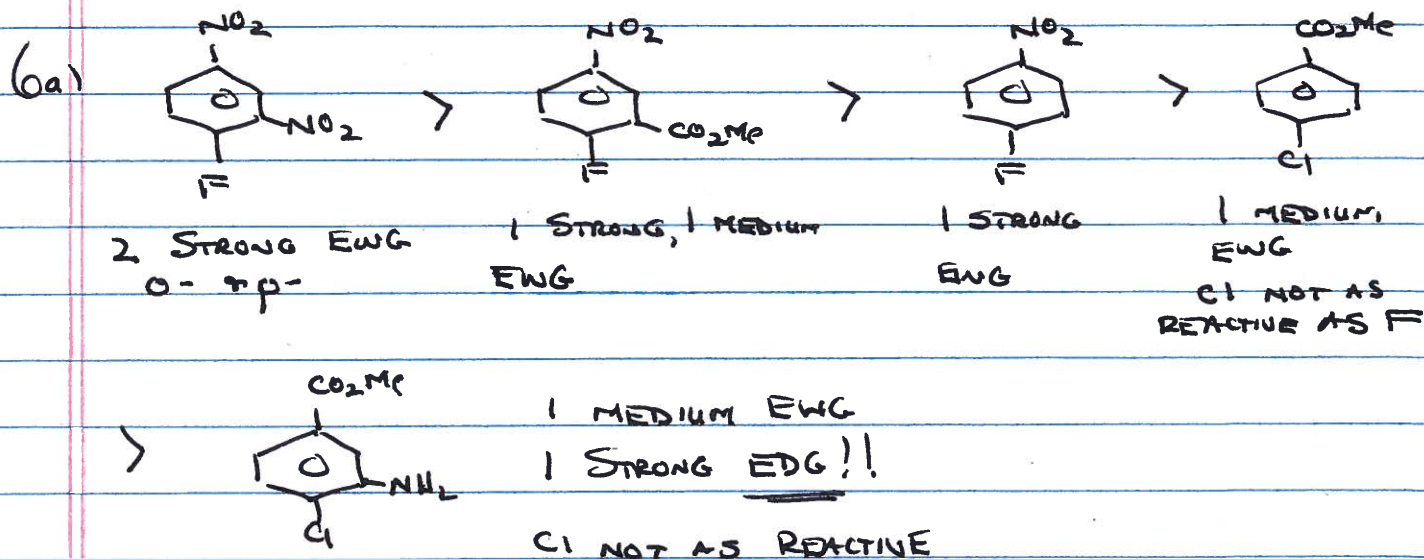
CONT'D

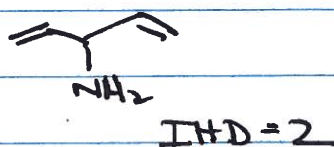
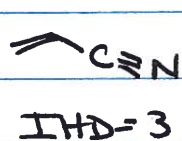
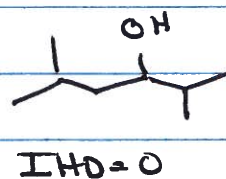
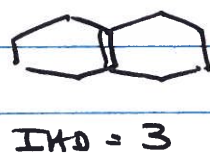
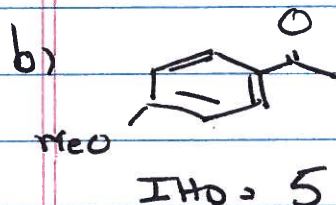


oops, forgot 4e)....it's at the end of the document



AT END





7.
$$\begin{aligned} \text{C} & \frac{62.04}{12.011} \\ &= \frac{5.165}{1.722} \\ &= 3 \end{aligned}$$

$$\begin{aligned} \text{H} & \frac{10.41}{1.008} \\ &= \frac{10.33}{1.722} \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{O} & \frac{27.55}{15.999} \\ &= \frac{1.722}{1.722} \\ &= 1 \end{aligned}$$

$\therefore$ EMPIRICAL FORMULA IS $\text{C}_3\text{H}_6\text{O}$

BUT THIS GIVES $n/e = 58$, AND THE ACTUAL MASS SPECTRAL $n/e = 116$

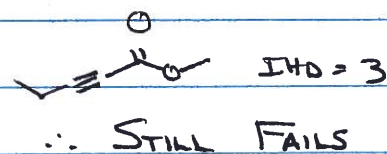
$\therefore$ MOLECULAR FORMULA IS $\text{C}_6\text{H}_{12}\text{O}_2$

WE CAN DO THIS WITH OR WITHOUT IHD

i.e.  IS $\text{C}_3\text{H}_4\text{O}_2$, SO IT FAILS, OR

$$IHD = \frac{2c + 2 - h - x + n}{2} = \frac{12 + 2 - 12}{2} = 1$$

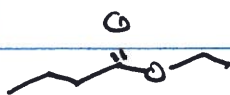
THE OTHERS ARE FINE, BUT



TO IR KEY ABSORPTIONS ARE:

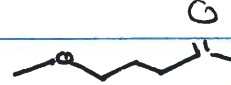
2967 cm^{-1} C-H STRETCH, sp^3 C-H

1715 cm^{-1} C=O STRETCH ... IT'LL TURN OUT TO BE
A KETONE BUT AT THIS POINT A CONJUGATED
ESTER WOULD WORK, TOO.

 FAILS - ESTER NOT CONJUGATED ν_{max} C=O
SHOULD BE 1740 cm^{-1} "ISH"

 THIS IS AN ALCOHOL AND THERE'S NO ν_{OH}
AT 3400 cm^{-1}

$\therefore$ WE'RE LEFT WITH  AND 

FOR , ONE EXPECTS

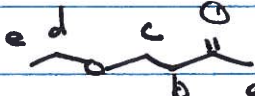
- $\uparrow$ S, A=3
- $\uparrow$ t, A=2
- $\uparrow$ t, A=2
- $\uparrow$ tt (or m), A=2
- $\uparrow$ S, A=3

THIS FAILS WITH THE GIVEN
1H NMR SPECTRUM

IT HAS ONLY 1 S, A=3

AND THE OTHER A=3 RESONANCE
IS A t

ALSO NOTHING LOOKING LIKE A tt

SO, LET'S TRY 

FOR A PREDICT $\delta = 2.1$ ppm, S, A=3

(GOOD MATCH WITH $\delta = 2.15$, S, A=3 RESONANCE OBSERVED)

b, PREDICT $\delta = 2.3 + (0.3) = 2.6$ ppm, t, A=2

ACCEPTABLE ENOUGH MATCH WITH $\delta = 3.1$, t, A=2 OBSERVED

CONT'D.

c, Predict $\delta = 3.4 + (0.4) = 3.8$ ppm, t, A=2

GOOD MATCH WITH $\delta = 3.65$, t, A=2 OBSERVED.

d, Predict $\delta = 3.4$ ppm, q, A=2

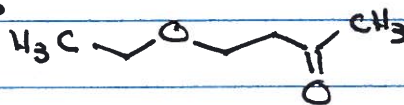
GOOD MATCH WITH $\delta = 3.5$, q, A=2

e, Predict $\delta = 1.2$ ppm, t, A=3

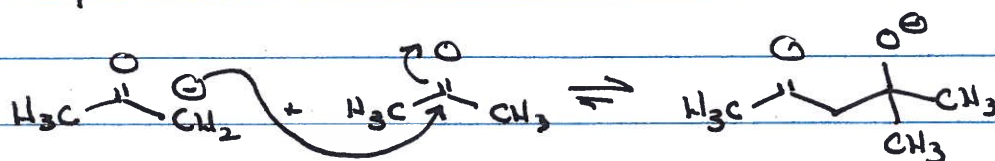
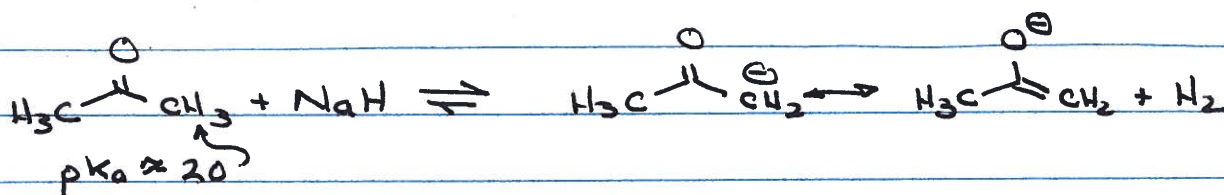
GOOD MATCH WITH $\delta = 1.15$, t, A=3

EVERYTHING MATCHES ADEQUATELY OR BETTER

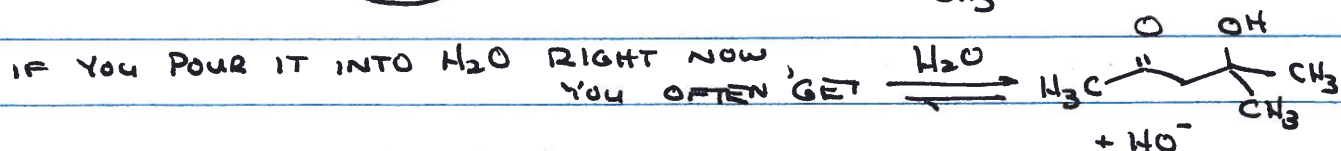
$\therefore$ THE CPD IS



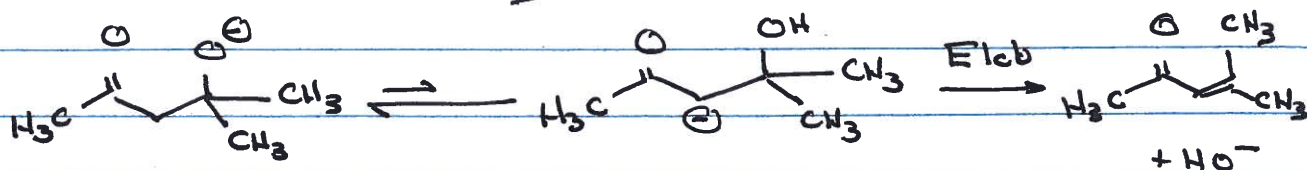
Bonus



IF YOU POUR IT INTO H_2O RIGHT NOW, YOU OFTEN GET



BUT WITH JUST A LITTLE ~~PUSHING~~ HEATING:



BOTH OF THESE ARE KNOWN AS ALDOL ADDITION OR
ALDOL CONDENSATION.

