University of Tanta

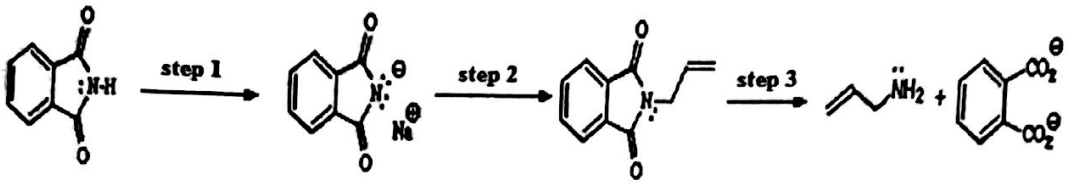
Depart. of Pharm. Chemistry
Organic Chemistry
Final Exam.
First Semester, First Year
Time allowed: 120 min. - Date: 31/12/2013

Faculty of Pharmacy

This Exam Booklet contains (.13.) different pages

Part one (100 Points) in 50 minutes

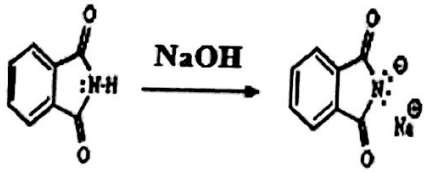
I- Complete the following: (13 Points)



(i) Give the reagents needed to carry out Step 1. Write an equation for the formation from these reagents of the inorganic species which reacts with phthalimide.

Reagents...**NaOH**.....

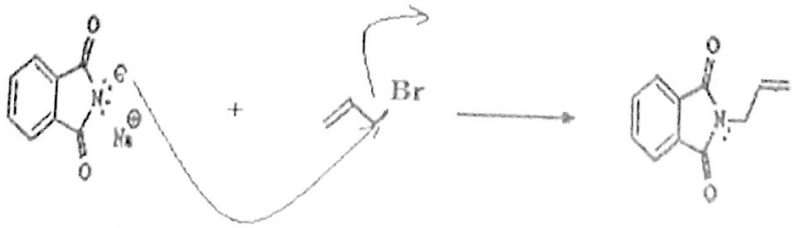
equation.....



(ii) Name and outline a mechanism for the reaction in step 2.

Name *of* mechanism...SN2.....

Mechanism.....



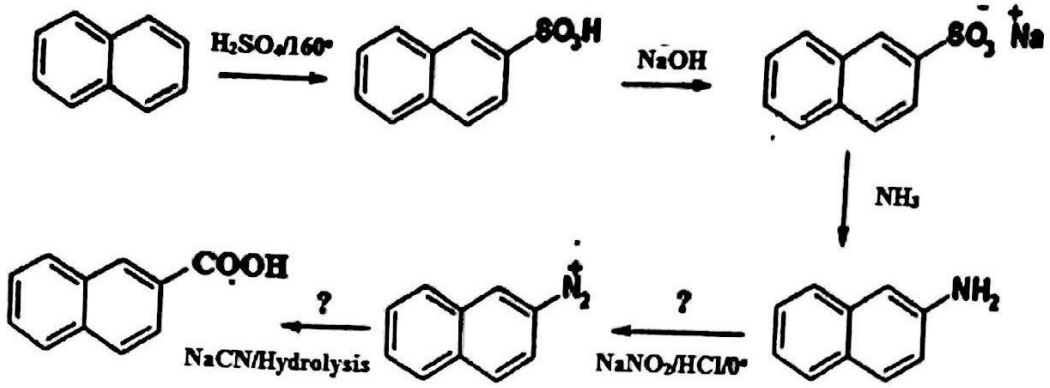
(iii) Give the reagent for Step 3 and state a condition.

Reagent .....**NaOH or NH_2NH_2**.....

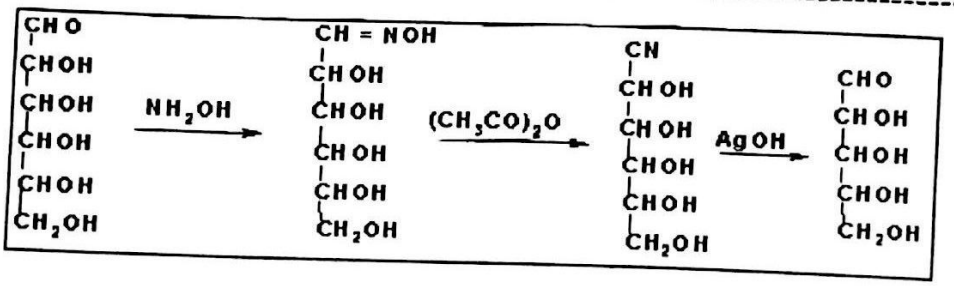
state a condition...**heat**.....

II- Complete the following: (30 Points)

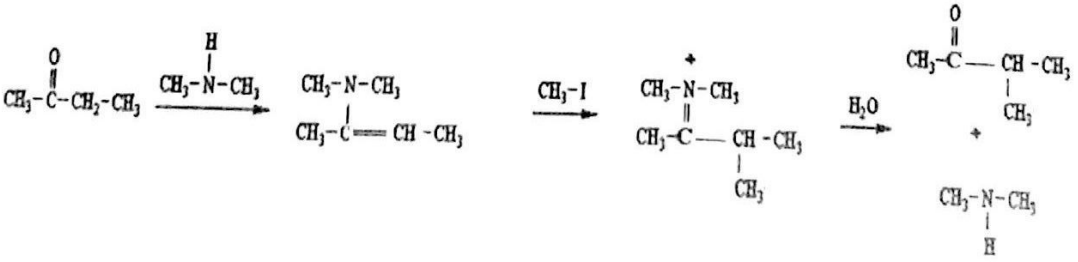
1-



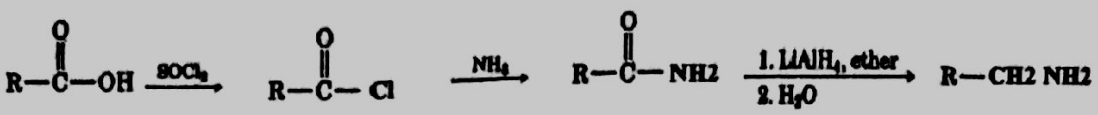
2----------



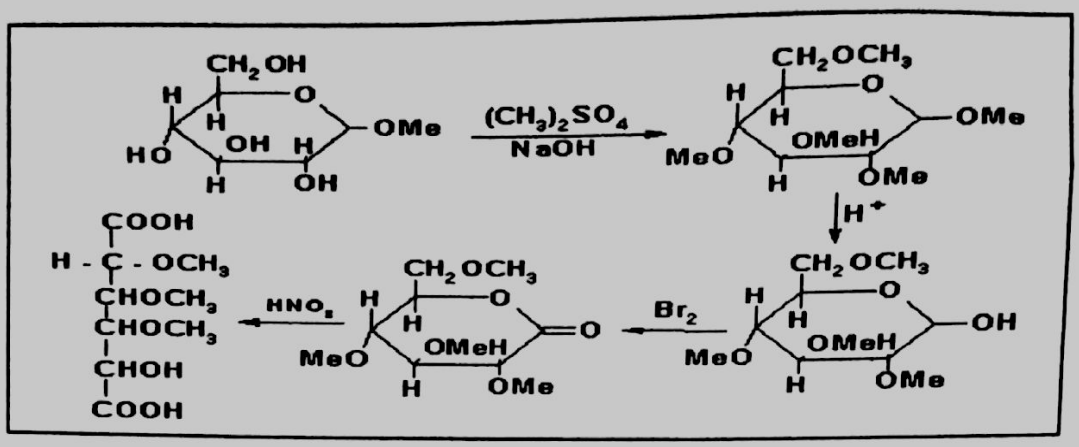
3----------



4----------



5----------



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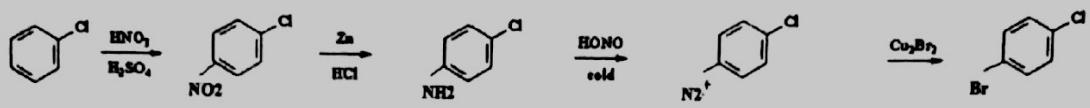
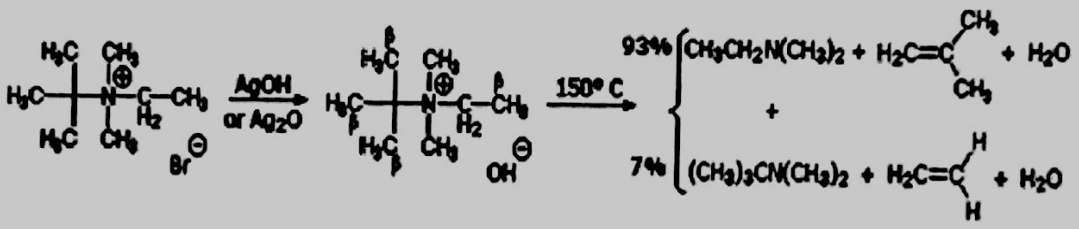
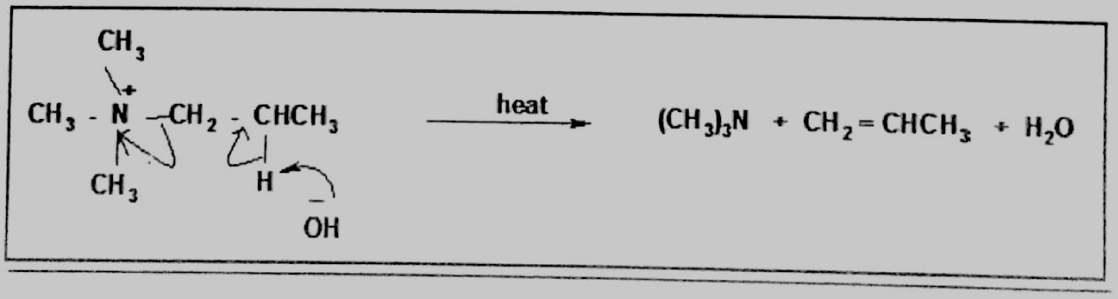


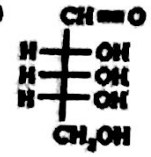
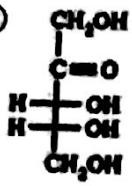
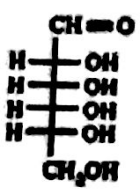
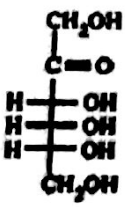
7----------



Give the mechanism of formation of compound No. 2



III-Which of the following compounds cannot exist in a pyranose form? (3 points)

(A) 
(B) 
(C) 
(D) 

IV-Arrange the following in order of decreasing basicity: (9 Points)

a- N-methylaniline > aniline > Acetanilide

b-4-chloro-2-nitroaniline > 4-chloro-3-nitroaniline > 3,4-dichloroaniline ,

c- methyl aniline > Ammonia > aniline,

.....

V-Which phenol in each of the following pairs is more acidic? (9 Points)

a- 4-nitrophenol

.....

b- 4-cyanophenol

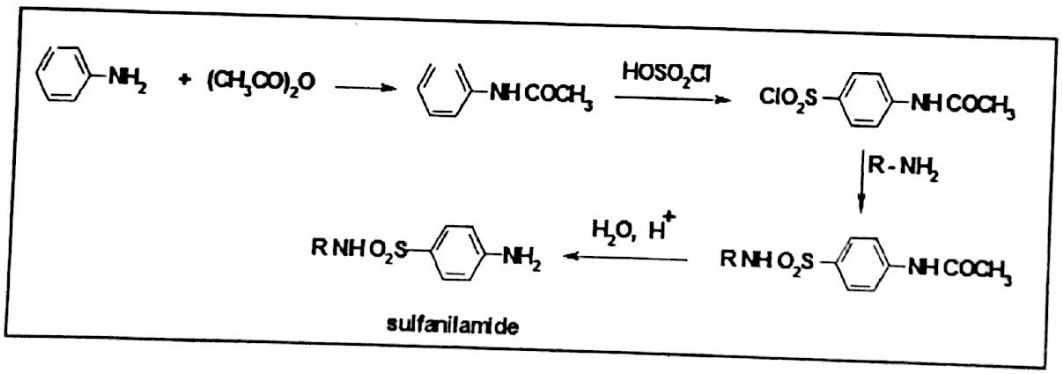
.....

c-2,6-diclorophenol

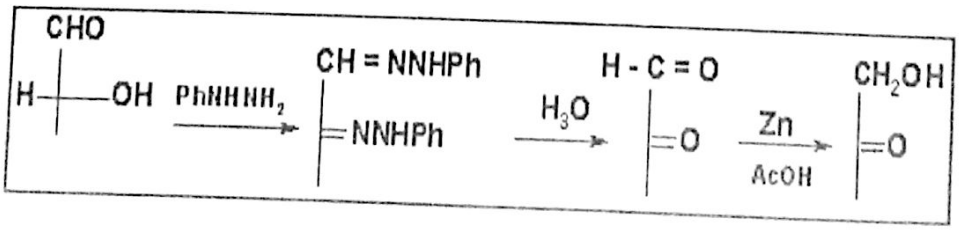
.....

VI-Write equations for each step in the following syntheses: (36 Points)

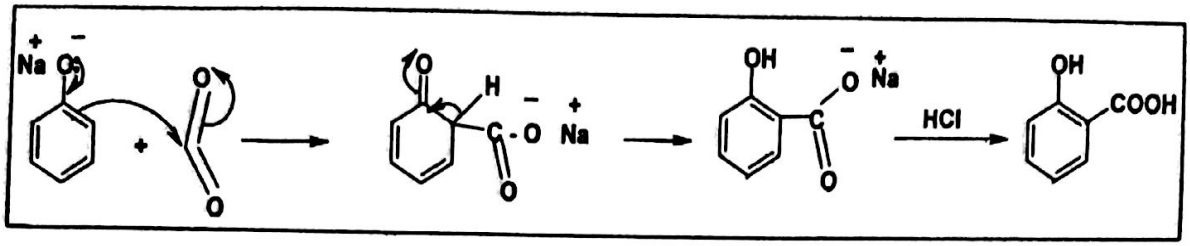
a



b-Glucose to fructose

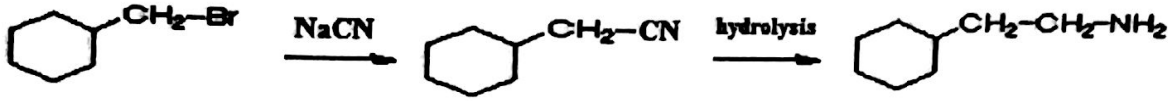


c-Phenol to salicylic acid (mechanism)



.....

d-



.....

Model answer

Univ. of Tanta, 1st Year Pharmacy, Org. Chem. Final Exam.
Dec. 2013

Part II (75 Points) by K. Elberembally, Ph.D.

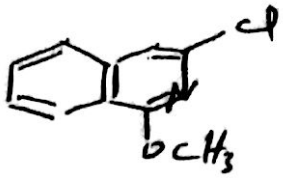
صور ال الكتروني

Q.1: 15 items; 1 minute and 2.5 point for each item.

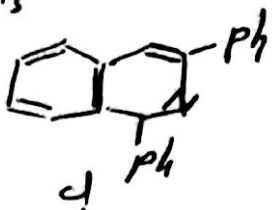
Give structures of the products, if any, of each of the following reactions (pages 7, 8). Indicate the major and minor products.

v صور إلى الكتروك

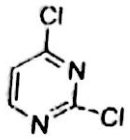
(a) 1,3-Dichloroisoquinoline — MeONa, MeOH, reflux →



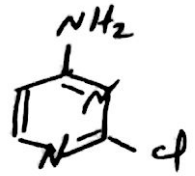
(b) 1,3-Diphenylbenzo[c]pyryliumium tetrafluoroborate — aq. NH_3 →



(c)

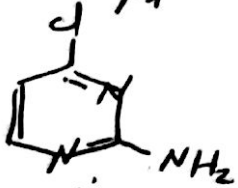


NH_3, EtOH, rt →



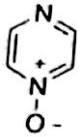
major

+



minor

(d)



$POCl_3$ →

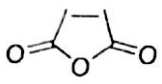
(e)

1- $N(Me)_2CHO$, $POCl_3$, 35 °C →

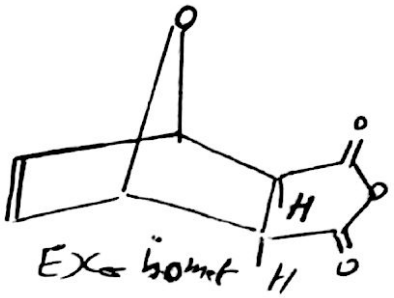
2- H_2O

(f)

+



→

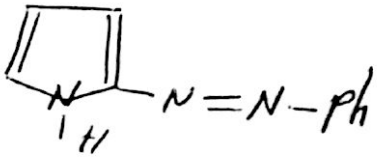


Exo isomer

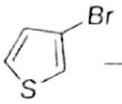
(g) Pyrrole

Ph-N=N, 0 °C,

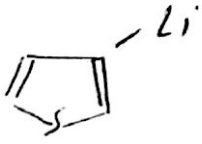
aq NaOA, EtOH →



(h)

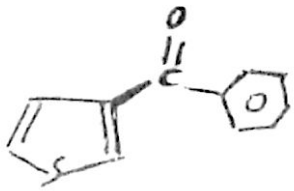


n- BuLi, THF, -70 °C →



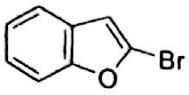
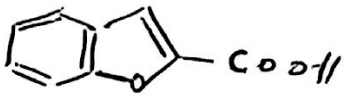
1- Ph−C≡N →

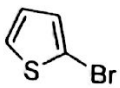
2- HCl, H_2O

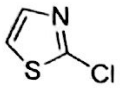


٨ حضرة الكتروفيل

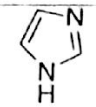
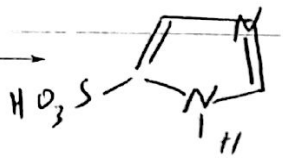
(i) Pyrazine $\xrightarrow{\text{c. } H_2SO_4,\ \text{c. } HNO_3}$ No Reaction

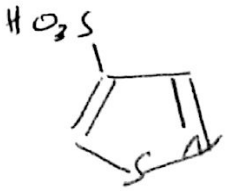
(j)  $\xrightarrow[\text{2- } CO_2]{\text{1- n-BuLi, } Et_2O,\ 0\ ^oC}$ 

(k)  $\xrightarrow{MeONa}$ No Reaction

(l)  $\xrightarrow{PhSNa,\ MeOH,\ rt}$ 

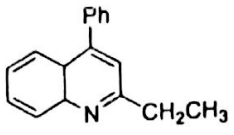
(m)  $\xrightarrow{PhCOCl,\ FeCl_3}$ No Reaction

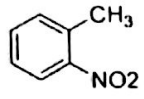
(n)  $\xrightarrow{\text{f. } H_2SO_4\ 160\ ^oC}$ 

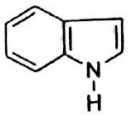
(o)  $\xrightarrow{\text{fuming } H_2SO_4}$ 

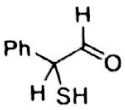
Q.2 : 10 items; 1.5 minute and 3.75 points for each item.

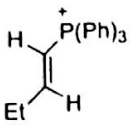
Give the missing reactants, reagents, intermediates, or products in the following syntheses. Show your answer in the assigned places on the next page.

(a) A + $CH_3COCH_2CH_3$ —(aq. KOH; EtOH/0°C)→ 

(b) 

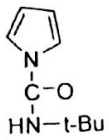
—($(CH_3)_2NCH(OCH_3)_2$; DMF, heat)→ B —(aq. TCl_3)→ 

(d) 

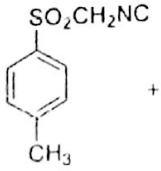
+ 

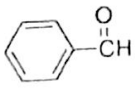
—(pyridine)→ C —(chloranil; t-BuOH, heat)→ D

(e) 

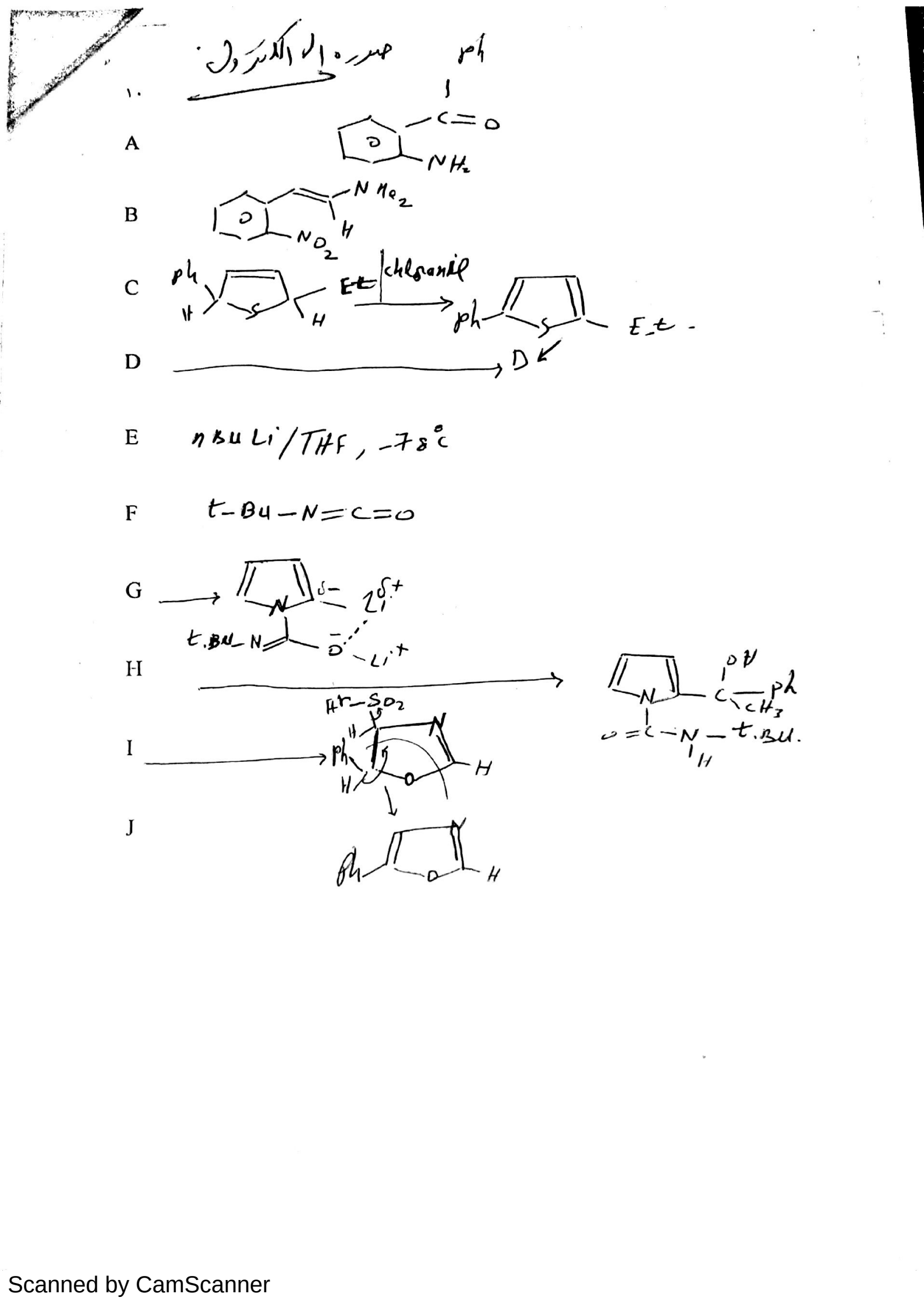
—(1- E; 2- F)→ 

—(2 n-BuLi)→ G —(PhCOMe)→ H

(f) 

+ 

—(K_2CO_3, CH_3OH; heat)→ I —(K_2CO_3, CH_3OH)→ J



Model ... (Jan 2011

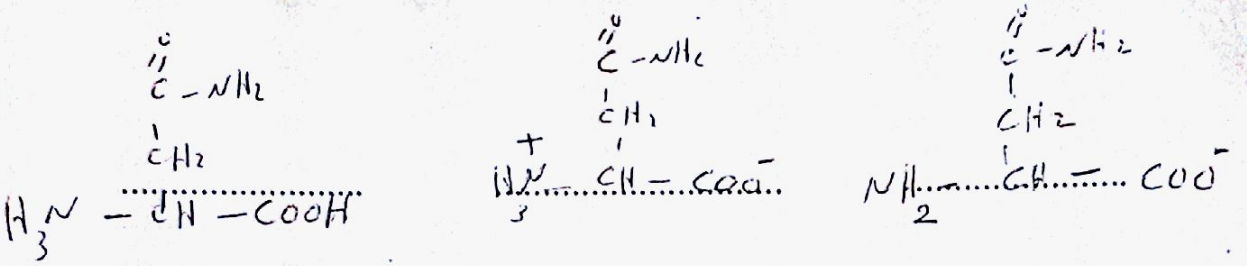
Part (3): Answer the following questions in (3) pages (75 marks, in 35 min) only in the provided spaces and do not use pencil.

1. Draw the chemical structures of the predominant forms of L-asparagine ($pKa_{(COOH)}$ = 2.02, $pKa_{(NH2)}$ = 8.80) present in aqueous solutions at pH 1.0, pH 5.4 and pH 11.5? Give the three-letter code for L-asparagine? (10 Marks, 5 min)

Answer:

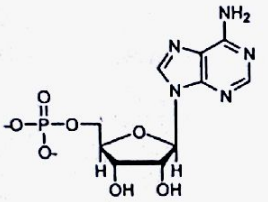
$$pI = \frac{2.02 + 8.80}{2} = \frac{10.82}{2} = 5.41$$

pH 1.0 pH 5.4 pH 11.5



Three-letter code.....Asn.....

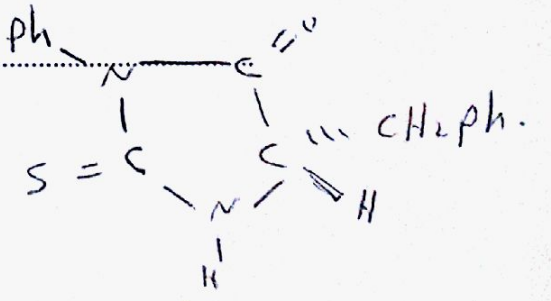
2. write the IUPAC name of the following nucleotide: (5 Marks, 1min)



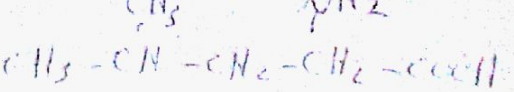
IUPAC name:.....adenosine 5'-phosphate

3. Predict **only the final product** of the following reactions; (28 Marks, 15 min)

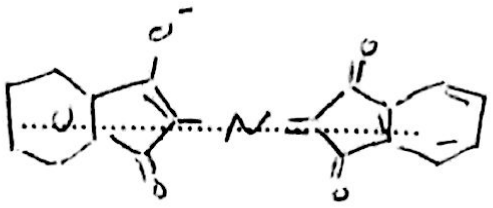
a) Phe-Gly-Val + C_6H_5-N=C=S ⟶



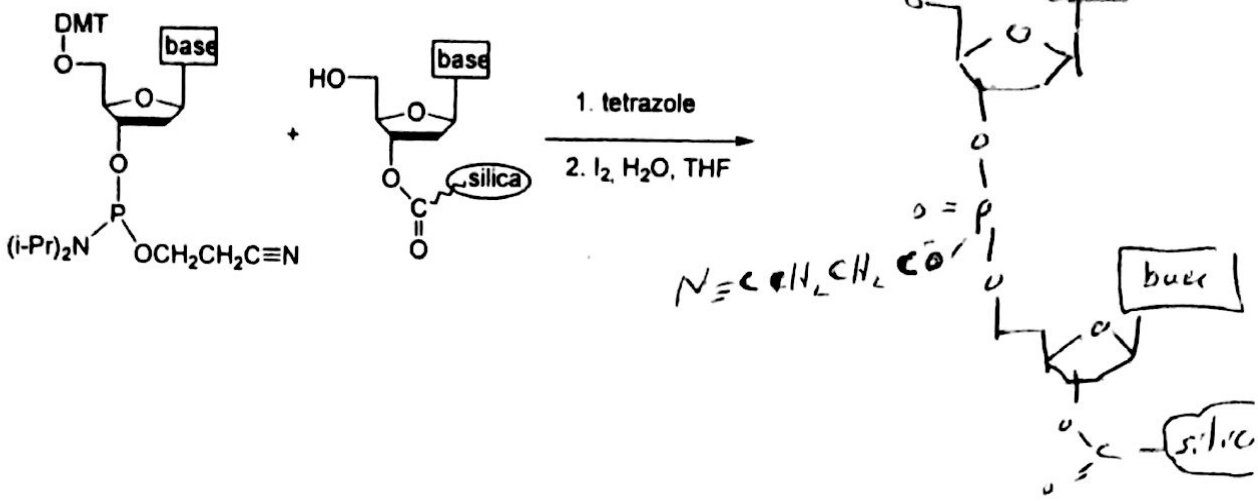
b) $CH_3CH(CH_3)CH_2CH_2COOH + Br_2 \xrightarrow[H_2O]{PBr_3} \xrightarrow{NH_3}$ .....



c) Phe + ninhydrin ⟶

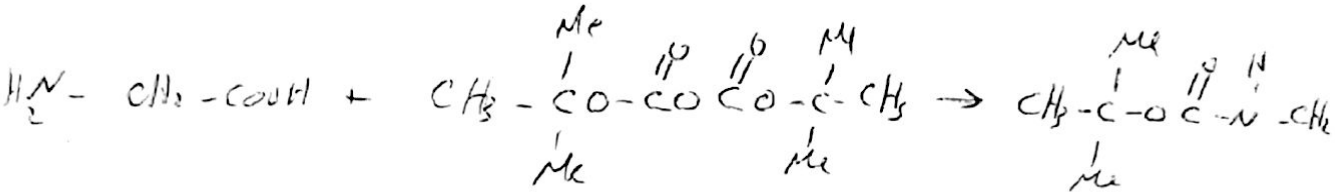


d)

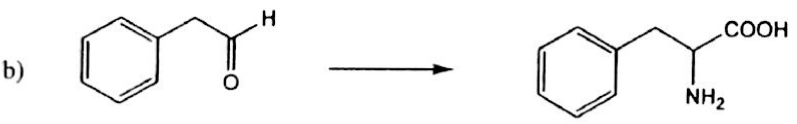


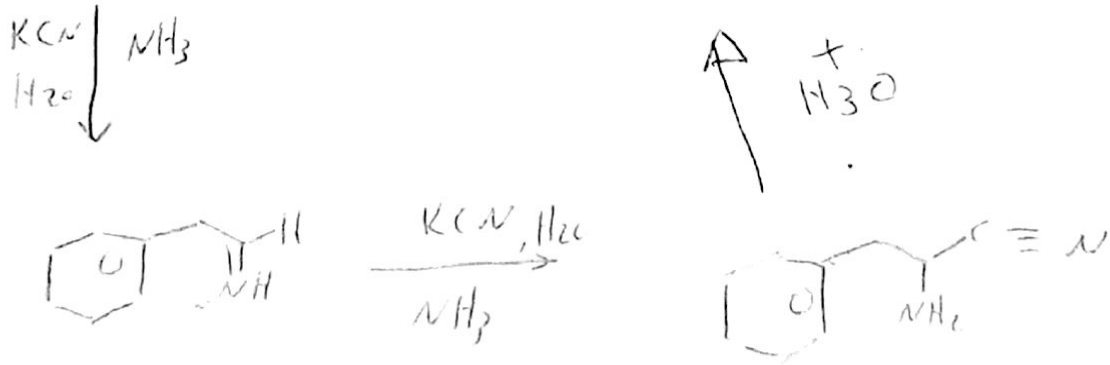
5. Suggest a method for each of the following conversions? (14 Marks, 6min)

a) glycine ⟶ Boc-Gly

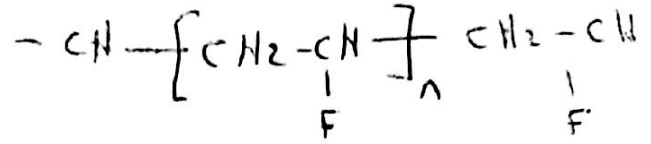


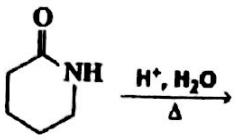
b)

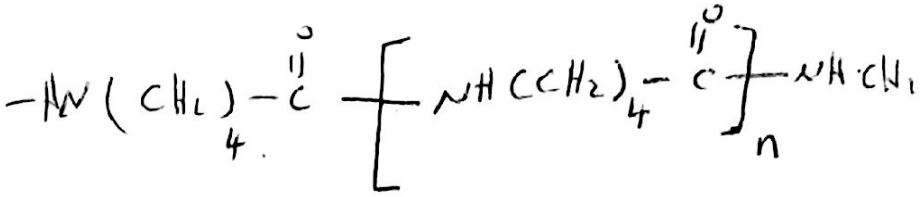




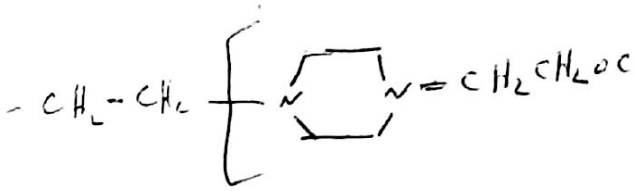
6. Draw short segment of the polymer obtained from the following monomer? (12 Marks, 6 min)

$CH_2=CHF \longrightarrow$ 

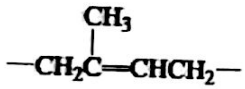


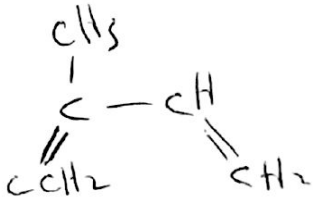


7. Draw the repeating unit of the step-growth polymer that will be formed from each of the following reactions? (3 Marks, 1min)

$ClCH_2CH_2OCH_2CH_2Cl$ +  $\longrightarrow$ 

8. Draw the structure of the monomer or monomers used to synthesize the following polymer? (3 Marks, 1min)





monomer

Good Luck

Examiners

Dr. Nabaweya Sharaf El-din

Dr. Kamel Elberembaly

Dr. Mervat El-Hamamsy