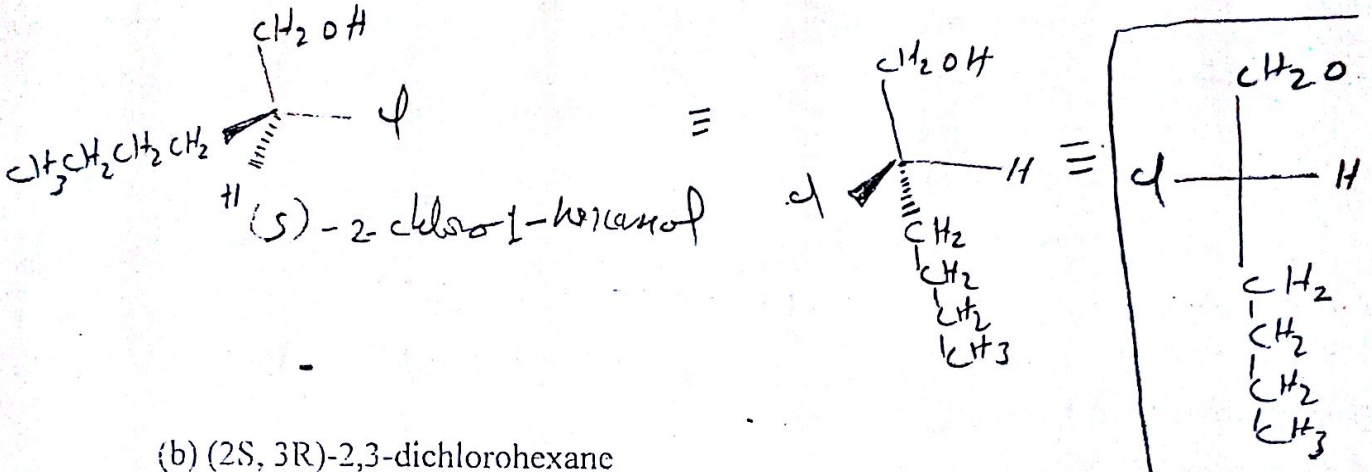
University of Tanta, 2nd leavel Clinical Pharmacy, Organic Chemistry 3, Jan 2014

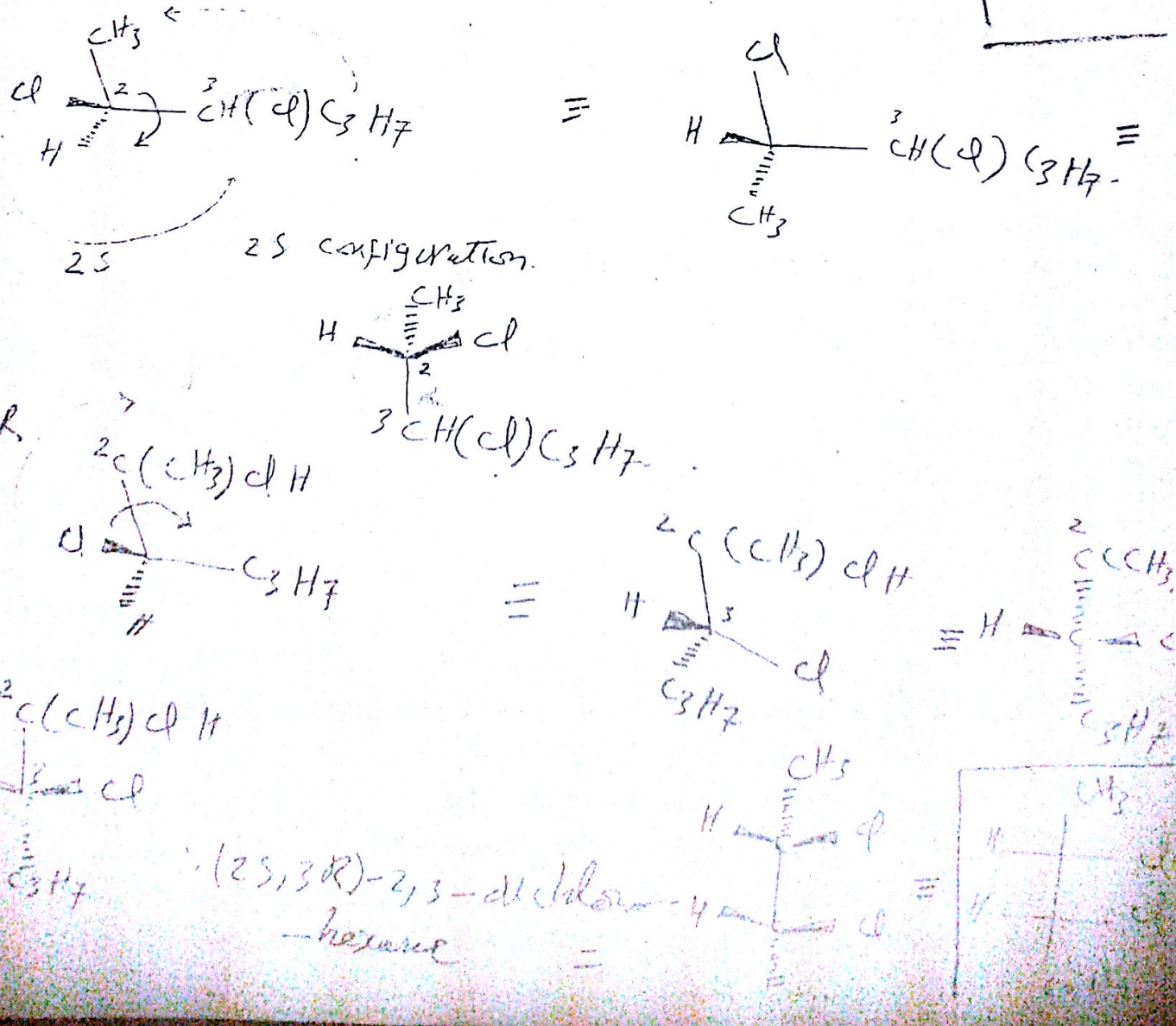
Model Answer

Part I (by K.Elberembally, Ph. D) 20 Points

Q.1 (15 Minutes, 5.5 Points)
Draw a Fischer projections for each compound
(a) (S)-2-Chloro-1-hexanol

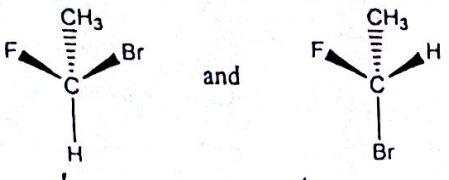


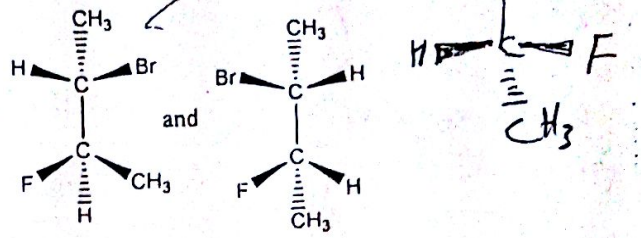
(b) (2S, 3R)-2,3-dichlorohexane

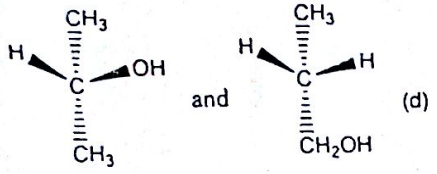


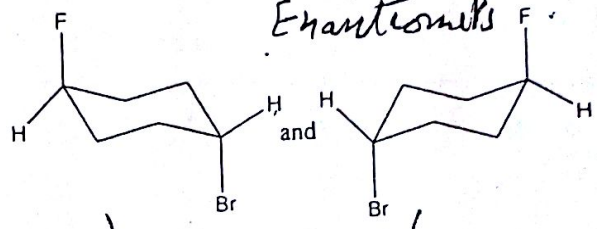
Q.2 (15 Minutes, 4.5 Points)

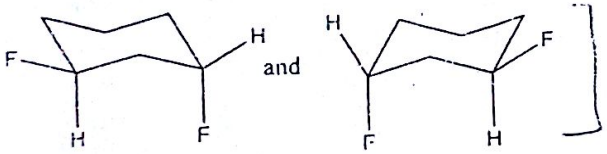
Give the stereochemical relationships between each pairs of structures shown below. Examples are same compound, structural isomers, enantiomers, diastreomers.

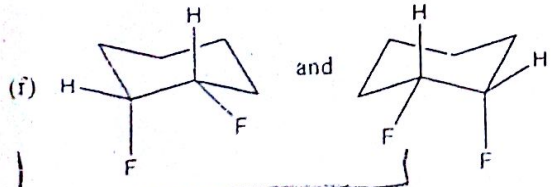
(a)  Enantiomers

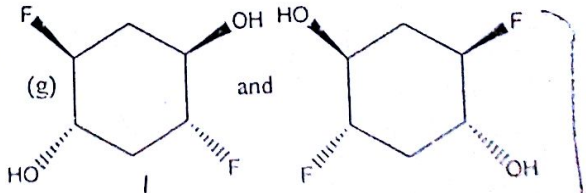
(b)  Enantiomers

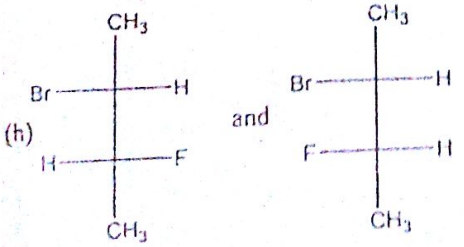
(c)  structural isomers

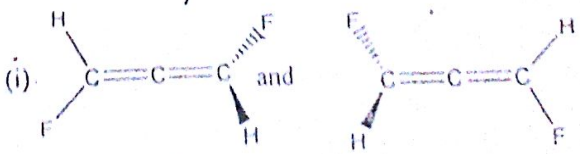
(d)  same comp. (two orientation of the same comp. in plane)

(e)  Enantiomers.

(f)  two conformations of same comp.

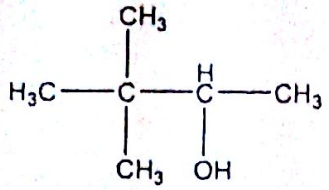
(g)  same comp. (two orientation of same comp.; center of symmetry)

(h)  diastereomers

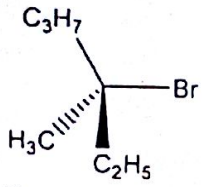
(i)  Enantiomers

Q 3 (20 Minutes, 7.5 Points)

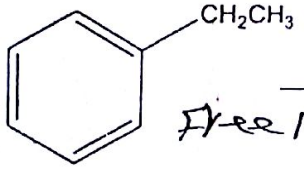
Give the products of the following reactions. Indicate the major product and minor products if any. In each part give the mechanism (S_N1, S_N2, E_1, E_2, free radicals).

(a) 

$\xrightarrow[E_1]{85\%\ H_3PO_4}$ major + minor

(b) 

$\xrightarrow[S_N1]{H_2O,\ acetone}$ + 5% + 50%

(c) 

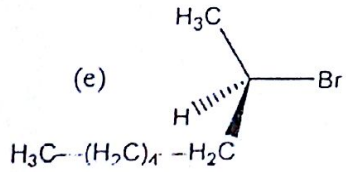
$\xrightarrow{\text{one equavlent of } Br_2/uv}$ Free radicals

major + minor

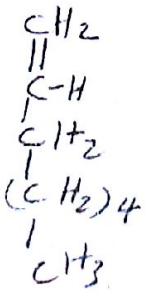
(d) $R-C\equiv C-H$

$\xrightarrow[2)\ CH_3CH_2Br]{1)\ Na^+\ \bar{N}H_2}$ S_N2

$R-C\equiv C-CH_2CH_3$

(e) 

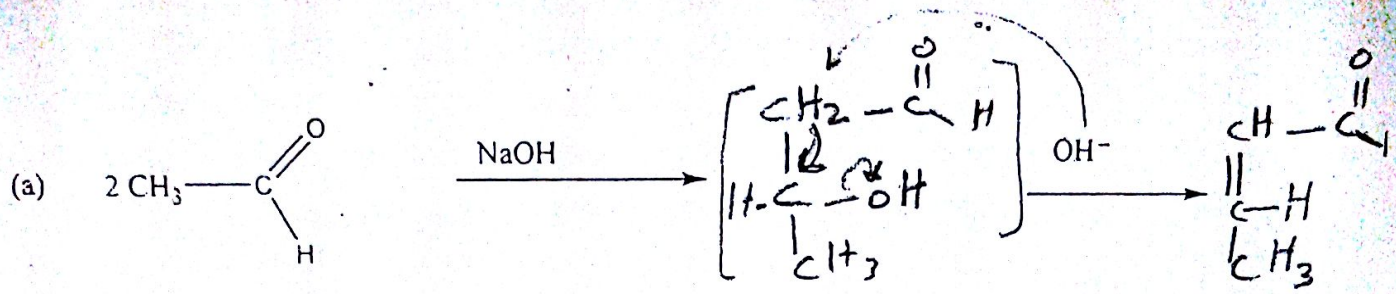
$\xrightarrow[E_2]{CH_3CH_2O^-\ Na^+}$

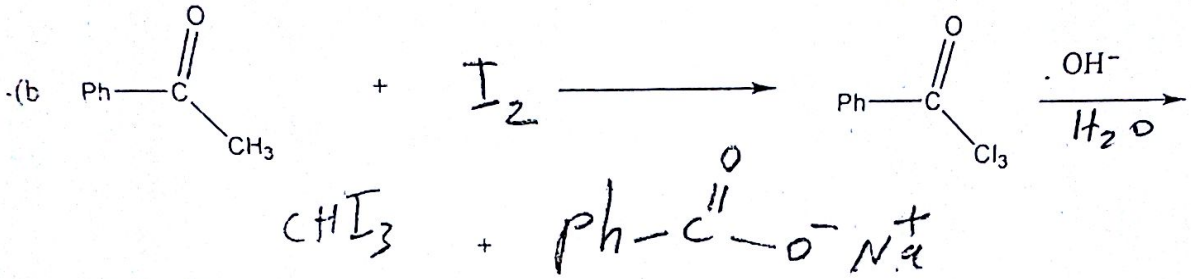


+ $CH_3-CH=CH-(CH_2)_4-CH_3$

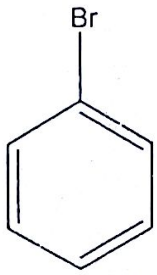
Q. 4 (10 Minutes, 2.5 Points)

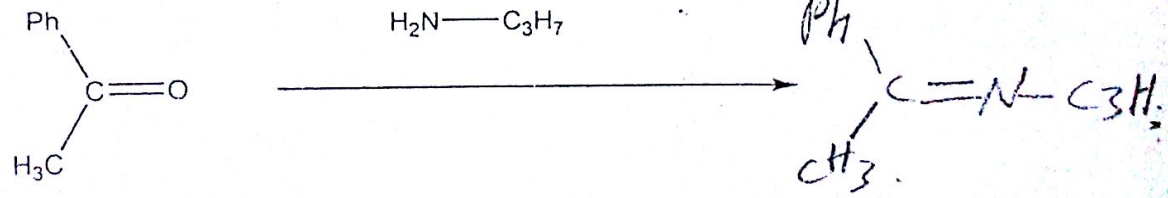
Supply the missed reactants, reagents, intermediates or products

(a) 

(b 

CHI_3 + $Ph-C(=O)-O^-Na^+$

(c) Benzene $\xrightarrow{Br_2/FeCl_3}$ 

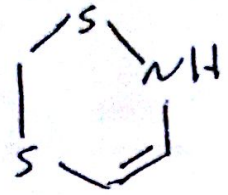
(d) 

organic

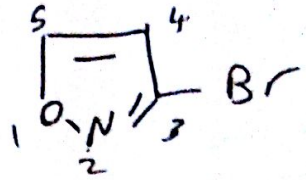
Part (2): (30 marks): Answer the following questions in (4) pages in (70) min., only in the provided space and do not use pencil.

1) Draw the chemical structure for each of the following: (4 marks, 5 min)

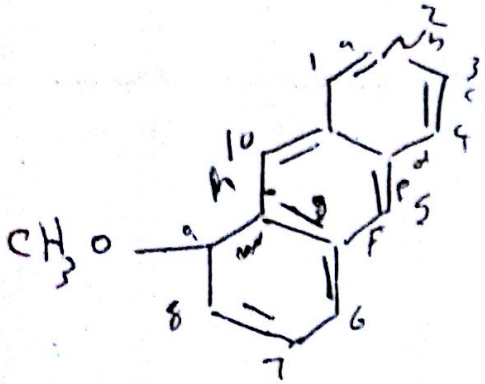
a) 2H,6H-1,5,2-dithiazine



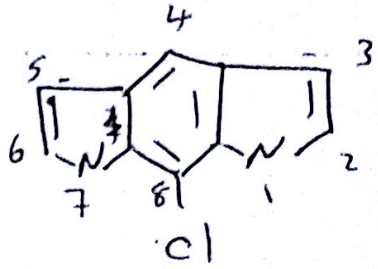
b) 3-bromo-1,2-oxazole



c) 9-methoxybenzo[g]isoquinoline

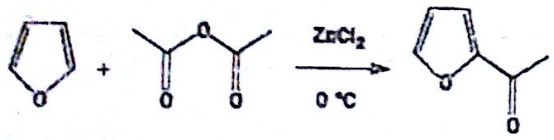


d) 8-chloropyrrolo[3,2-f]indole

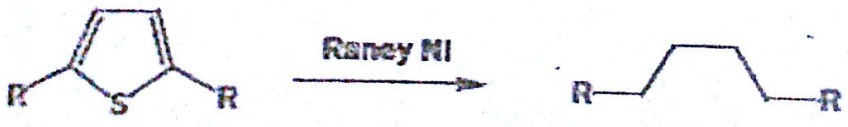


2) Complete the following equations? (2 marks, 2 min)

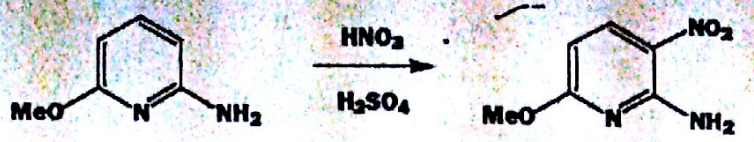
a)



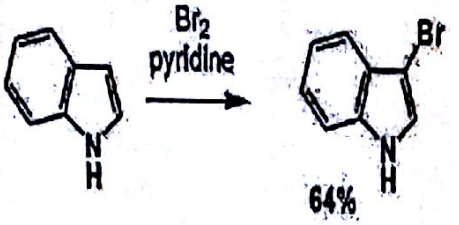
b)



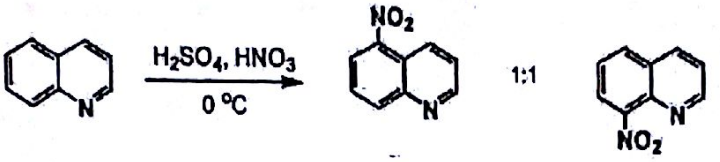
c)



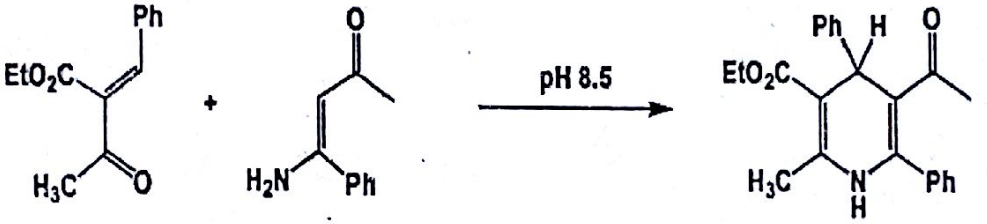
d)



e)

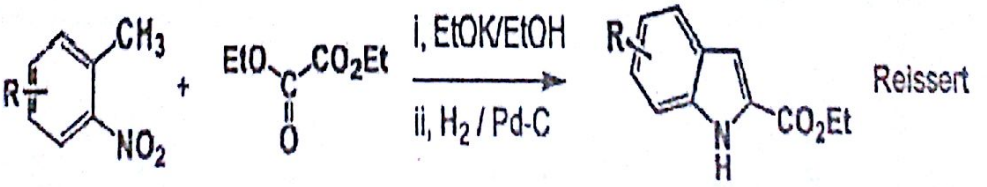


f)



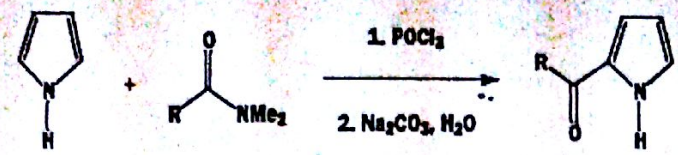
g)

h)

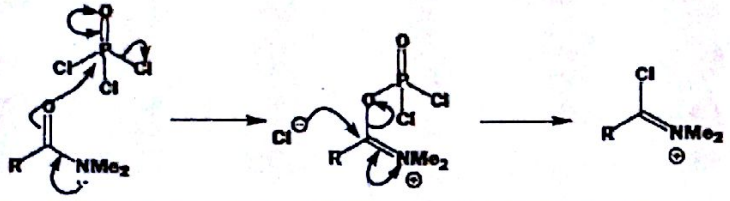


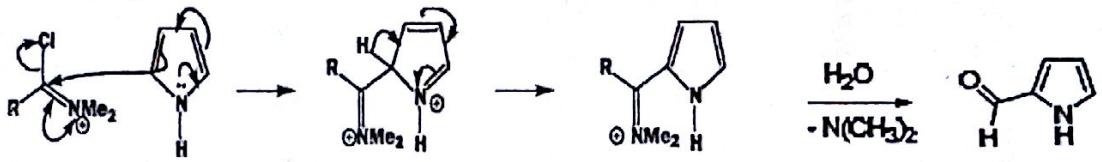
3) Complete and write the mechanism for each of the following equations? (2 marks, 2 min)

a)

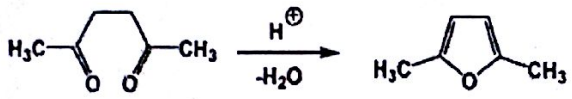


Mechanism



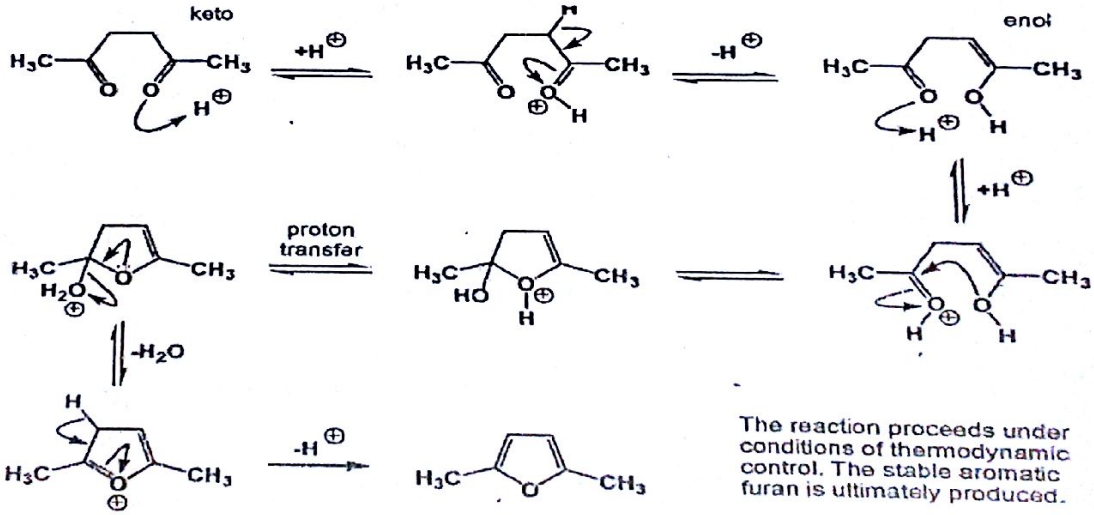


b)



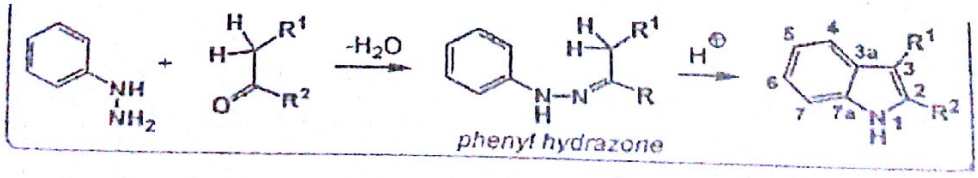
2,5-dimethylfuran

Mechanism

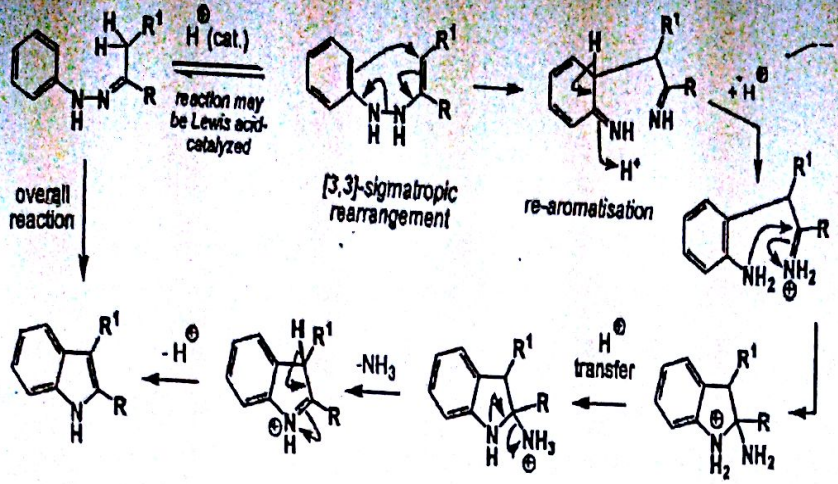


The reaction proceeds under conditions of thermodynamic control. The stable aromatic furan is ultimately produced.

c) phenylhydrazine to indole using Fischer method

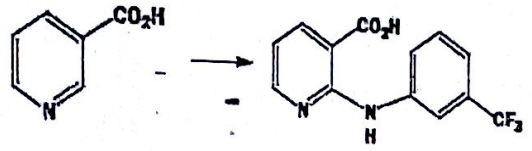


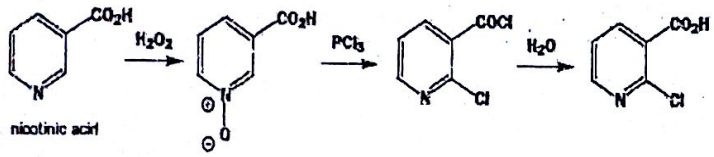
Mechanism

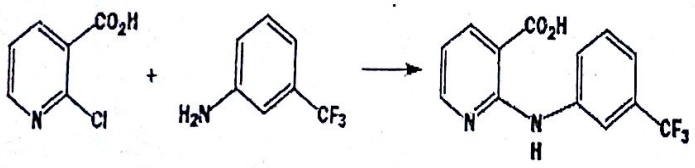


4) By means of chemical structures and equations, convert each of the following compounds to the corresponding product: (7 marks, 15 min)

a)

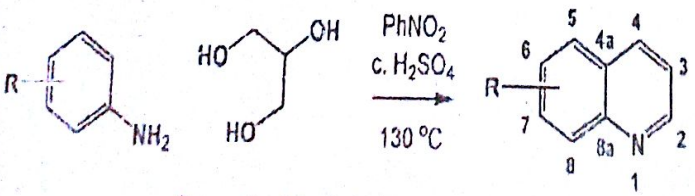






niflumic acid - analgesic

b) Aniline to quinoline (use **Skraup method**)



Glycerol is dehydrated *in situ* to give acrolein.