THE OPEN UNIVERSITY OF SRI LANKA
B.Sc DEGREE PROGRAMME / STAND ALONE COURSE 2011 /2012
LEVEL 5-FINAL EXAMINATION
CHU 3126 / CHE 5126 –ORGANIC CHEMISTRY
DURATION 2-HOURS

Friday 16th December 2011 **1.30 p.m. – 3.30 p.m.**

Answer any FOUR (04) questions only

If you have answered more than four questions, only the first four answers will be marked

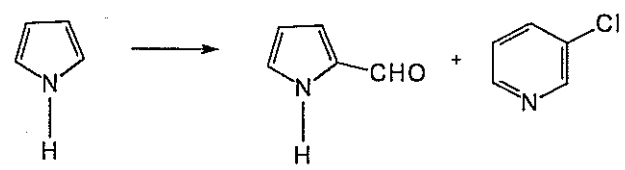
1. Answer all parts.

(a) Pyridine undergoes electrophilic substitution very slowly while nucleophilic substitution occurs readily. Explain.

(25 Marks)

(b) Pyrrole is more reactive than benzene towards electrophilic substitution reactions. Explain. (25 Marks)

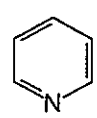
(c) Give the essential conditions and reagents necessary to carry out the following conversion. Write down the structures of all the intermediate products.



(25 Marks)

(d) Predict the products of the following reactions.

(i)  HNO_3/Ac_2O → A

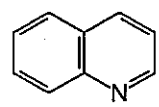
(ii)  Br_2/ 300°C → B

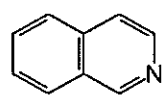
(25 Marks)

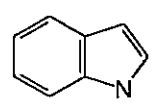
2. (a) Explain why electrophilic substitution takes place at the 2-position in pyrrole and 3-position in pyridine.

(40 Marks)

(b) Predict the products of the following reactions.

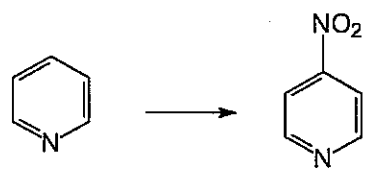
(i)  $\xrightarrow{HNO_3/Ac_2O}$ C

(ii)  $\xrightarrow{\text{alk. } KMnO_4}$ D + E

(iii)  $\xrightarrow[\text{ii) } H^+/H_2O]{\text{i) HCHO/HCN}}$ F

(30 Marks)

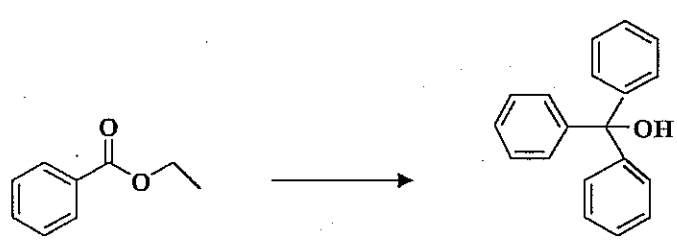
(c) Give the necessary reagents and experimental conditions to effect the following conversion . (**N.B.** Conversion may involve more than one step.)



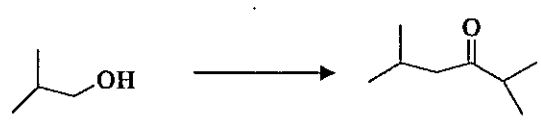
(30 Marks)

3. (a) Show how you could synthesize the following compounds.

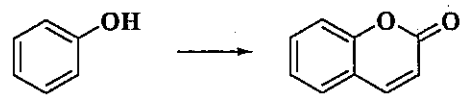
(i)



(ii)



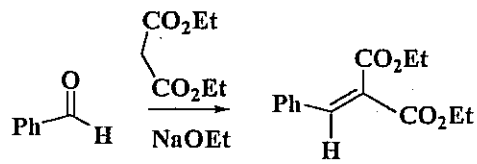
(iii)



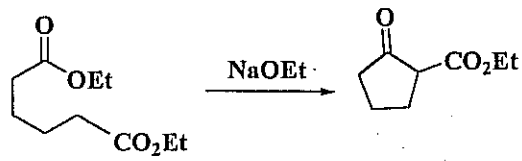
(60 Marks)

(b) Write the mechanism for the following reactions.

(i)



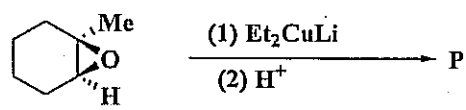
(ii)



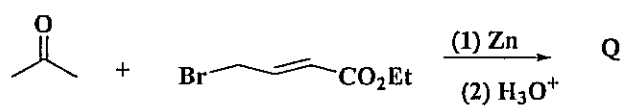
(30 Marks)

(c) Give the products **P** and **Q** for the following reactions.

(i)



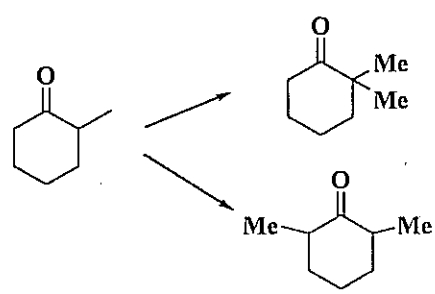
(ii)



(10 Marks)

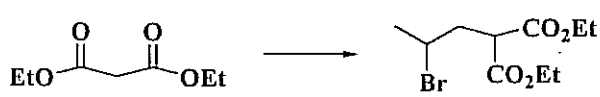
4. (a) Give the reagents required for the following conversions.

(i)



(ii)

(iii)



(iv)

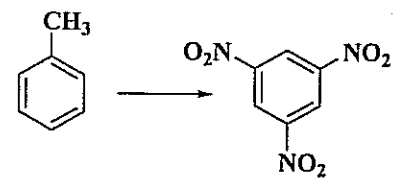
(v)

(30 Marks)

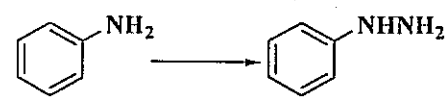
(b) Give the reagents and reaction condition required to carry out the following synthesis.

(i)

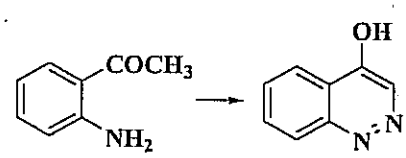
(ii)



(iii)



(iv)



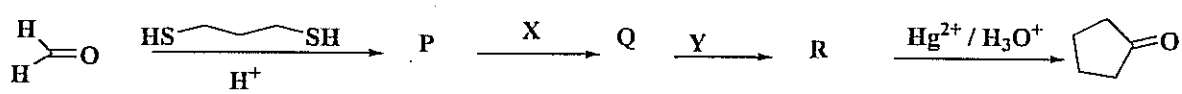
(60 Marks)

(c) Explain why the H atom attached to the N-atom of phthalimide shows significant acidity.

(10 Marks)

5. Give the products **P,Q** and **R** and the reactants **X** and **Y** required for the following conversion

(a)



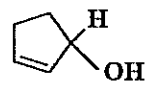
(25 Marks)

(b) Give the structure of the product expected allow o-nitroaniline reacts with H_2O_2 in the presence of acetic acid.

(10 Marks)

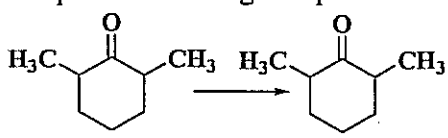
(c) Give the products of oxidation with MnO_2 of the following

(i) (ii)

$CH_3CH_2CH{=}CHCH_2OH$ 

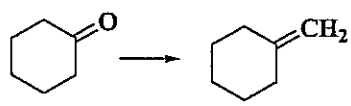
(10 Marks)

(d) Using a sulphur containing compound how would effect the following conversion



(20 Marks)

(e) How would you use Wittig reaction to carry out the following synthesis.



(15 Marks)

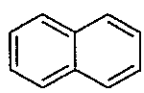
(f) Suggest a synthetic route to alanine from malonic ester using Curtius Rearrangement

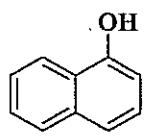
(20 Marks)

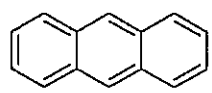
6. a) "C-2 of naphthalene is less reactive than C-1 towards electrophilic substitution". Explain the above statement.

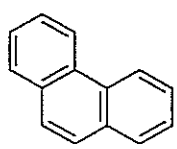
(30 Marks)

b) Give structures of the major products of the following reactions.

(i)  $\xrightarrow[40^0C]{Conc.\ H_2SO_4}$ P

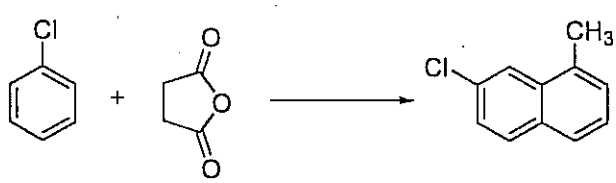
(ii)  $\xrightarrow[2).\ C_6H_5NH_2/HCl,\ 5^0C]{1)\ NaOH}$ Q

(iii)  $\xrightarrow[CCl_4,\ heat]{Br_2}$ R

(iv)  $\xrightarrow{O_3/Zn}$ S

(40 Marks)

c) Indicate giving the reagents how the following transformation is carried out using Haworth synthesis.



(30 Marks)