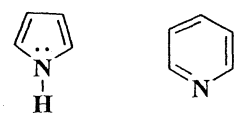
THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME / STAND ALONE COURSE 2012/2013
LEVEL 5 - FINAL EXAMINATION
CHU3126 /CHE5126 –ORGANIC CHEMISTRY II
DURATION: 2 HOURS

Date: 22nd (Wednesday) May 2013 **Time 1.00 p.m. – 3.00 p.m.**

Answer Any Four (04) Questions

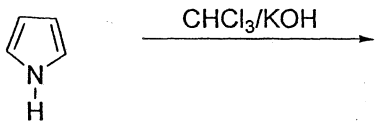
1. a) Explain the following statements.
   i. Pyrrole is more reactive towards nitration than benzene and elctrophilic substitution occurs predominantly at C-2 position.
   ii. Direction of the dipole moment of pyrrole is reversed its direction in pyridine.



Pyrrole Pyridine

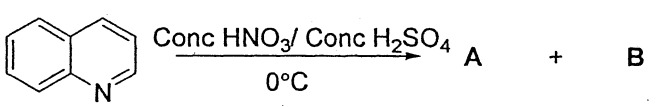
(30 marks)

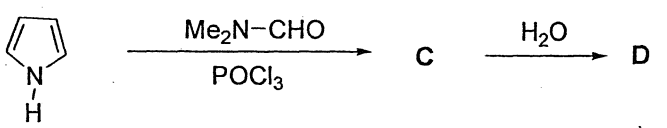
b) Give the mechanism and the product/s of the following reaction.

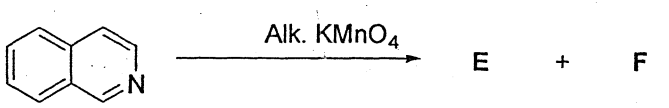


(40 marks)

c) Indicate the structures of products (A – F) you expect for the following reactions.

(i) 

(ii) 

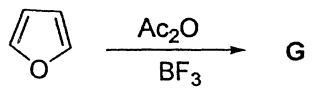
(iii) 

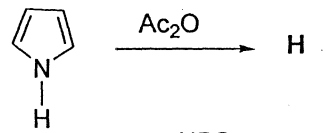
(30 marks)

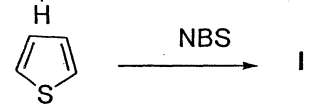
2. a) Pyridine undergoes nucleophilic substitutions easily but not electrophilic substitution, Explain the above statement.

(20 marks)

b) Indicate the structures of the missing compounds (**G – I**) in the following reaction schemes.

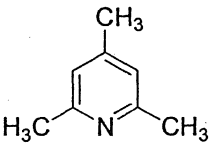
(i) 

(ii) 

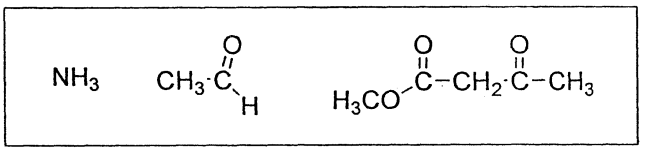
(iii) 

(30 marks)

c) Outline a synthetic route for **J** starting from the compounds given in the box.

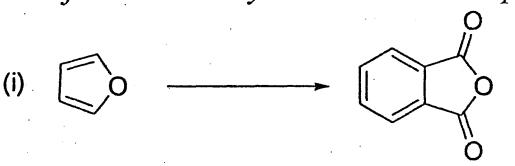


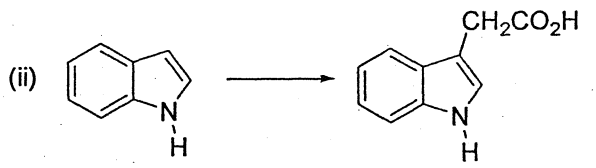
J



(30 marks)

d) Giving necessary reagents and reaction conditions show how the following transformations could be affected. *(Transformations may involve several steps)*

(i) 

(ii) 

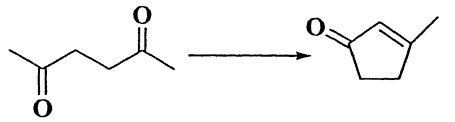
(20 marks)

3. (a) Briefly explain why mixed Claisen condensation can be carried out efficiently with diethyl oxalate or with ethyl formate than with ethyl acetate.

(20 Marks)

(b) Giving necessary reagents and conditions indicate how you would carry out the following reactions.

(i)



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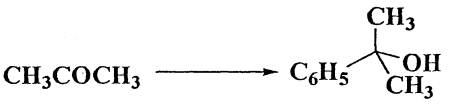
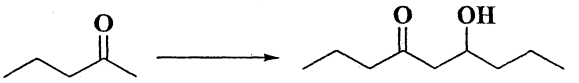


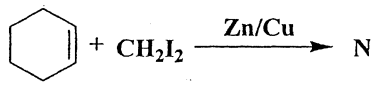
(iii)



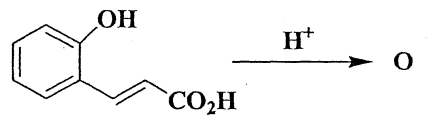
(45 Marks)

(c) Predict the products (**N – P**) of the following reactions.

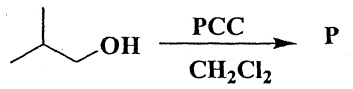
(i)



(ii)

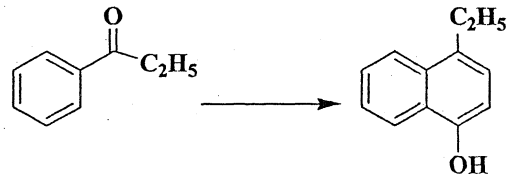


(iii)



(15 Marks)

(d) Giving the mechanism show how you would carry out the following synthesis.



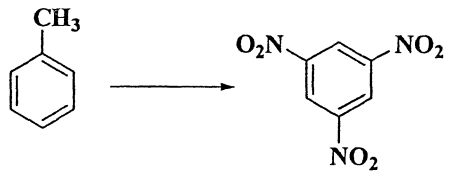
(20 Marks)

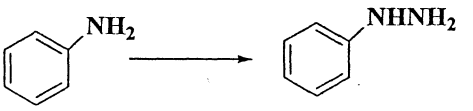
4. (a) Briefly explain why mixed claisen condensation can be carried out efficiently with diethyl oxalate **or** with ethyl formate than with ethyl acetate.

(20 Marks)

(b) Give necessary reagents and conditions to carry out the following multistep reactions.

(i) 

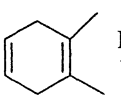
(ii) 

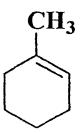
(iii) 

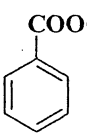
(45 Marks)

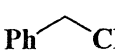
(c) Predict the products **(Q - W)** of the following reactions.

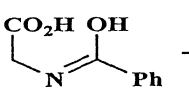
(i) $PhCOOH + NH_3 \xrightarrow{200°C} Q$

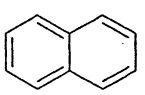
(ii)  $\xrightarrow{RCOOOH}$ **R**

(iii)  $\xrightarrow[2.\ Na_2Cr_2O_7/H_2SO_4]{1.\ B_2H_6}$ **S**

(iv)  $\xrightarrow[Conc\ H_2SO_4\ 5\text{-}15°c]{Conc\ HNO_3}$ **T**

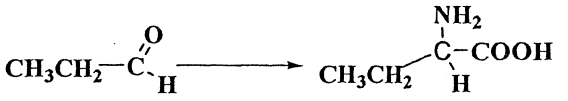
(v)  $\xrightarrow{MeONO\ /\ MeO^-}$ **U**

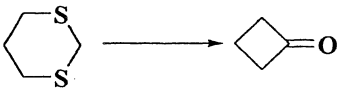
(vi)  $\xrightarrow[-H_2O]{Ac_2O}$ **V**

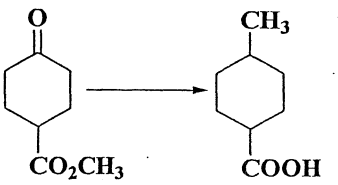
(vii)  $\xrightarrow{HNO_3\ /\ HOAc}$ **W**

(35 Marks)

5. (a) Indicate how you would carry out the following synthesis.

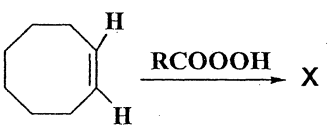
(i) 

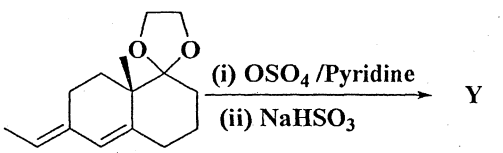
(ii) 

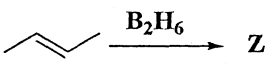
(iii) 

(60 Marks)

(b) Give the structures of the products (**X –Z**) you expect from the following reactions.

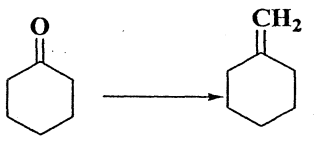
(i) 

(ii) 

(iii) 

(15 Marks)

(c) How would you use the Wittig reagent to carry out this synthesis ? Give the mechanism for the reaction.



(25 Marks)

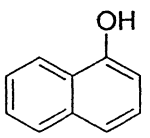
6. a) Explain the following statements.

i. The C_1-C_2 bond of naphthalene is shorter than the C_2-C_3 bond.

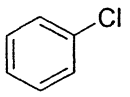
ii. Electrophilic substitution of anthracene occur readily at position 9-10

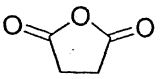
(30 marks)

b) Predict the products (**A-E**) of the following reactions.

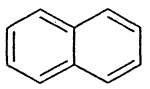
(i) 

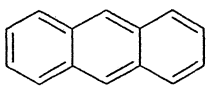
$\xrightarrow[2.\ H^+]{1.\ C_6H_5N_2Cl/NaOH/0\text{-}5°C}$ **A**

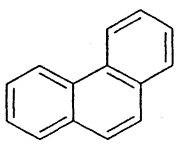
(ii) 



$\xrightarrow[AlCl_3]{}$ **B**

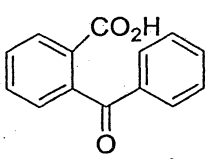
(iii) 
$\xrightarrow[10\text{-}15°C]{CrO_3/CH_3CO_2H}$ **C**

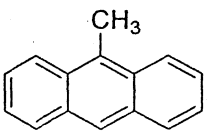
(iv) 
$\xrightarrow[H_2SO_4]{Na_2Cr_2O_7}$ **D**

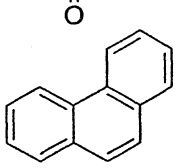
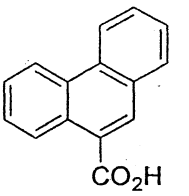
(v) 
$\xrightarrow[CH_3CO_2H]{H_2O_2}$ **E**

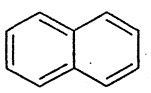
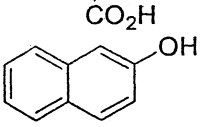
(40 marks)

c) Giving necessary reagents and reaction conditions indicate how the following conversions could be effected.

(i) 

$\longrightarrow$ 

(ii) 
$\longrightarrow$ 

(iii) 
$\longrightarrow$ 

(30 marks)

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