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THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME 2017 / 2018

LEVEL 5 - FINAL EXAMINATION

CYU5303 - ORGANIC CHEMISTRY II

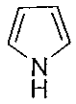
DURATION: 02 HOURS

Wednesday, 12th September 2018 1.30 – 3.30 p.m.

Answer ALL FOUR (04) questions.

1) Answer any **FOUR (04)** parts from parts (a) – (e).

(a) Explain why pyrrole is more reactive than benzene towards electrophilic substitution reactions.



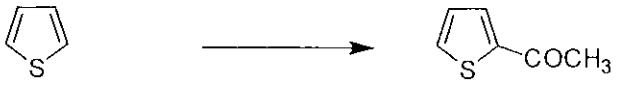
pyrrole

(b) Draw the resonance structures of pyrrole and thiophene and explain why the resonance energy of pyrrole is much less than that of thiophene.

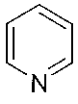
Thiophene

(c) Give the reaction conditions of the following reactions.

(i) 

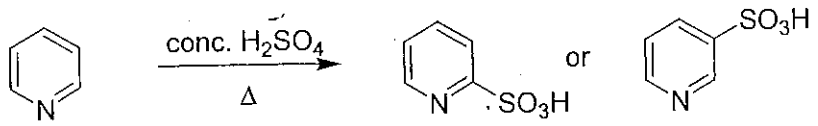
ii) 

(d) The H atoms of methyl groups attached to C-4 of pyridine are acidic. Explain this statement giving the relevant resonance structures.



pyridine

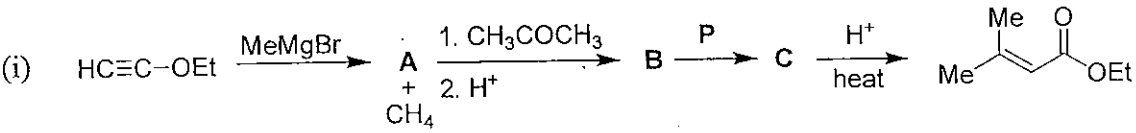
(e) Giving reasons select the most likely product that you expect from the reaction given below.



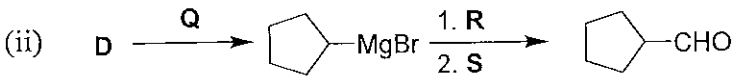
(25 x 4 = 100 Marks)

2) (a) Give the structures of compounds **A – D** and the reagents **P – S** in the following reaction scheme.

(i)

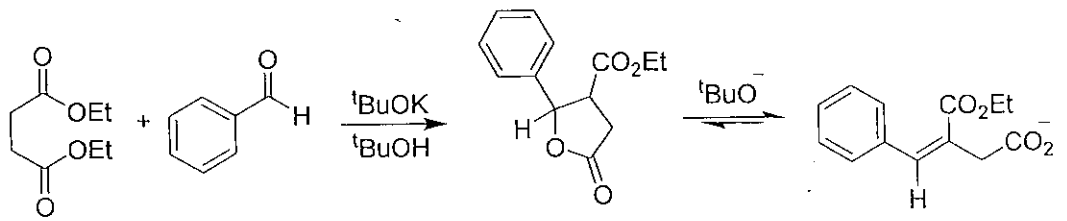


(ii)



(40 Marks)

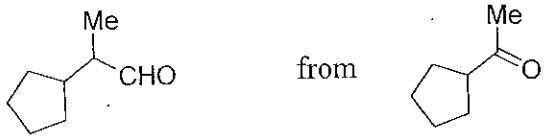
(b) Indicate the mechanism of the following reactions.



(20 Marks)

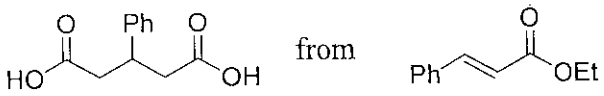
(c) Giving necessary reagents and conditions show how you would carry out any **two (02)** of the following syntheses using the indicated reaction/method.

(i)



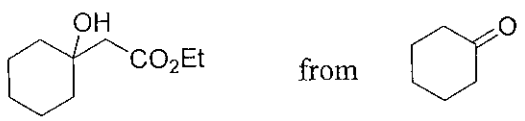
using Darzen reaction

(ii)



using Michael Addition

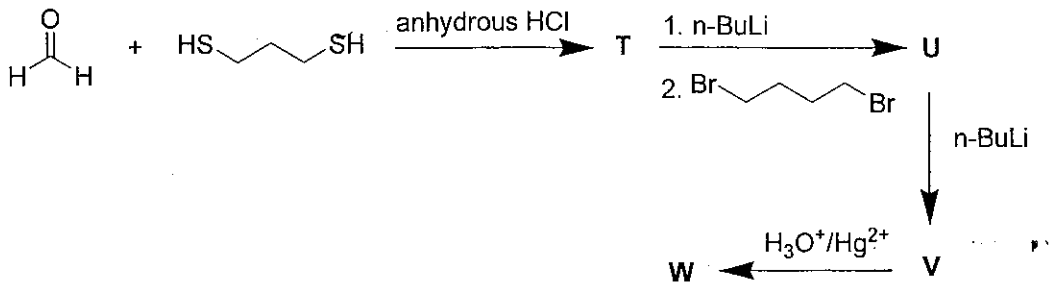
(iii)



using Reformatzky reaction

(40 Marks)

3) (a) Give the structures of the compounds **T** – **U** of the following reaction scheme.

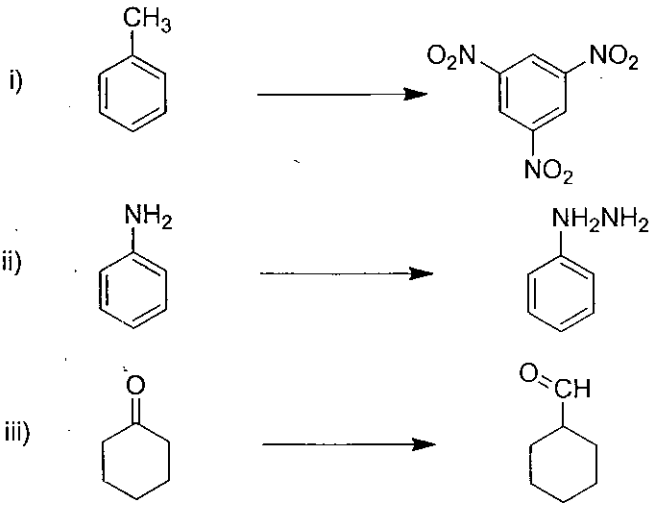


(20 Marks)

(b) Show how you would use 'Ritter reaction' to synthesize $(CH_3)_3C\text{-}NH_2$ from $(CH_3)_3COH$.

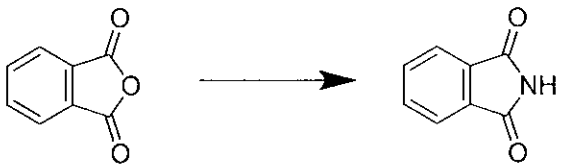
(20 Marks)

(c) Give necessary reagents and conditions show how you would carry out the following multistep reactions.



(40 Marks)

(d) Indicate the mechanism involved in the conversion of phthalic anhydride to phthalimide in the presence of aqueous ammonia.



(20 arks)

4) (a) A halogenated hydrocarbon (**E**) showed M^+ and $[M+2]^+$ at m/e 136 and 138 respectively with almost equal relative intensity. It showed one singlet in its ^1H NMR spectrum.

(i) Giving reasons determine the halogen present in the compound (**E**)?

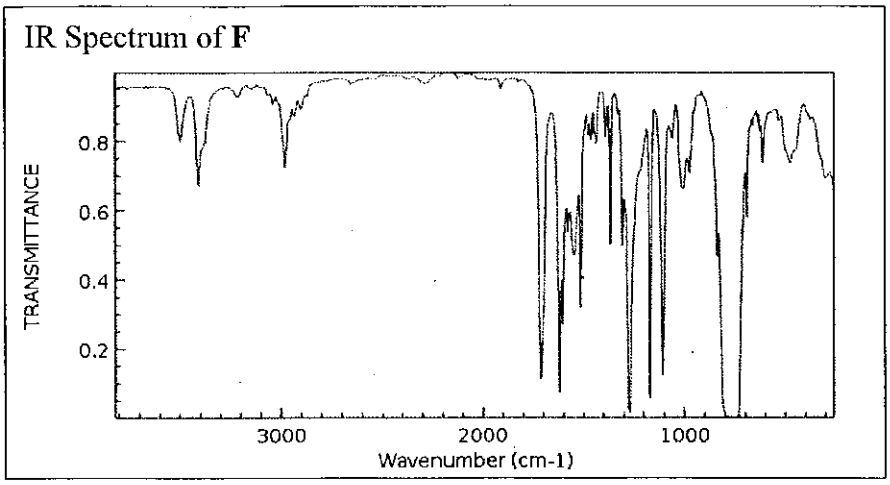
(ii) Propose a structure for the compound (**E**).

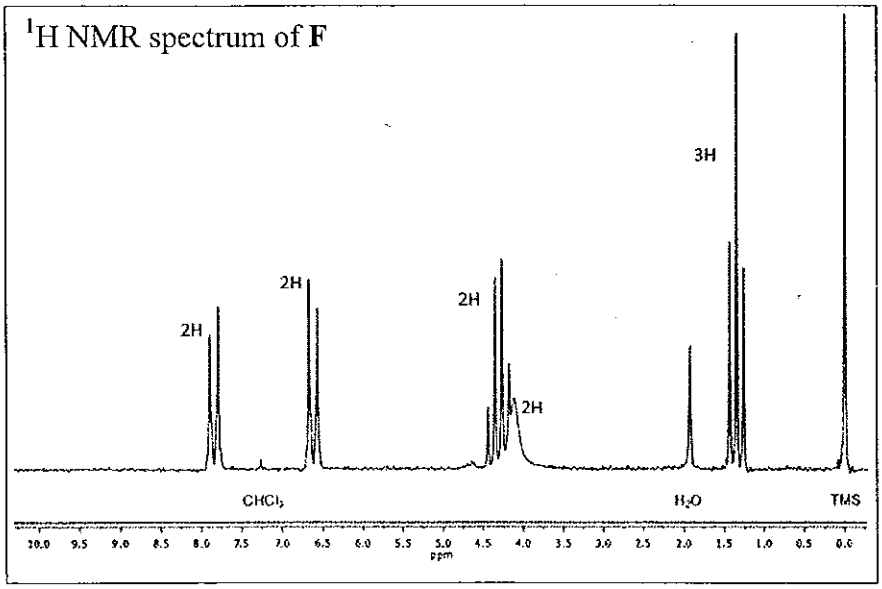
(15 Marks)

(b) Explain why EI mass spectrum of ethyl benzene shows a strong peak at *m/e* 91.

(10 Marks)

(c) Given below are IR and ^{1}H NMR spectra of compound **F** ($C_9H_{11}NO_2$).





(i) What are the functional groups present in **F**?

(ii) How many different types of protons are present in the compound **F**?

(iii) Deduce the structure of the compound **F** and assign the ^{1}H NMR data.

(iv) If D_2O is added to the NMR sample of **F** and shaken for a while and the NMR spectrum recorded, what changes would you see in the ^{1}H NMR spectrum of **F**?

(75 Marks)