EASTERN UNIVERSITY, SRI LANKA

SPECIAL DEGREE EXAMINATION IN CHEMISTRY

(FEB/MARCH' 2014)

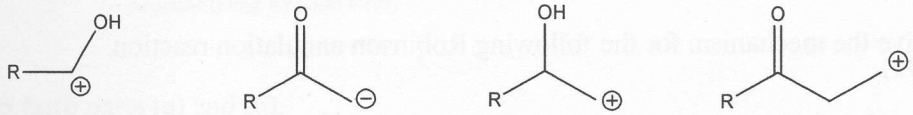
FOURTH YEAR FIRST SEMESTER-2009/2010

CHS 06-ORGANIC CHEMISTRY II

Answer all questions **Time allowed: 02 hours**

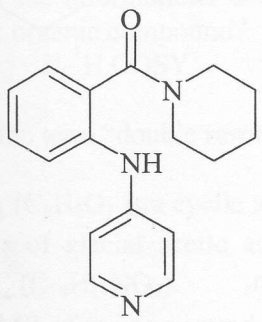
1. Answer **both** parts (a) and (b).

(a) What are "synthons"? Explain how the synthons could be classified? Classify the following synthons and give the corresponding equivalents.

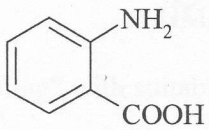


(b) Using the synthon approach, devise synthetic strategies for the following compounds. Show how the syntheses could be effected from the starting materials given.

(i)



From



Ofornine (antihypertensive drug)

(ii)

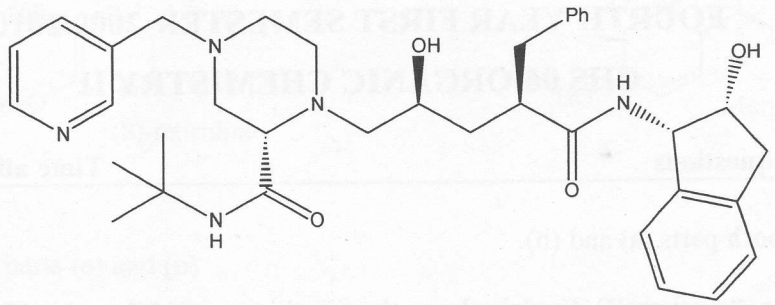
from HC≡CH

Violet oil

(100 marks)

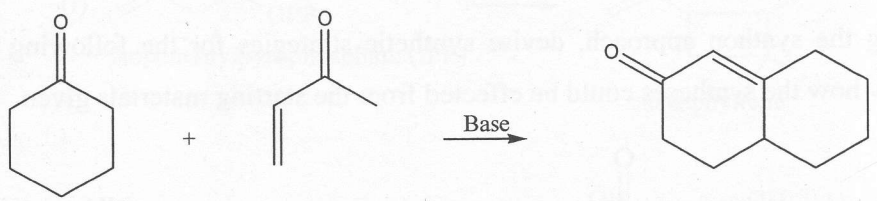
2. Answer **both** parts (a) and (b)

(a) The following molecule is known as crixivan, HIV protease inhibitor. Carry out suitable disconnections using retrosynthetic analysis.



Indicate how you could synthesize the synthons you proposed.

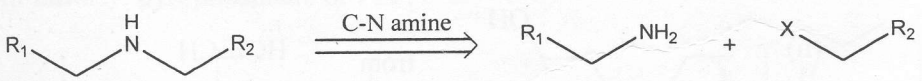
(b) Give the mechanism for the following Robinson annulation reaction.



(100 marks)

3. Answer **both** parts (a) and (b).

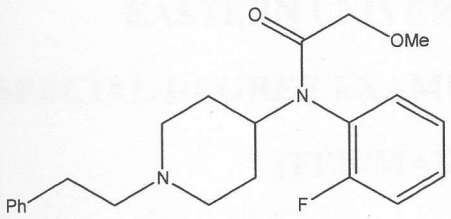
(a) Consider the following disconnection reaction.



Explain why the above disconnection is unsuitable. Suggest **two** suitable disconnections for this molecule.

(100 marks)

(b)Using the synthon approach, devise synthetic strategies for the following compounds. Show how the syntheses could be effected from the starting materials given.



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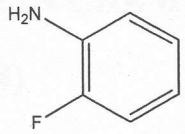
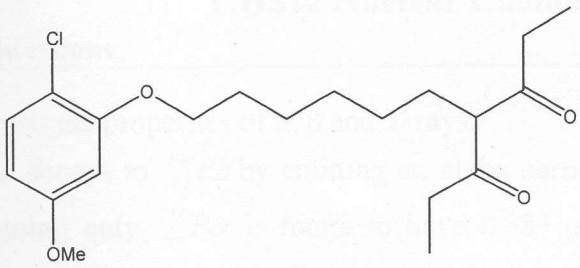


Ocfentanil (Pain killer)



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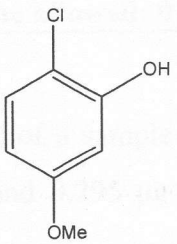

Arildone (Drug for polio virus)

(100 marks)

4. Answer **both** parts (a) and (b).

(a) (i) What is/are the difference/s between the one dimensional experiments and two dimensional experiments in the NMR spectroscopy for data/signal presentation?

(ii) What are the informations obtained from the following 2-D NMR methods for a particular organic compound?

x) ^{1}H-^{1}H COSY y) HMQC z) HMBC

(iii) Explain the term "double resonance or spin decoupling" with suitable example

(b) Compound **A** ($C_6H_6O_3$ is a cyclic anhydride) reacted with the compound **B** ($C_8H_{11}N$) in the presence of glacial acetic acid and then slightly warm the mixture to form a compound **C** ($C_{14}H_{17}NO_3$).

The ^{13}C –NMR of the compound **A** ($C_6H_6O_3$) had signals at δ 166.0 (s), 125.3 (d) and 32.3 (t).

The IR spectrum of the **B** ($C_8H_{11}N$) had absorptions at ν_{max} 3375, 3325, 3025 and 820 cm^{-1}. Its 1H-NMR spectrum showed signals at δ 6.87(d,9Hz,2H), 6.41(d,9Hz,2H), 3.90(s,2H,removed by D_2O), 2.59(q,7Hz,2H) and 1.24(t,7Hz,3H).

The IR spectrum of the **C** ($C_{14}H_{17}NO_3$) had absorptions at ν_{max} 3200-2550 (broad), 1750, 1670, 1600 and 825 cm^{-1}.

Interpret the spectroscopic data and chemical reaction involved and deduce the structures of the compounds **A**, **B** and **C**.

(100 marks)