

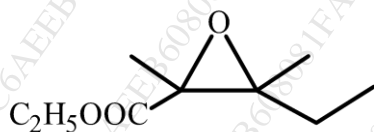
(2 1/2 Hours)

Marks:60

- N.B. i) All questions are compulsory.  
ii) Figures to the right indicate full marks.

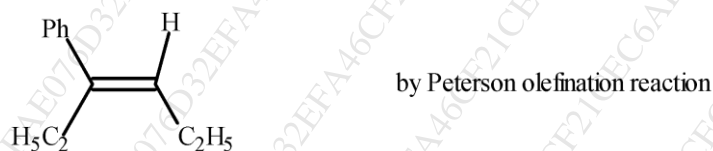
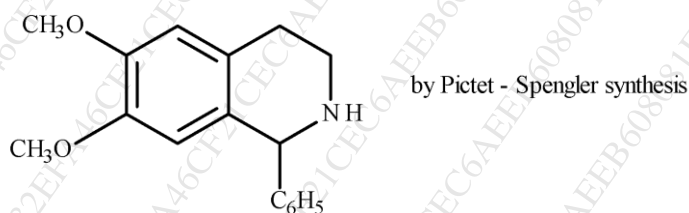
1. A. Attempt **any two** of the following: **8**

- i) What are the characteristics of a click reaction? Give an example of the Huisgen 1,3-dipolar reaction.  
ii) Discuss the mechanism and one application of the Ugi 4-component reaction.  
iii) How will you prepare the following compound by the Darzen's glycidic ester condensation?



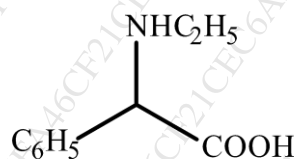
Explain the mechanism of this reaction.

- iv) How will you prepare the following



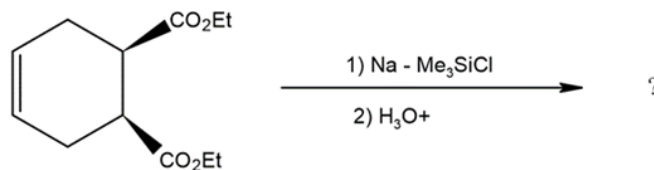
B Attempt **any one** of the following: **4**

- i) Give an example each of the following  
Hantzsch synthesis  
Mitsunobu reaction,  
Ritter reaction  
Mukaiyama esterification.  
ii) What are multicomponent reactions? List any two advantages of these reactions. Show the synthesis of the following compound by a suitable multicomponent reaction.

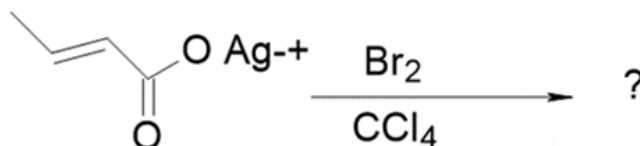


2. A Attempt **any two** of the following: 8

- i) Give the product and mechanism of the following reaction.



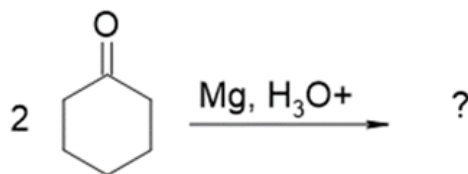
- ii) Predict the product, name the reaction and suggest the mechanism.



- iii) Discuss with suitable examples, intramolecular C-C bond formation using tin hydride.  
 iv) Explain persistent radical with its stability and radical initiator with suitable examples.

B Attempt **any one** of the following: 4

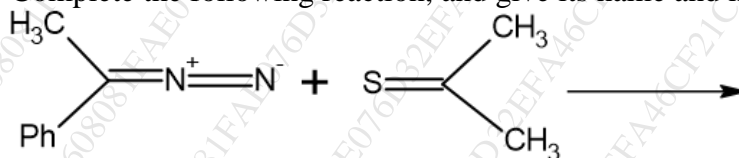
- i) Predict the product, name the reaction and suggest the mechanism.



- ii) Define radicals and discuss the characteristics of radicals.

3. A Attempt **any two** of the following: 8

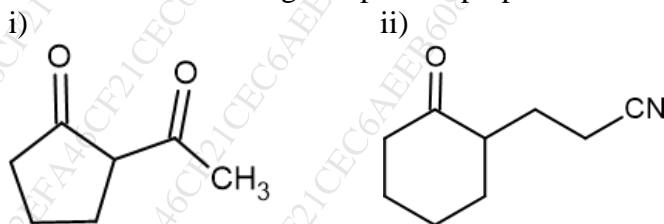
- i) How are enamines prepared using alkynes? Give one example and explain the mechanism involved.  
 ii) Complete the following reaction, and give its name and mechanism



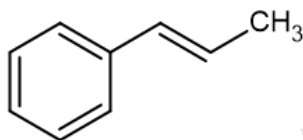
- iii) What is Steven's rearrangement? Illustrate with the mechanism and one application.  
 iv) Explain the generation of carbanions in nitro compounds and phosphonates and give one application of each in C-C bond formation

B Attempt **any one** of the following: 4

- i) How are the following compounds prepared via enamine?

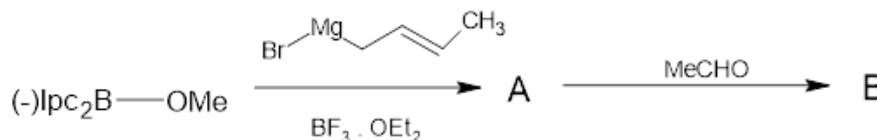


- ii) Using phosphorous ylide, suggest synthesis of the following compound. Name the reaction involved and provide a mechanism for the same.

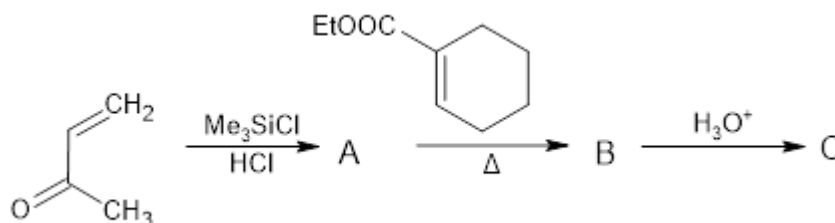


4. A Attempt **any two** of the following: 8

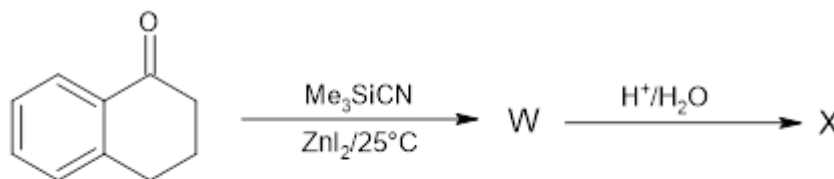
- i) Give the synthesis of 1,3-butadiene using  $\text{PhSeCH}_3$ .  
 ii) Complete the following reaction with correct stereochemistry and predict the mechanism.



- iii) Complete the following reaction and identify A, B and C.

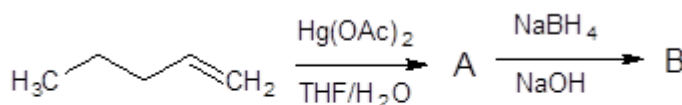


- iv) Complete the following reaction by identifying W, X, Y and Z.



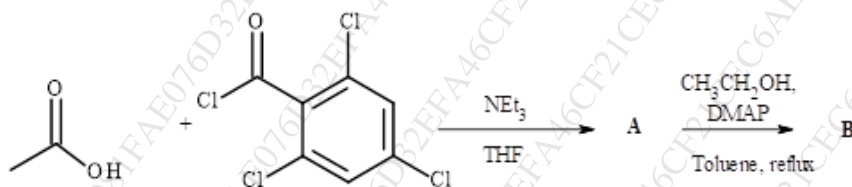
B Attempt **any one** of the following: 4

- i) Trialkylborane when reacted with  $\text{NaCN}$  in presence of  $(\text{CF}_3\text{CO})_2\text{O}$  at low temperature gives ketone while in excess of  $(\text{CF}_3\text{CO})_2\text{O}$ ,  $\text{H}_2\text{O}_2/\text{OH}^-$  and higher temperature gives tertiary alcohol. Explain with a suitable example.  
 ii) Complete the following reaction and predict its name and mechanism.



5. Answer **any four** of the following: 12

- (a) What is a multi-component organic reaction between an aryl aldehyde, a  $\beta$ -keto ester and urea called? Illustrate this reaction with a suitable example.
- (b) Complete the following reaction by drawing suitable structures for A and B.

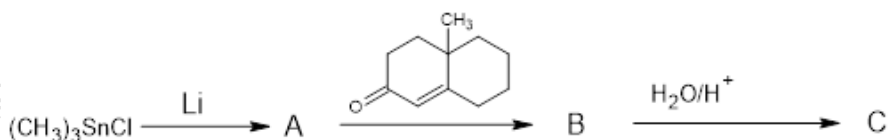


What is the name of this reaction?

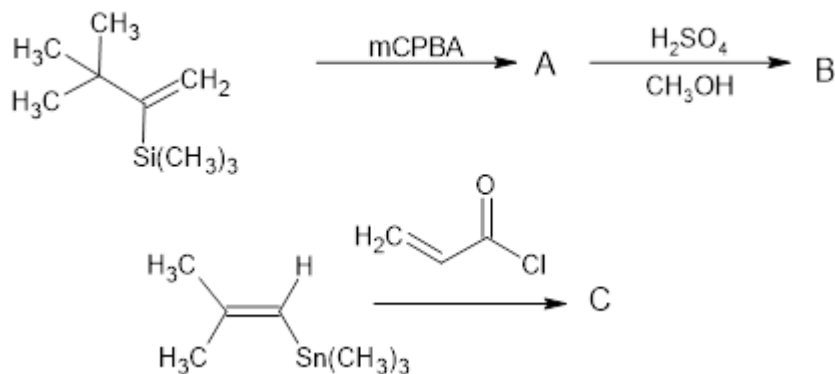
- (c) With a suitable example, explain the mechanism of McMurry coupling.
- (d) Write the reagent, by-product and name of the following reaction.



- (e) Write the structures of phosphorus and nitrogen ylide. Which ylide is most stable. Justify the answer.
- (f) What is Bestmann Ohira reagent? How is it prepared? What is its advantage?
- (g) Identify A, B and C in the following reaction.



- (h) Identify A, B and C in the following reaction.



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