M. Sc. Chemistry Examination, 2019

(3rd Semester)

Organic Chemistry Special

Paper - XII-O

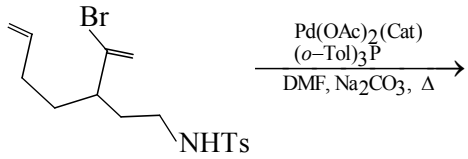
Time : Two hours Full Marks : 50

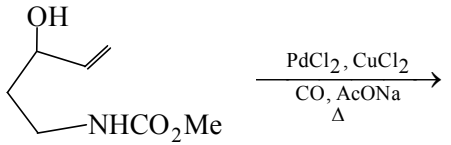
(25 marks for each unit)

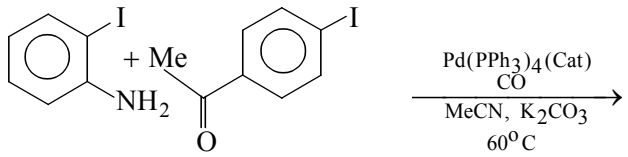
Use a separate answerscript for each unit.

UNIT - O - 3121

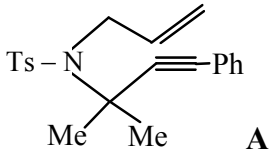
1. a) Predict the major product(s) and explain with plausible mechanism of the following reactions : 3×3

i) 

ii) 

iii) 

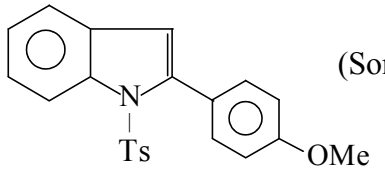
b) How can you synthesise the following compound **A** using Nicolas reaction ? Explain the mechanism.



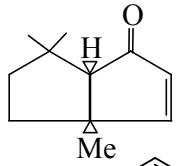
A

What will happen when the aforesaid compound is heated with $Co_2(CO)_8$? Give the mechanism. 2+3

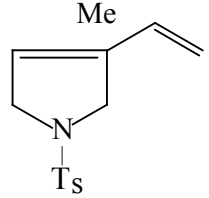
c) How can you achieve the synthesis of the following compounds using the reaction indicated in parenthesis in one of the steps ? 2×4

i) 

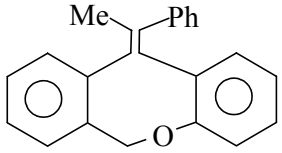
(Sonogashira coupling)

ii) 

(Stille coupling)

iii) 

(Metathesis)

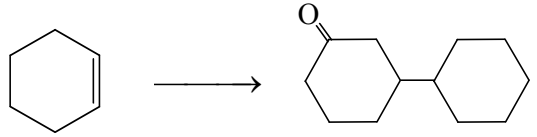
iv) 

(Suzuki coupling)

b) B-alkylcatecholboranes can act as radical precursors compared to trialkylborane – Justify with proper reason.

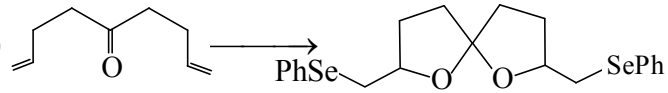
c) How do you carry out the following transformations using organoboron reagents.

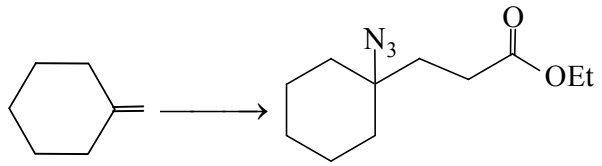
i) $C_6H_{11}C \equiv CH \rightarrow C_6H_{11} - C \equiv C - C \equiv C - C_2H_5$

ii) 

5. a) Comment on the protocols of deselenenylation with mechanisms. $2\frac{1}{2}$

b) How do you carry out the following conversions using organoselenium reagents (show mechanism) ***(any one)*** 2×1

i) 

ii) 

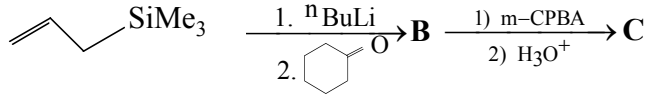
d) Discuss the role of CuX and fluoride ion in the Stille coupling reaction. 2

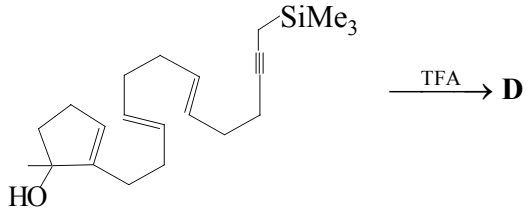
e) How can a Lewis base accelerate the Pauson-Khand reaction ? 1

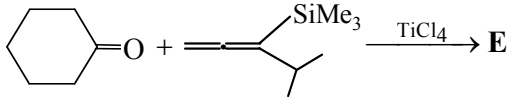
UNIT - O - 3122

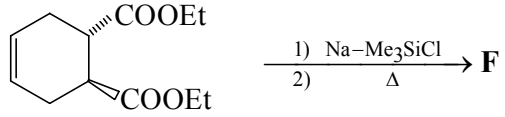
2. a) Write down the steps for the synthesis of diphenyl acetylene using trimethylsilyl diazomethane by Colvin rearrangement. Why is trimethylsilyl diazomethane superior to diazomethane ? $2+\frac{1}{2}$

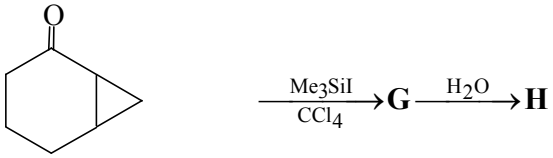
b) Predict the product(s) of the following reactions with plausible mechanism, wherever applicable ***(any five)*** 2×5

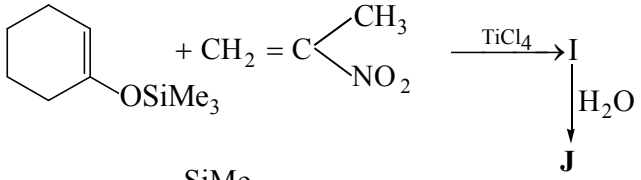
i) 

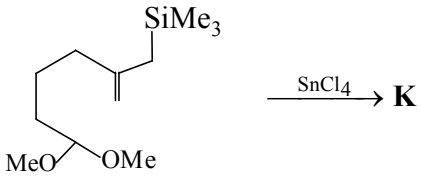
ii) 

iii) 

iv) 

v) 

vi) 

vii) 

3. Answer ***any two*** of the following questions : 2×2

a) Comment on the MO-diagram of Ligand-Metal interaction for Fischer and Schrock carbenes.

b) α, β -Unsaturated Fischer carbenes can serve as a Michael acceptor – Explain it with proper example.

c) What is Petasis reagent ? Give a comparison with the Tebbe's reagent.

4. Answer ***any two*** of the following questions : 2×2

a) Stereoselective aldol condensation can be achieved by Boron enolates – Justify with proper example.