ii) Account for the change in chemical shift value for ^{31}P NMR of the following two compounds:

PCl_3[δ(P) = 220 ppm] and PF_3[δ(P) = 97 ppm]

iii) What are the common reference compounds used in ^{19}F nmr measurements and their expected chemical shift values? What would be the nature of ^{1}H and ^{19}F nmr spectra for the compound $CH_3C(=O)CH_2F$?

M. Sc. Chemistry (Special Supplementary)

Examination, 2023

(3rd Semester)

Paper: XII-O

[Organic Chemistry Special]

Time : Two Hours Full Marks : 40

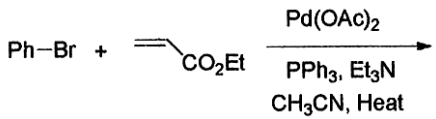
(20 marks for each Unit)

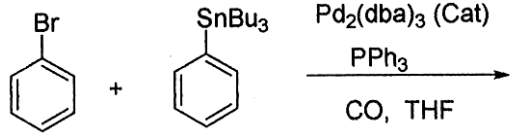
Use a separate answer script for each Unit.

UNIT – O-3121

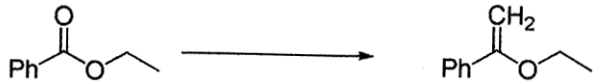
Answer ***all*** the questions:

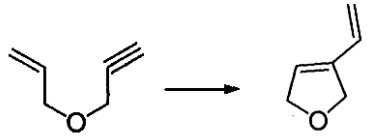
1. a) Predict mechanistically the structure of the products in the following reactions. 3+3

i) 

ii) 

b) Mention the reagents for the following transformations and explain the formation of products with plausible mechanism. 3+3

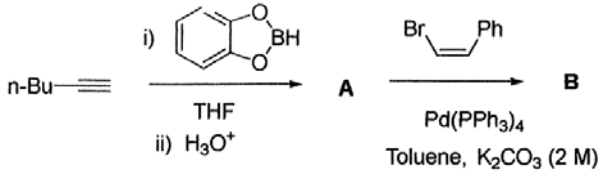
i) 

ii) 

c) Describe the mechanism of reduction of $PdCl_2$ to Pd(0) in the presence of Et_3N. 2

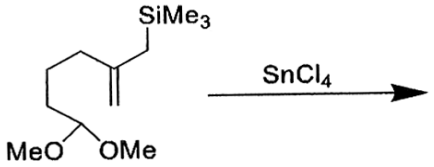
d) Mechanistically explain the regionselectivity of Pauson-Khand reaction between phenylacetylene and 1-butene. 3

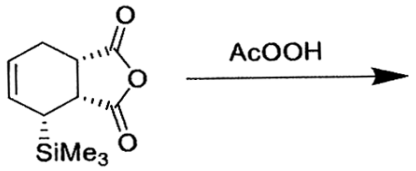
e) Write down the structure of the products **A** and **B**. Mechanism is not required. 3

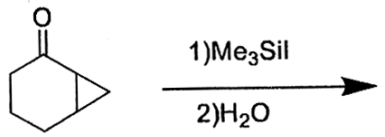


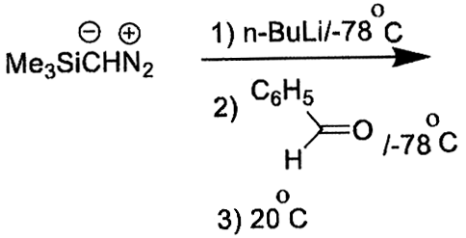
UNIT – O-3122

2. a) Predict the product(s) of the following reactions with plausible mechanism (***any three***) : $1\frac{1}{2}\times 3$

i) 

ii) 

iii) 

iv) 

b) Why are the allyl silanes more reactive than vinyl silanes? $\frac{1}{2}$

3. Explain briefly the basic principle of MALDI-TOF mass spectrometry, including the mechanism of ion formation and the role of the matrix. Mention its two essential applications. 4+1

4. Write short notes on (any ***two*** of the following) : $2\times 2\frac{1}{2}$

i) Polarization transfer

ii) Nuclear overhauser effect

iii) DEPT

iv) COSY

5. Answer ***any two*** of the following questions : $2\times 2\frac{1}{2}$

i) Comment on the advantages of using HSQC, HMBX and DQF-COSY experiments towards elucidiation of chemical structure of an organic compound.