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It is further certified that the student has fulfilled all the requirements of Comprehensive, Candidacy, and SOTA.

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List of Notations, Symbols and Abbreviations

Notations	Abbreviations
%	Percentage
<	Less than
>	More than
°	Degree
Å	Angstrom
Ac	Acetyl
Ac ₂ O	Acetic anhydride
AcOH	Acetic acid
Bn	Benzyl
Bz	Benzoyl group
Boc	Di- <i>tert</i> -butyl dicarbonate
brs	Broad singlet
Obser.	Observed
Calc.	Calculated
©	Copyright
CHCl ₃	Chloroform
CD ₃ OD	Methanol-d ₄
CDCl ₃	Deuterated chloroform
cm	Centimeter
<i>J</i>	Coupling constant
DMF	Dimethylformamide
DMSO- <i>d</i> ₆	Deuterated dimethyl sulfoxide
D ₂ O	Deuterated water
°C	Degree Celsius
d	Doublet
DMAP	4-Dimethylaminopyridine
DCE	Dichloroethane
DCM	Dichloromethane
dd	Doublet of doublet
ddd	Doublet of doublet of doublet
ddt	Doublet of doublet of triplet
DMSO	Dimethyl sulfoxide
dq	Doublet of quartet

dt	Doublet of triplet
DBU	1,8-Diazabicyclo[5.4.0]undec-7-ene
DABCO	1,4-Diazabicyclo[2.2.2]octane
equiv.	Equivalent
EtOH	Ethanol
EtOAc	Ethyl acetate
EDG	Electron donating group
EWG	Electron withdrawing group
equiv.	Equivalent
g	Gram; Gravitational force
BAs	Barbituric acids
h	Hour
Sc(OTf) ₃	Scandium (III) Trifluoromethanesulfonate
H ₂ DEBA	Diethylbarbituric acid
Hz	Hertz
IR	Infra-Red
LDA	Lithium diisopropylamide
m	Multiplet
H ₃ BA	Barbituric acid
MeOH	Methanol
mg	Milligram
MHz	Megahertz
min	Minute
mL	Milliliter
mm	Millimeter
mmol	Millimole
μm	Micrometer
M.p.	Melting point
nm	Nanometer
NMR	Nuclear Magnetic Resonance
<i>n</i> -BuLi	<i>n</i> -Butyllithium
KOH	Potassium hydroxide
pH	Potential of hydrogen
ppm	Parts per million
RT	Room temperature
NaCl	Sodium chloride

s	Singlet
NMP	N-Methyl-2-pyrrolidone
<i>t</i> -Bu	Tertiary butyl
THF	Tetrahydrofuran
TLC	Thin-Layer Chromatography
TMS	Tetramethylsilane
CF ₃ COOH	Trifluoroacetic acid
UV	Ultraviolet
XRD	X-ray Diffraction
α	Alpha
β	Beta
γ	Gamma
δ	Chemical shift
[ox]	Oxidation
R _f	Refractive Index
i.e.	that is
<i>o</i>	Ortho
<i>m</i>	Meta
<i>p</i>	Para
H ₂ O ₂	Hydrogen peroxide
H ₂ SO ₄	Sulfuric acid
Et ₃ N	Triethylamine
Cu(OTf) ₂	Copper (II) trifluoromethanesulfonate
Yb(OTf) ₃	Ytterbium (III) trifluoromethanesulfonate
TBHP	<i>tert</i> -Butylhydroperoxide
BHT	Butylatedhydroxytoluene
Ag ₂ O	Silver(I) oxide
LiAlH ₄	Lithium aluminium hydride
ZnCl ₂	Zinc chloride
Ni(OTf) ₂	Nickel (II) trifluoromethanesulfonate
KMnO ₄	Potassium permanganate
K ₂ S ₂ O ₈	Potassium persulfate
TEMPO	(2,2,6,6-Tetramethylpiperidin-1-yl)oxidanyl
ZnO	Zinc oxide
CH ₃ COOH	Acetic acid

<i>p</i> -TSA	<i>p</i> -Toluenesulfonic acid
TiO ₂	Titanium dioxide
CuCl	Copper (I) chloride
AlCl ₃	Aluminium chloride
NaBH ₄	Sodium borohydride
DTBP	Di- <i>tert</i> -butyl peroxide
et al.	et alia, Latin for “and others”
i.e.	that is
e.g.	Example
equiv.	Equivalents

General Experimental Considerations

All the chemicals were procured from Aldrich, USA and E. Merck, Germany and were used as received. The solvents were purchased from Merck, India and Ranbaxy, India and were purified before its use. The preparation and particulars of the substrates employed for the work undertaken are given in their respective chapters. **Melting points** were measured using Stuart Melting point apparatus SPM10 in open capillary tubes and are uncorrected. **Infrared (IR)** spectra were recorded on Perkin-Elmer FT-IR-5300 spectrophotometer (ν_{\max} expressed in cm^{-1}). The ^1H (500 MHz) and ^{13}C (126 MHz) **NMR** spectra were run on a Bruker Advance 500 MHz FT-NMR at 500 MHz spectrometers. Chemical shifts are given in δ ppm, using tetramethylsilane (TMS) as an internal standard. The **elemental microanalyses** were performed on Exeter Analytical Inc Model, CE-440 elemental analyzer.

Thin-layer Chromatography (TLC) was performed on glass plates (7.5×2.5 and 7.5×5.0 cm) coated with Merck silica gel GF 254 using various combinations of ethyl acetate and n-hexane as an eluent. Visualization of spots was accomplished either in iodine chamber or by exposure to UV light. Merck silica gel (100-200 mesh) was used for column chromatography (approximately 15-20 g per 1 g of the crude product).