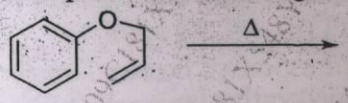
[Time : 2 ½ Hours] [Total marks: 75]

N.B. : (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Use of logarithmic table/non-programmable calculator is allowed.

Q.1 Attempt Any Three of the following: 15

A. a) Discuss the $A_{AC}2$ mechanism of acid catalysed esterification of carboxylic acid. 03
b) Distinguish between basicity and nucleophilicity. 02

B. a) Discuss the stereochemistry of NGP with a suitable example. 03
b) Complete the following reaction and name the reaction involved. 02



C. a) Explain with mechanism pyrolysis of acetates. 03
b) Complete the following reaction and name the reaction involved. 02

$CH_3COOCH_3 + NaOH \longrightarrow ?$

D. Explain the mechanism of photoreduction of benzophenone to benzpinacol. 05

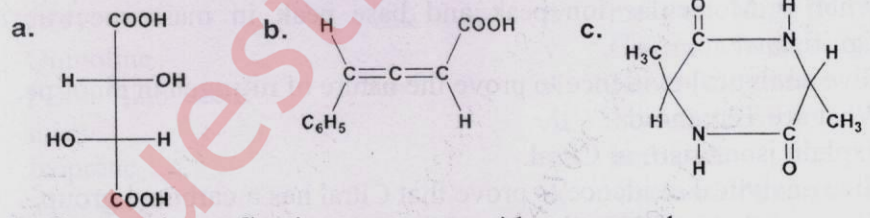
E. a) Explain the Norrish type-II reaction of pentan-2-one. 03
b) Write a note on photosensitization reaction. 02

Q.2 Attempt Any Three of the following: 15

A. Explain the stereochemistry of unsymmetrically substituted biphenyls using suitable example. 05

B. State whether following molecules are chiral or achiral

a) 03



b) Define rotation reflection symmetry with an example 02

C. a) Convert pyridine to pyridine-N-oxide. Draw the resonating structures of pyridine-N-oxide. 03

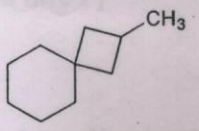
b) What is the action of following reagents on pyridine-N-oxide? 02
i) SO_2Cl_2
ii) Conc.HNO_3 + Conc. H_2SO_4 at 160^0 C.

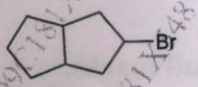
D. Give the Bischler-Napieralski synthesis for the preparation of Isoquinoline. Write the reaction of isoquinoline with alkaline $KMnO_4$. 05

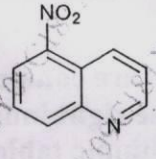
E. a) Write the synthesis of Indole-3-acetic acid. 03
b) What are Agrochemicals? How are they classified? 02

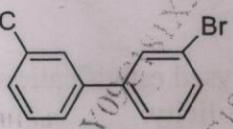
Q.3 **Attempt Any Three of the following:** **15**

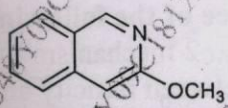
A. Write IUPAC name of the following compounds. **05**

i) 

ii) 

iii) 

iv) 

v) 

B. How adipic acid is prepared from glucose? Write significance with reaction. **05**

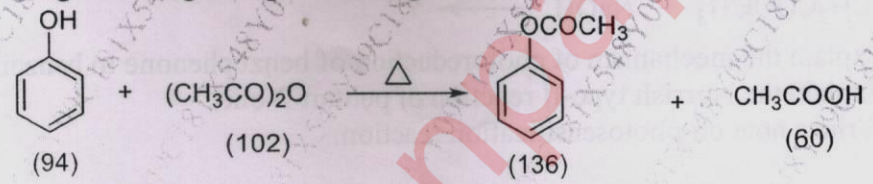
C. State any two principles of green chemistry. Explain with suitable example. **05**

D. Write a note on : **05**

i) E-Factor

ii) Sonication technique used in organic synthesis.

E. Calculate the % atom economy and theoretical yield of the following reaction if the given weight of phenol is 2g. **05**



Q.4 **Attempt Any Three of the following:** **15**

A. Illustrate the electronic transition of organic molecules. Give application of UV spectroscopy. **05**

B. What is Molecular ion peak and base peak in mass spectrum? Write the significance. **05**

C. **a)** Give analytical evidence to prove the nature of nitrogen in nicotine. **03**

b) What are Terpenoids? **02**

D. **a)** Explain isomerism in Citral. **03**

b) Give analytical evidence to prove that Citral has a carbonyl group. **02**

E. Write synthesis of Nicotine from Nicotinic acid. **05**

Q.5 **Answer the following:** **15**

A. **Select whether the following statements are true or false (Any five)** **05**

a. A transition state has highest energy and least stability.

b. Carbonyl compounds containing α-H atom show Norrish type-I cleavage.

c. Karanjin is the main active ingredient of karanja oil.

d. Compound having centre of symmetry will be optically active.

e. Number of π- bond in the structure of biphenyl is 6.

f. Trichloromethane is a green solvent.

g. Citral is a diterpene.

h. Decrease in absorbance intensity in U.V spectrum is called Hypsochromic shift.

B. Select the correct option and complete the following statements. (Any five) 05

a. All Electrophiles are……..
a) Lewis acids b) Lewis bases
c) Neutral d) Electron pair donar

b. Conversion of allyl benzene to phenyl cyclopropane is an example of ……reaction.
a) di-π Methane b) Norrish type-I
c) Norrish type-II d) Wittig reaction

c. ……..compound is most basic.
a) Pyridine b) Pyridine-N-oxide c) quinoline d) isoquinoline

d. …… is not biopesticide.
a) Neem oil b) Azadiractin c) Karanja oil d) Indole-3-acetic acid

e. Phase transfer catalyst among the following is ……:..
a) Rany Ni b) Pt c) Pd d) Quaternary ammonium halide

f. Pent-1-ene on hydrobromination predominantly gives……..
a) Pentane b) 2-Bromopentane
c) 1,2-Dibromopentane d) 1-Bromopentene

g. In a mass spectrometer an organic compound is bombarded with electron of about ……energy.
a) 500 eV b) 70 eV c) 1000 eV d) 5 eV

h. Number of carboxyl group in Levulinic acid is….
a) one b) Two c) Three d) zero

C. Match the column: (Any five) 05

a.	Photoisomerization	i.	Benzo[b]pyridine
b.	Diels Alder reaction	ii.	Cumulene
c.	Isoquinoline	iii.	-OH group.
d.	DDT	iv	mass to charge ratio
e.	Quinoline	v.	Cis-trans isomerism
f.	Penta-1,2,3-triene	vi.	Benzo[c]pyridine
g.	m/e	vii.	Insecticides
h.	Isoprene	viii.	herbicide
		ix.	Cycloaddition reaction
		x.	Saponification
