[Time: 3 Hours] [Marks: 100]

1. **All questions are compulsory.**
2. **All questions carry equal marks.**
3. **Figures to the right indicate full marks.**
4. **Use of log table/ non-programmable calculator is allowed.**

Q.1 Attempt any four of the following. 20

A) Give the full form of NGP. Explain with a suitable example the effect of NGP on kinetics and stereochemistry of the reaction. 5

B) a) Distinguish between acidity and electrophilicity. 3

b) What is pyrolytic elimination of acetates? 2

C) What are pericyclic reactions? Name different types of pericyclic reactions. Explain any one of it with a suitable example. 5

D) a) Explain acyl nucleophilic substitution reaction with suitable example. 3

b) Complete the following reaction and name the reaction involved. 2

$$CH_3COOCH_3 + NaOH \longrightarrow ?$$

E) What is photoreduction? Explain the mechanism of photoreduction of benzophenone. 5

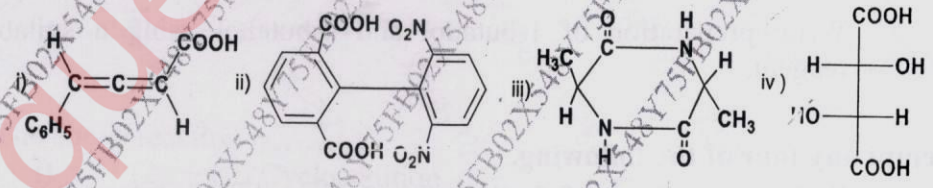
F) a) Explain the Norrish type-II reaction of 2-pentanone. 3

b) Write a note on photosensitization reaction. 2

Q.2 Attempt any four of the following. 20

A) Write a note on stereochemistry of allenes. 5

B) Define molecular chirality. State whether the following compounds are optically active or optically inactive. 5



C) Give the Skraup synthesis of quinoline. Write the reaction of quinoline with n-butyl lithium. 5

D) What is the action of following reagents on pyridine N-oxide? 5

i) Br_2, Oleum, 70^0 C

ii) SO_2Cl_2

iii) $NaNH_2$ in Liq.NH_3

iv) Conc. HNO_3 + Conc. H_2SO_4, 160^0 C

v) n-BuLi

E) a) Write a note on biopesticides. 3

b) Draw the resonating structures of Pyridine-N-oxide 2

F) What are agrochemicals? Mention its two advantages. Write the synthesis of Indole-3-acetic acid. 5

Q.3 Attempt any four of the following. **20**

A) Illustrate any two principles of Green Chemistry with suitable example. **5**

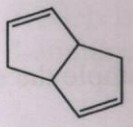
B) Draw the structure of following organic compounds; **5**

i) Bicyclo[2.2.2]octan-2-one ii) Hepta-2,3,4-trienoic acid

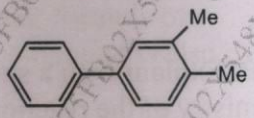
iii) 4,4'-Dinitrobiphenyl iv) 3,4-Difluoroquinoline

v) 1-Ethyl-isoquinoline

C) Write IUPAC name of the following compounds; **5**

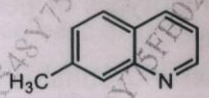


i)



ii)

iii)



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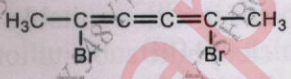


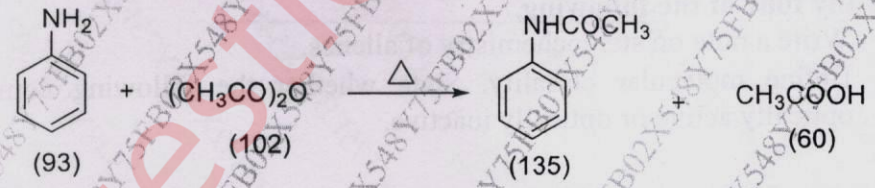
v)

D) Explain the following terms with suitable example **5**

i) Green reagent

ii) Green catalyst

E) Calculate the % atom economy and theoretical yield of the following reaction if the given weight of aniline is 0.5g. **5**



F) Write preparation of 1-butanol and 2-butanol using a suitable Grignard reagent. **5**

Q.4 Attempt any four of the following. **20**

A) Write the synthesis of citral starting from methyl heptenone. **5**

B) Explain chromophore-auxochrome interaction in UV-visible spectroscopy with suitable examples. **5**

C) What is Molecular ion peak? Give the mass fragmentation of acetone and 2-methylbut-2-ene. **5**

D) Write the synthesis of Adrenaline from 2,3-Dihydroxy benzaldehyde. **5**

E) What are Isoprene and special isoprene rules? Write the harmful effects of Nicotine. **5**

F) Explain the use of Hoffmann's exhaustive methylation and degradation in finding structure of alkaloids. **5**

Q.5 A) Select the correct option and complete the following statements: (any five) 5

a) Cope elimination is observed in……

i) N-substituted amide
ii) Aromatic ketoxime
iii) Tertiary amine oxide

b) All nucleophiles are……..

i) Lewis acid
ii) Lewis base
iii) Neutral

c) 1,3,5-Hexatriene undergoes elctrocyclic reaction to for……

i) 1,3-Cyclohexadiene
ii) Cyclohexane
iii) 1,4-Cyclohexadiene

d) Basicity is a ……term.

i) Kinetic
ii) Thermodynamic
iii) Photochemical

e) Phosphorescence involves the transition of……. ……

i) Singlet-Singlet
ii) Triplet-Triplet
iii) Triplet-Singlet

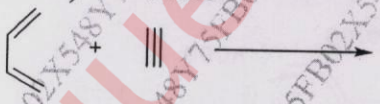
f) Conversion of Allyl benzene to phenyl cyclopropane is an example of ……reaction.

i) di-π Methane
ii) Norrish type-I
iii) Norrish type-II

g) A triplet state has a ……energy than the singlet state.

i) Low
ii) High
iii) Same

h)



The above reaction is……..

i) $(2\pi + 2\pi)$ Cycloaddition
ii) $(4\pi + 2\pi)$ Cycloaddition
iii) Group Transfer reaction

Q.5 B) State whether true or false: (any five) 5

a) Meso-tartaric acid is optically active.
b) Cummulenes with odd number of double bonds show optical isomerism.
c) Atropisomerism is due to restricted rotation around C-C single bond in biphenyls.
d) DDT and BHC belong to the class of insecticides.
e) Karanja oil is not a biopesticide.
f) Bromination of pyridine-N-oxide takes place at 4-position
g) Isoquinoline is also known as 2-azanaphthalene.

Q.5 C) Fill in the blanks with correct alternatives given in the bracket: (any five) 5

(Biphenyl, Mannich, $KMnO_4$, Methyl Chloride, three components, Nine, Vinylic, linear, NaSH, Acid, Twelve, Benzylic)

a) Methyl Lithium on treatment with …….forms ethane.
b) The reduction of m-Dinitrobenzene by using……gives m-nitroaniline.
c) o-Chlorotoluene on treatment with ……gives o-Chlorobenzoic acid.
d) Green Chemistry is based on……..principles.
e) Biginelli reaction is ……type of reaction.
f) NBS is ……brominating agent.
g) $(C_6H_5)_2$ is a molecular formula of ……
h) β-amino carbonyl compound is also called……. base.

Q.5 D) Match the columns: (any five) 5

Column A		Column B
a) Turpentine oil	(i)	Colour bearing group
b) Leuco base of crystal violet	(ii)	m/e value
c) Oxidation of Citral	(iii)	Structure of Nicotine
d) Chromophore	(iv)	α-Pinene
e) Eicosanoids	(v)	Colourless
f) Pinners work	(vi)	Geranic acid
g) Mass spectrum	(vii)	Prostaglandins
	(viii)	-OH
	(ix)	Lactic acid