[Time :3 Hours] **[Marks:100]**

NB:-

1. Please check whether you have received the right question paper
2. All questions are Compulsory
3. Figures to the right indicates full marks
4. Use of logtables/non-programmable calculator is permitted

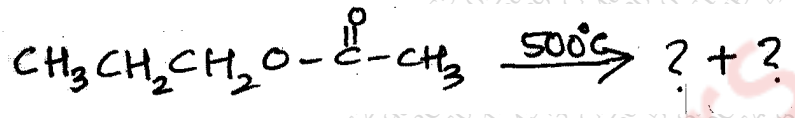
Q1 Answer **any Four** of the following

(A) a) What is NGP effect? What are its characteristics? **3**

b) Distinguish between nucleophilicity and basicity **2**

(B) a)Explain with mechanism the acid catalysed esterification of carboxylic acids **3**

b) Complete the following reaction and name the reaction involved: **2**

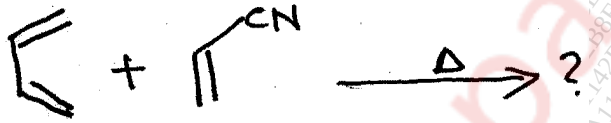


(C) a) Give the mechanism of Chugaev reaction **3**

b) Explain electrocyclic reaction with a suitable example **2**

(D) a) What are pericyclic reactions? How are they classified? **3**

b) Complete the following and name the reaction: **2**



(E) a)Explain fluoresecence and phosphorescence with the help of a neat and labelled Jablonski diagram **3**

b) Distinguish between photochemical and thermal reactions. **2**

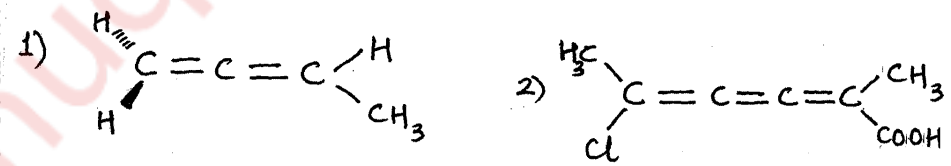
(F) a)Explain with mechanism the photoreduction of Benzophenone to Benzpinacol **3**

b) Write the products of Norrish type I reaction of Acetone at 100^0C **2**

Q2 Answer **any four** of the following

(A) Explain the stereochemistry of unsymmetrically substituted biphenyls using suitable example **5**

(B) a) State whether the following compounds are optically active or optically inactive.Justify your answer **3**

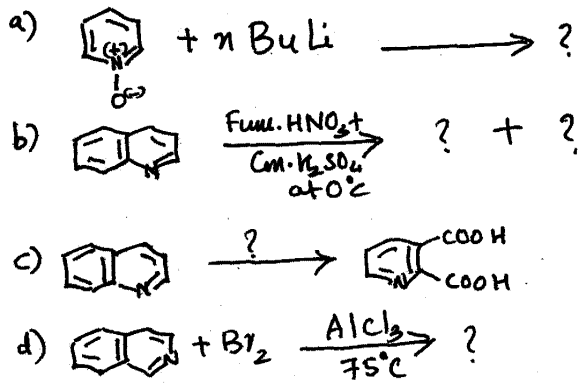


b) Define alternating axis of symmetry with a suitable example **2**

(C) Give the Skraup synthesis of Quinoline. Write the reaction of Quinoline with n-Butyl lithium **5**

(D) Convert Pyridine to Pyridine-N-oxide. Draw the resonating structures of Pyridine-N-oxide. What is its action on 1) SO_2Cl_2 and 2)Conc.HNO_3 +Conc.H_2SO_4 at 160^0C **5**

(E) Complete the following reactions:- **5**



(F) What are Agrochemicals? How are they classified? Write the synthesis of Indole-3-acetic acid **5**

Q3 Answer **any four** of the following

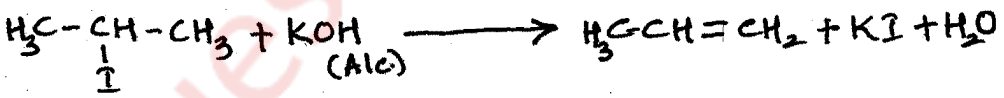
(A) Explain the following terms with suitable examples: **5**
a) Chemoselectivity b) Multicomponent synthesis

(B) Write the structure of the following compounds: **5**
a) Hexa-2,3-diene-1-oic acid b) 6-Methoxy isoquinoline-4-carbaldehyde
c) Spiro[4,4]nona-1,6-diene d) 3-Bromo bicyclo [4.2.0] octane
e) Bicyclo [3.3.2] deca-3-ene

(C) 1.2g of salicylic acid on acetylation gave 1.4g of acetyl salicylic acid. Determine the theoretical yield and percentage yield **5**
(Atomic weights: C=12; H= 1 ; O=16)

(D) Design a suitable synthesis of the following compounds: **5**
a) p-Iodo benzoic acid b) Butan-2-ol (using Grignard reagent)

(E) What is atom economy? Calculate the % atom economy in the following reaction **5**



(Atomic weights: C=12; H= 1 ; O=16; K= 39 ; I= 127)

(F) Explain the use of the following in green chemistry **5**
a) Dimethyl carbonate b) Biocatalysts

Q4 Answer **any four** of the following

(A) Give analytical evidence to prove the following: **5**
a) Nicotine contains N-Methyl pyrrolidine ring
b) Citral is an α,β-unsaturated aldehyde

(B) Explain the use of Hofmann's exhaustive methylation and degradation in the structural determination of alkaloids with an example **5**

(C) Give the synthesis of : **5**
a) Citral from methyl heptenone b) Adrenaline from catechol

(D) Discuss: **5**
a) Isomerism in citral b) Harmful effects of nicotine

(E) What are chromophores? Explain chromophore-chromophore interaction in uv-visible spectroscopy with suitable examples **5**

(F) Explain the significance of basepeak in mass spectroscopy. Give the mass spectral fragmentation of Butan-2-one **5**

Q5 (A) Select the correct answer and fill in the blanks **(any Five)** **5**

a) ----------is a kinetic term
i) acidity ii) basicity iii) electrophilicity

b) Acyl nucleophilic substitution reaction involves _____intermediate
i) triagonal ii) tetrahedral iii) cyclic

c) Insertion of carbene into double bond is an example of _____reaction.
i) chelotropic ii) sigmatropic iii) cycloaddition

d) Polar solvents increase rate of reaction of _____
i) cope elimination ii) chugaev iii) pyrolysis of acetates

e) Cope elimination proceeds through _____membered cyclic transition state
i) four ii) five iii) six

f) The number of molecules reacted or formed per photon of light absorbed is called _____
i) yield of the reaction ii) quantum efficiency iii) quantum yield

g) Norrish Type II reaction of 2-Hexanone gives _____
i) propene ii) 2-butene iii) ethene

h) Substances which initiate a photochemical reaction but itself does not undergo any change is called a_____
i) sensitizer ii) catalyst iii) promoter

(B) State whether the following are True or False **(any Five)** **5**

a) Cummulenes with odd no of double bonds and unsymmetrical substitutions at terminal carbons show geometrical isomerism

b) Meso tartaric acid is optically inactive although it contains two asymmetric carbon atoms

c) Trans-1,3-Dimethyl cyclobutane is chiral

d) Indole-3-acetic acid is a naturally occuring plant growth regulator

e) Karanja oil is used both internally and externally

f) DDT is an organic insecticide

g) Endosulfan is a herbicide

h) Cytokinins are Plant growth reguators which stimulate cell division

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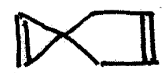
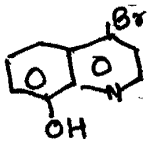
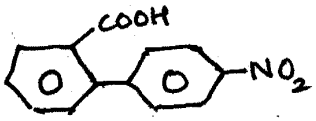
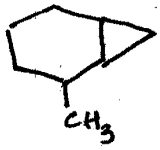
(C) Give the IUPAC name of **any five** of the following compounds: **5**

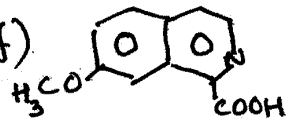
a) 

b) 

c) 

d) 

e) 

f) 

g) 

(D) State whether the following are True or False **(any Five)** **5**

a) n ⟶ π* transitions occur in the vacuum uv region
b) A molecule of citral contains two olefinic double bonds
c) The molecular ion peak of p-Nitro aniline will appear at even mass number value
d) The nitrogen atoms in nicotine are secondary in nature
e) Butadiene absorbs at a longer wavelength than ethene
f) Monoterpenoids contain two isoprene units
g) Adrenaline is a peptide hormone
