[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

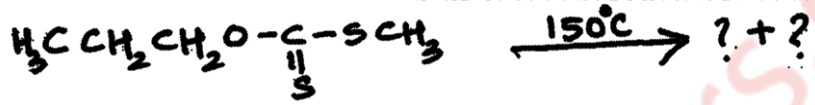
Q1 Answer **any Four** of the following

(A) a) Discuss the $B_{AC}2$ mechanism of hydrolysis of esters **3**

b) Distinguish between transition state and intermediate **2**

(B) a) Discuss the stereochemistry of NGP with a suitable example **3**

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

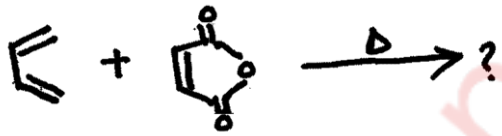


(C) a)Explain with mechanism pyrolysis of acetates. **3**

b) Explain chelotropic reaction with an example **2**

(D) a) What are electrocyclic and sigmatropic reactions? Explain with examples **3**

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



(E) a)Explain Intersystem crossing and electronic excitation process with the help of a neat and labelled Jablonski diagram. Which out of the above two transitions is forbidden? Justify **3**

b) Explain with mechanism Di-π methane rearrangement **2**

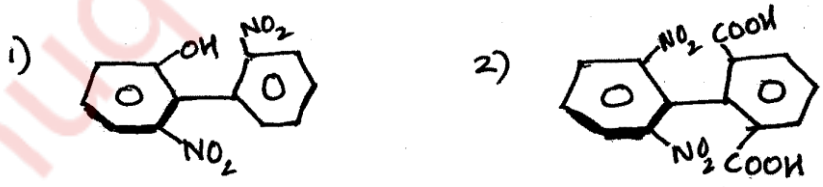
(F) a) Explain Norrish type II reaction of 2-Pentanone **3**

b) Write a note on photosensitization reaction. **2**

Q2 Answer **any four** of the following

(A) Explain the optical isomerism in cummulenes with even no of double bonds (Allenes) **5**

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

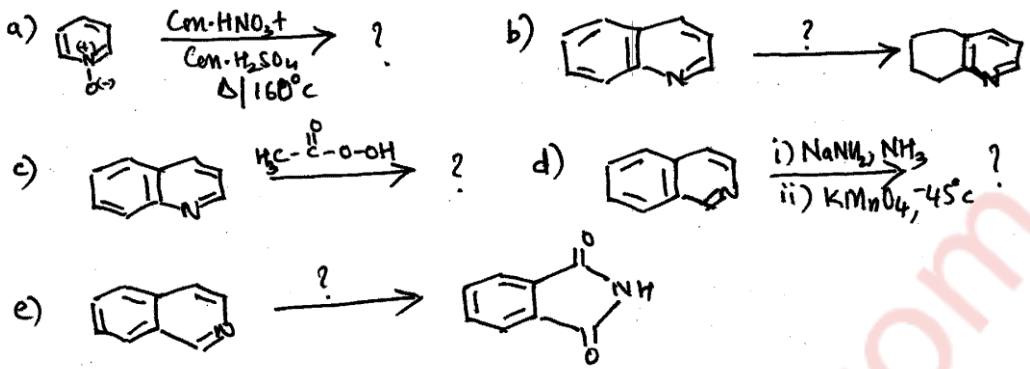


b) Define centre of symmetry with an example **2**

(C) Give the Bischler-Napieralski reaction for the preparation of Isoquinoline. Write the reaction of Isoquinoline 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) $NaNH_2$ in Liq.NH_3 **5**

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



(F) What are Agrochemicals? How are they classified? Give two advantages of it. Write the synthesis of Endosulfan **5**

Q3 Answer **any four** of the following

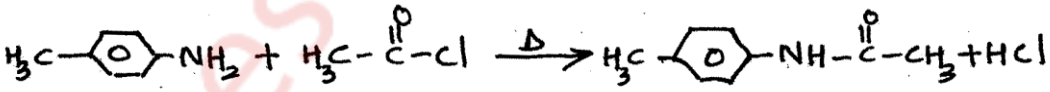
(A) Explain the following terms with suitable examples: **5**
a) Convergent synthesis b) E-factor

(B) Write the structure of the following compounds: **5**
a) 1-Ethoxy-5-chloro isoquinoline b) 3-Methyl bicyclo[3.2.2]nonane
c) Spiro[3,4]octa-1,6-dione d) 1-Bromo 2,3-pentadiene
e) 2,6-Dinitro biphenyl-2'-carboxylic acid

(C) 1.0g of benzoic acid acid on esterification gave 1.25g of ethyl benzoate. 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) o-Chloro benzoic acid b) 1-Pentanol (using Grignard reagent)

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



(Atomic weights: C=12; H= 1 ; O=16; N= 14 ; Cl= 35.5)

(F) Explain the use of the following in green chemistry **5**
a) Enzymatic catalysts b) Super critical carbon-di-oxide

Q4 Answer **any four** of the following

(A) Give analytical evidence to prove the following: **5**
a) Citral is an α,β-unsaturated aldehyde
b) Citral is an acyclic monoterpenoid

(B) Discuss Hofmann's exhaustive methylation and degradation of an alkaloid containing Pyridine ring. What conclusions can you draw? **5**

(C) Give the synthesis of : **5**
a) Nicotine from Nicotinic acid
b) Adrenaline from protocatechuic aldehyde

(D) Discuss: **5**
a) classification of terpenoids b) isomerism in citral

(E) Explain chromophore-auxochrome interaction in uv-visible spectroscopy with suitable examples **5**

(F) Explain the significance of isotopic peaks in mass spectroscopy. Give the mass spectral fragmentation of Propanone **5**

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

a) Cope elimination is observed in _____
i) N-substituted amide ii) aromatic ketoxime iii) tertiary amine oxides

b) All nucleophiles are _____
i) Lewis acid ii) Lewis base iii) neutral

c) 1,3,5-Hexatriene undergoes electrocyclic reaction to form _____
i) 1,3-Cyclohexadiene ii) cyclohexene iii) 1,4-Cyclohexadiene

d) NGP reaction involves _____nucleophilic attacks
i) two ii) one iii) zero

e) _____reaction involves pyrolysis of xanthate esters
i) Cope ii) Chugaev iii) Electrocyclic

f) Phosphorescence involves the transition of _____to _____
i) singlet to singlet ii) triplet to triplet iii) singlet to triplet

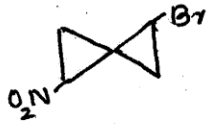
g) Conversion of Allyl benzene to Phenyl cyclopropane is an example of _____reaction
i) Di-π methane ii) Norrish Type-I iii) Norrish Type-II

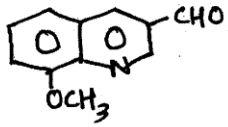
h) Benzophenone reacts with isopropyl alcohol in presence of light to form benzpinacol is an exampe of _____reaction
i) photoreduction ii) photooxidation iii) photosensitization

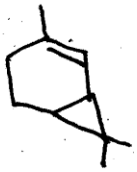
(B) State whether the following are **True or False (any Five)** **5**

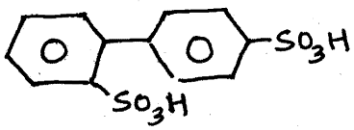
a) Cummulenes with even no of double bonds and unsymmetrical substitutions at terminal carbons will not show optical isomerism
b) Trans-1,3-Dimethyl cyclobutane is chiral
c) Gibberelins belong to the class of Plant Growth Regulators
d) Active component of neem oil is Azadirachtin
e) Trans-1,2-Dichloro cyclopropane is optically active
f) Karanja oil belong to the class of rodenticide
g) Fungistatics kill the fungi
h) DDT and BHC belong to the class of Insecticides

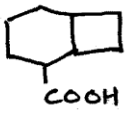
(C) Give the IUPAC name of **any five** of the following compounds: **5**

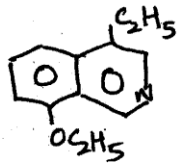
a) 

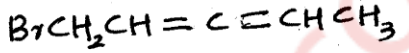
b) 

c) 

d) 

e) 

f) 

g) 

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

a) σ⟶σ* transitions occur at shorter wavelengths than π⟶π* transitions

b) Monoterpenoids contain one isoprene unit

c) In mass spectroscopy, a molecular ion is a carbon radical

d) In a molecule of citral the two olefinic double bonds are conjugated

e) A chromophore-chromophore interaction causes bathochromic shift

f) Nicotine is a pyrrole-piperidine alkaloid

g) The main function of adrenaline is to increase the blood pressure

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