

[Time :3 Hours]

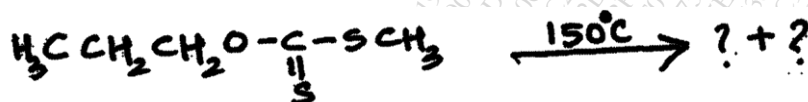
[Marks:100]

NB:-

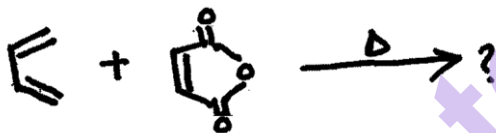
1. Please check whether you have received the right question paper
2. All questions are Compulsory
3. Figures to the right indicates full marks
4. Use of logtables/non-programmable calculator is permitted

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



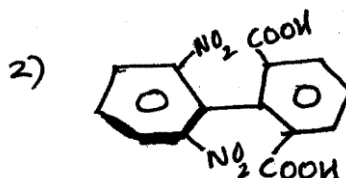
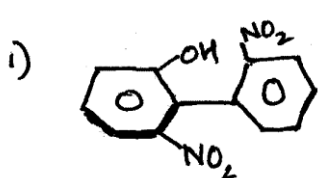
- (C) a) Explain with mechanism pyrolysis of acetates. 3
 b) Explain chelotropic reaction with an example 2
- (D) a) What are electrocyclic and sigmatropic reactions? Explain with examples 3
 b) Complete the following and name the reaction: 2



- (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

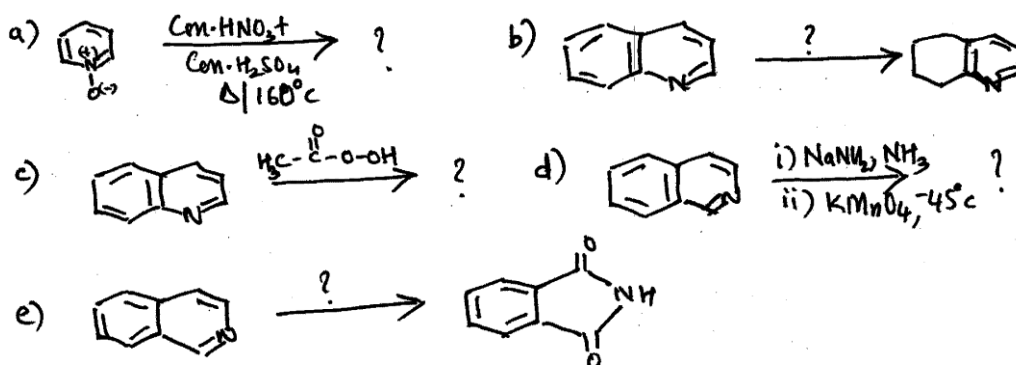
- (A) Explain the optical isomerism in cummulenes with even no of double bonds (Allenes) 5
 (B) a) State whether the following compounds are optically active or optically inactive. 3
 Justify your answer



- 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 (Atomic weights: C=12; H= 1 ; O=16)

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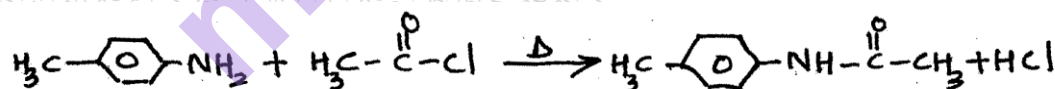
(D) Design a suitable synthesis of the following compounds:

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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 monoterpene

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

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(C) Give the synthesis of :

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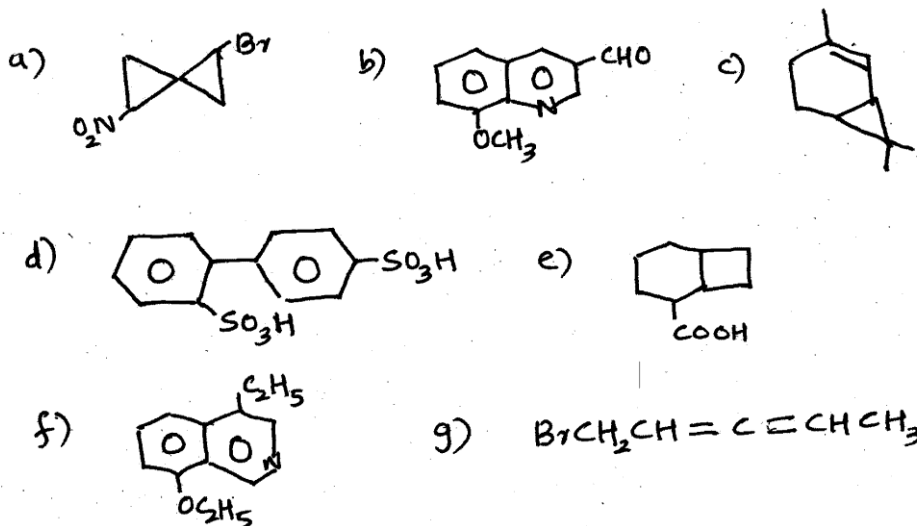
a) Nicotine from Nicotinic acid
b) Adrenaline from protocatechuic aldehyde

- (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 example 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



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

5

- $\sigma \rightarrow \sigma^*$ transitions occur at shorter wavelengths than $\pi \rightarrow \pi^*$ transitions
- Monoterpenoids contain one isoprene unit
- In mass spectroscopy, a molecular ion is a carbon radical
- In a molecule of citral the two olefinic double bonds are conjugated
- A chromophore-chromophore interaction causes bathochromic shift
- Nicotine is a pyrrole-piperidine alkaloid
- The main function of adrenaline is to increase the blood pressure