

[Time :3 Hours]

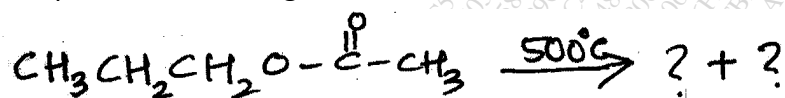
[Marks:100]

NB:-

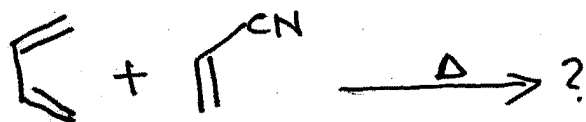
1. Please check whether you have received the right question paper
2. All questions are Compulsory
3. Figures to the right indicates full marks
4. Use of logtables/non-programmable calculator is permitted

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**



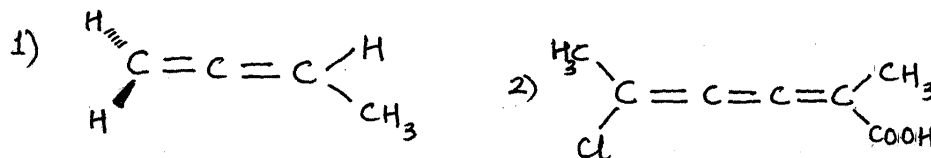
- (C) a) Give the mechanism of Chugaev reaction **3**
 b) Explain electrocyclic reaction with a suitable example **2**
- (D) a) What are pericyclic reactions? How are they classified? **3**
 b) Complete the following and name the reaction: **2**



- (E) a) Explain fluorescence 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°C **2**

Q2 Answer any four of the following

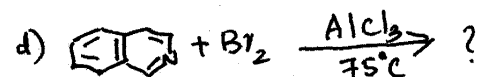
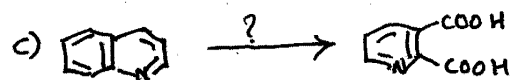
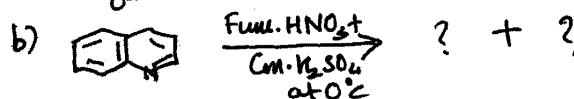
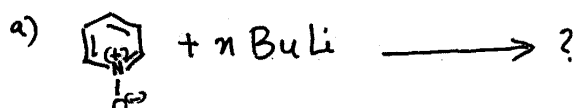
- (A) Explain the stereochemistry of unsymmetrically substituted biphenyls using suitable example **5**
- (B) a) State whether the following compounds are optically active or optically inactive. Justify your answer **3**



- 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) SO₂Cl₂ and 2) Conc. HNO₃ + Conc. H₂SO₄ at 160°C **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 (Atomic weights: C=12; H=1 ; O=16)

5

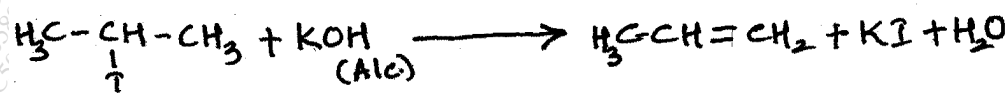
(D) Design a suitable synthesis of the following compounds:

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

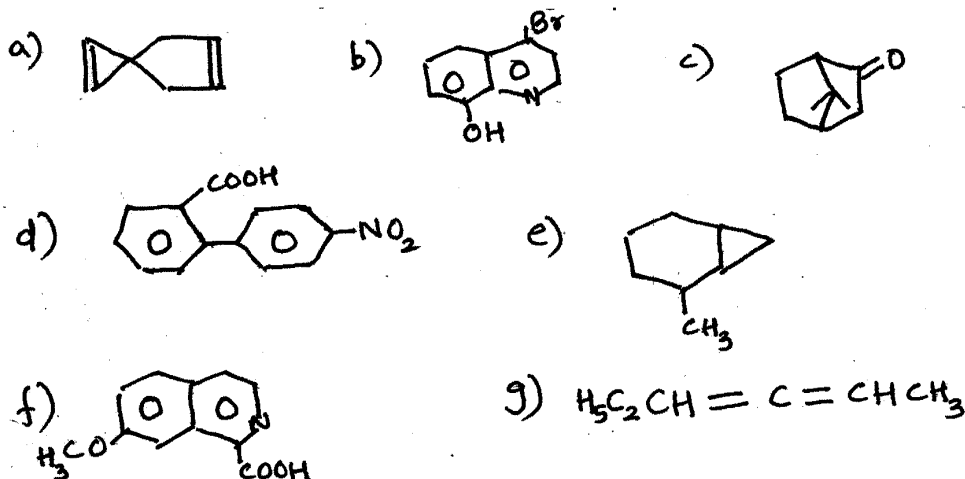
- a) -----is a kinetic term
 i) acidity ii) basicity iii) electrophilicity
- b) Acyl nucleophilic substitution reaction involves _____ intermediate
 i) trigonal ii) tetrahedral iii) cyclic
- c) Insertion of carbene into double bond is an example of _____ reaction.
 i) chelotropic ii) sigmatropic iii) 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 occurring 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 regulators which stimulate cell division

(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

- $n \rightarrow \pi^*$ transitions occur in the vacuum uv region
- A molecule of citral contains two olefinic double bonds
- The molecular ion peak of p-Nitro aniline will appear at even mass number value
- The nitrogen atoms in nicotine are secondary in nature
- Butadiene absorbs at a longer wavelength than ethene
- Monoterpenoids contain two isoprene units
- Adrenaline is a peptide hormone