

[Time :3 Hours]

[Marks:100]

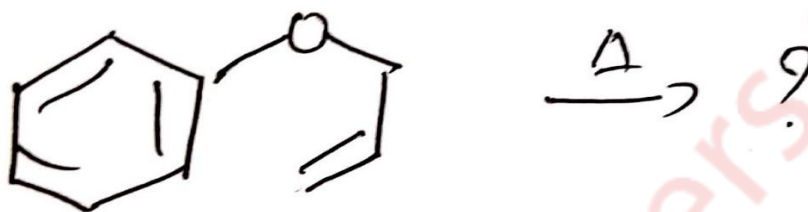
NB:-

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

Q.1

Answer **any four** questions out of the following.

- A a) Discuss the BAC² mechanism of hydrolysis of esters 3
 b) Distinguish between electrophiles and nucleophiles. 2
- B a) Discuss the stereochemistry of NGP with a suitable example 3
 b) Complete the following reaction and name the reaction involved: 2

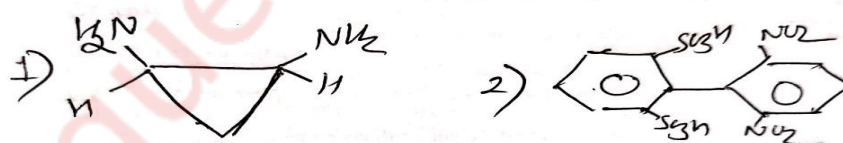


- C a) Explain with mechanism cope reaction. 3
 b) Explain cheletropic reaction with suitable example. 2
- D a) What are electrocyclic and sigmatropic reactions? Explain with examples. 3
 b) Complete the following and name the reaction: 2
 Butadiene + acrylonitrile $\xrightarrow{\text{heat}}$?
- E With the help of a neat and labelled Jablonski diagram explain different physical processes associated with excited molecules. 5
- F a) Explain Norrish type I reaction at room temperature. 3
 b) Distinguish between thermal and photochemical reactions. 2

Q.2

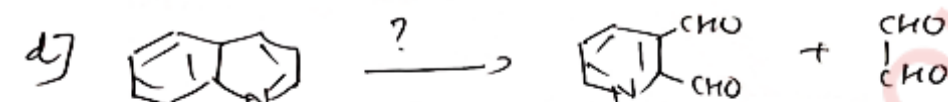
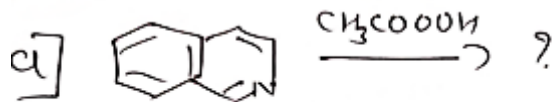
Answer **any four** questions out of the following:

- A Write a note on the stereochemistry of biphenyls. 5
- B a) State whether the following compounds are optically active or optically inactive. Justify your answer. 3



- b) Define plane of symmetry with an example. 2
- C Give the Skraup synthesis for the preparation of quinoline. Write the reaction of quinoline with nitrating mixture. 5

D Complete the following reactions. 5



E a) What are the disadvantages of agrochemicals? 3

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

F What are Agrochemicals? Give two advantages of it. Write the synthesis of indole 3 acetic acid with their application. 5

Q.3 Answer **any four** of the following :

A Explain Chemoselectivity with two suitable examples. 5

B Define Convergent synthesis. Give one example of convergent synthesis. 5

C a) Calculate the % atom economy for the following reaction: 3



b) Give the advantages of bio-catalysts 2

D Give the synthesis of the following from a suitable starting compound: 5

1) p-bromobenzoic acid

2) 1-phenyl ethanol using a suitable Grignard reagent.

E Write the structural formula for each of the following compounds: 5

1) Quinoline-5-carboxaldehyde

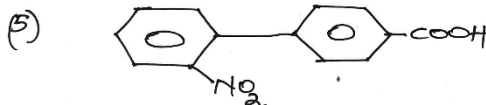
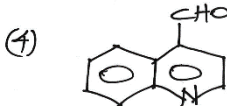
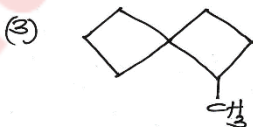
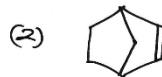
2) Bicyclo[2.2.1] hepta-2,5-diene

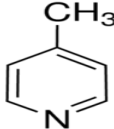
3) Spiro[2.5] octane

4) 2, 3'-dimethyl diphenyl

5) 1,3-dichloro-1,2-butadiene

F Give IUPAC names for each of the following compounds. 5



- Q.4 Answer **any four** of the following :
- A Explain the following terms used in spectroscopy with suitable example: **5**
- 1) Auxochrome
 - 2) Bathochromic shift
- B Explain the fragmentation of the following molecules: **5**
- 1) Ethyl methyl ketone
 - 2) 2-methyl pentane
- C Give analytical evidence to prove the following: **5**
- 1) Citral is an acyclic monoterpene
 - 2) Nicotine has N-methyl pyrrolidine ring.
- D Give the reactions for Hofmann Exhaustive Methylation and degradation of: **5**
- 
- E Give the synthesis of Nicotine from nicotinic acid. **5**
- F
- a) Give Ott's synthesis of adrenaline **3**
 - b) State isoprene rule. **2**
- Q.5 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) In NGP the stereochemistry of product is _____
 i) changed ii) retained iii) inverted
 - e) _____ is a thermodynamic term.
 i) electrophilicity ii) nucleophilicity iii) basicity
 - f) Homolytic fission of covalent bond results into formation of _____
 i) carbocation ii) free radical iii) carbanion
 - g) Norrish Type-I reaction occurs in _____
 i) Ethane ii) Dimethyl ketone iii) benzene
 - 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) Trans-1,2-Dichloro cyclopropane is optically active.
 - b) Trans-1,3-Dimethyl cyclobutane is achiral
 - c) In quinoline electrophilic substitution takes place at 2 position .
 - d) Methanol is reactant used for the Skraup synthesis of quinoline.
 - e) The dipole moment of pyridine N-Oxide is more than pyridine.

- f) DDT and BHC belong to the class of Insecticides
 g) Fungistatics kill the fungi.

Q.5 C State true or false. (Attempt any Five) 5

- Reactions with higher E-factor are more desirable
- Carbon tetrachloride is an example of green solvent
- A synthesis in which the product is obtained through a series of single step reactions is called convergent synthesis
- Biginelli reaction is an example of multi component synthesis
- Atom economy is higher when by-products are not formed in any chemical reaction.
- Molecular formula of biphenyl is $(C_6H_5)_2$
- In spiro compounds the two rings are attached such that one carbon atom is common to both the rings.
- Quinoline is benzo[c] pyridine.

Q.5 D Match the columns (Attempt any Five) 5

Column A

- Adrenaline
- Citral-b
- Nicotine
- Isoprene
- Protein hormone
- Increase in intensity of absorption
- Auxochrome

Column B

- OH group
- Tobacco leaves
- Neral
- Hyperchromic effect
- Epinephrine
- 2-methyl butadiene
- Insulin
