

Time: 3Hours

Marks: 100

- N.B.: (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.
 (3) Use of log table/ non-programmable calculator is allowed.

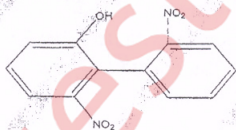
Q.1 Attempt ANY FOUR of the following:

- A) Write short notes on the following:
 i) Chelotropic reactions 3
 ii) Electrophilicity 2
- B) Complete the following reaction and name the product. Explain the mechanism of the reaction. 5

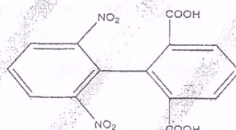
$$\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightleftharpoons{\text{dry HCl gas}} ?$$
- C) Explain the following terms: 5
 i) ligand ii) B_{AC2} iii) pericyclic reaction iv) nucleophile
 v) synartetic acceleration
- D) Using suitable examples explain sigmatropic and group transfer reactions. 5
- E) Distinguish between the following:
 i) Fluorescence and Phosphorescence 3
 ii) Singlet and Triplet state 2
- F) What is photosensitisation? Explain the photochemical reduction of benzophenone. 5

Q.2 Attempt ANY FOUR of the following:

- A) a) State whether following compounds are optically active or optically inactive. Justify your answer. 3



i)

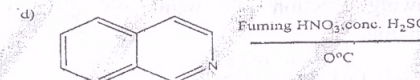
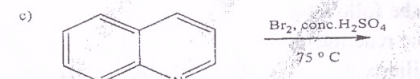
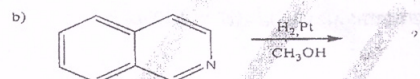
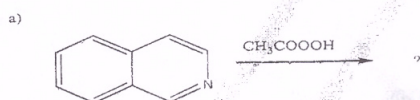


ii)

- b) Define centre of symmetry with an example. 2
- B) Write a note on stereochemistry of allenes. 5
- C) a) Give synthesis of indole-3-acetic acid. 3
 b) Give preparation of pyridine-N-oxide from pyridine. 2

D) Complete the following reactions.

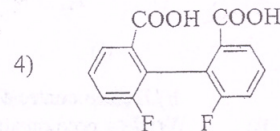
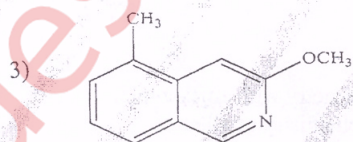
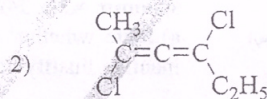
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- E) What are Agrochemicals? Give advantages of using agrochemicals. Write the synthesis of Endosulfan.
 F) Give the Bischler-Napieralski synthesis for the preparation of Isoquinoline. Write the reaction of isoquinoline with alkaline KMnO_4 .

Q.3. Attempt ANY FOUR of the following:
 A) Give the IUPAC names of the following:

5



B) Write the structural formula for each of the following compounds: 5

1. 1-chloro-6-methoxyspiro [3.4] octane
2. Bicyclo [3.3.0] octan-3-carboxylic acid
3. 2,2'-difluoro-6,6'-dinitrodiphenyl
4. 2-methoxy quinoline
5. Penta-2,3-diene-1-oic acid

C) a) Explain convergent synthesis with a suitable reaction? 3
 b) Define chemoselectivity with a suitable example? 2

D) a) Explain multicomponent synthesis with a suitable example? 3
 b) What is E-factor? Give its significance? 2

E) Give the synthesis of the following from a suitable starting compound. 5

- 1) 1-phenyl ethanol using a suitable Grignard reagent
- 2) n-pentane using a suitable Organolithium compound

F) a) Define atom economy? Calculate the percentage atom economy of the following reaction? 3



[Given Atomic Weights: C=12, H=1, O=16]

b) Give any two applications of biocatalyst in green chemistry? 2

Q.4 Attempt ANY FOUR of the following: 3

A) a) Explain the following terms used in spectroscopy with suitable example 3

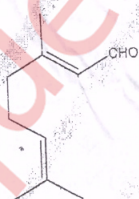
- i) Chromophore
- ii) Auxochrome

b) Give the shifts in absorption bands in UV- visible spectroscopy. 2

B) a) Explain the fragmentation of the 2- Methyl pentane 3

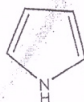
b) Define Base peak and Isotopic peak 2

C) a) What are terpenoids? Give products of ozonolysis of the following terpenoid? 3



b) State Special isoprene rule with suitable example. 2

D) Give the reaction for Hofmann exhaustive methylation and degradation of 3



b) What are harmful effects of nicotine? 2

Q.5 B) State whether the following statements are TRUE or FALSE: (ANY FIVE) 5

- a) Trans-1,3-Dimethyl cyclobutane is chiral.
- b) Cumulenes having odd number of double bonds shows geometrical isomerism.
- c) Alternating axis of symmetry is also known as rotation reflection axis.
- d) Electrophilic substitution reactions on isoquinoline takes place preferably at position 5 and 8.
- e) Isoquinoline is also known as 2-azanaphthalene.
- f) Gibberelins belong to the class of Plant Growth Regulators.
- g) Endosulfan is a plant growth regulating hormone.

Q.5 C) Fill in the blanks with correct alternatives given in the bracket : (ANY FIVE) 5

- [quinoline, chemoselective, LiAlH_4 , dimethylsulphate, larger, bridged head, smaller, isoquinoline, renewable, dimethylcarbonate, supercritical CO_2 , regioselective, tert.butyl hydroperoxide]
- a) Addition of halogen acid to an unsymmetrical alkene is an example of ----- reaction.
 - b) Methane is an example of ----- raw material
 - c) ----- causes selective methylation of active methylene compounds
 - d) Oxidation of aldehydes can be carried out with benign reagents like -----
 - e) Dry cleaning of the clothes can be done using ----- instead of carbon tetrachloride.
 - f) benzo[c]pyridine is also called -----
 - g) For the nomenclature of spirans the ----- ring is given preference
 - h) To name the fused and the bridged ring systems the numbering starts from one of the ----- carbon atoms.

Q.5 D) Match the columns: (ANY FIVE) 5

- | Column A | Column B |
|--------------------------------|---|
| a) Citral-b | (i) Odd mass number |
| b) $>\text{N}-\text{CH}_3$ | (ii) Nicotine |
| c) Epinephrine | (iii) Hypochromic shift |
| d) Pinner | (iv) Geranial |
| e) Odd number of nitrogen atom | (v) Laevorotatory |
| f) β - carotene | (vi) Neral |
| g) Citral-a | (vii) $\lambda_{\text{max}} = 452\text{nm}$ |
| | (viii) Protein hormone |
| | (ix) Herzig Meyer method |
