

FACULTY OF SCIENCE**M. Sc. IV – Semester (CBCS) Examination, October 2020****Subject: Chemistry (Organic Chemistry/Pharmaceutical Chemistry)
Paper – I: Drug Design and Discovery****Time: 2 Hours****Max. Marks: 80****PART – A****Note: Answer any five questions.****(5x7=35 Marks)**

1. Write a note on Me too drugs.
2. Write a brief note on drug patents.
3. Explain the concept of rigidification of lead.
4. Write a note on SAR studies on Sulfa drugs.
5. Write a brief note on cluster significant analysis.
6. What is molecular modeling? Explain.
7. Write a note on High Through put Screening.
8. What are the common resins used in combinatorial synthesis.

PART – B**Note: Answer any three questions.****(3x15=45 Marks)**

- 9 (a) What are folklore drugs? What are the different stages involved in drug discovery?
(b) Explain occupancy theory and induced fit theory of drug receptor interactions.
- 10 (a) Define pharmacokinetics. Explain different stages in pharmacokinetic and how they influence the drug activity?
(b) Write a detailed note on development of salbutamol from Lead Molecule?
- 11 (a) Discuss the role of following strategies in drug design with suitable examples.
(i) Conformational blockers (ii) Ring variation (iii) variation and position of hetero atoms.
(b) Discuss briefly about the discovery of Oxaminquine.
- 12 (a) How does (i) variation of aromatic substituent and (ii) ring expansion and ring contraction help in improving the biological activity of the lead? Explain.
(b) Discuss briefly about the discovery of captopril.
- 13 (a) Explain the linear and nonlinear relationship between biological activity and lipophilicity constant.
(b) Write a note on Topliss scheme and explain the influence of steric and electronic parameters in aromatic substitution.
- 14 (a) Explain the terms Hammett's constant (σ) and lipophilicity constant (π).
(b) Explain the principle involved in structure and ligand based drug design.

FACULTY OF SCIENCE

M. Sc. IV – Semester Examination, October 2020

**Subject: Chemistry (Pharmaceutical Chemistry)
Paper – II: Drug Synthesis and Mechanism of Action**

Time : 2 Hours

Max. Marks: 80

PART – A

Note : Answer any five questions.

(5x7=35 Marks)

1. Write the synthesis of Dapsone.
2. Write a brief note on lipids as possible drug targets.
3. Write the structure of Amisacrine & Rifamycin and mention their use.
4. Explain the mechanism of action of cyclophosphamide.
5. Write the synthesis of Nifedipine.
6. How are adrenergic receptors classified? Give an example of drug for each type.
7. Explain the terms Eutomer, Distomer & Eudesmic Ratio.
8. Formulate the synthesis of S,S – Ethambutol.

PART – B

Note: Answer any three questions.

3x15=45 Marks)

9. (a) Discuss about the mechanism of action of penicillins on bacterial cell wall.
(b) Write the synthesis of penicillin – G.
- 10 (a) What are H⁺/K⁺-ATPase inhibitors? What is their importance and explain mechanism of action.
(b) Write the synthesis of Acetazolamide.
11. (a) Describe briefly about the DNA topoisomerase inhibitors and give structures of two drugs of this class.
(b) Write the synthesis of AZT.
- 12 (a) Write the structure of cyclosporine, Levamisole and mention their pharmacological activity.
(b) Write the synthesis of chloroquin.
13. (a) Write the synthesis & biological action of chlorpheniramine.
(b) Explain briefly about Dopamine receptor agonist & antagonists. Write the synthesis of L-DOPA.
- 14 (a) Explain the structure of neuron & nerve transmission.
(b) Write the synthesis & pharmacological activity of propranolol.
15. (a) How chirality influences the biological activity. Explain.
(b) What is metabolic chirality inversion? Explain with suitable example.
- 16 (a) Write the synthesis of (+) ephedrine & explain its biological activity.
(b) Write the synthesis of Levocetirizine & explain its biological activity.

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M.Sc. IV – Semester Examination, October 2020

Sub: Chemistry (Organic Chemistry)

Paper – III(A): Advanced Heterocyclic Chemistry

Time : 2 Hours

Max. Marks: 80

PART – A

Note : Answer any five questions.

(5x7=35 Marks)

- How is azetidine synthesized? Give any one method. What products are obtained by reaction of azetidine with CS_2 , HCHO and HNO_2 .
- What happens when 1-bromo-3-chloro propane is treated with thiourea?
- How will you synthesize the following molecules?
 - 3,5-Dimethyl pyrazole
 - 4-Phenyl oxazole
- Among pyrazole or 4-methyl pyrazole which has lower boiling point. Why?
- What happens when benzil is treated with 2 moles of hydroxyl amine followed by reaction with H_2SO_4 ?
- Give any two methods of preparation of 1,2,4-oxadiazole.
- Complete the following reactions.



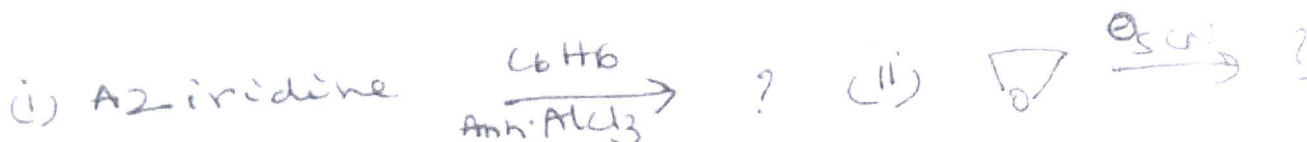
- Give any one method of synthesis of tellerophenes.

PART – B

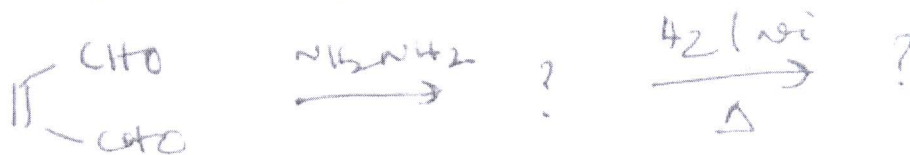
Note: Answer any three questions.

(3x15=45 Marks)

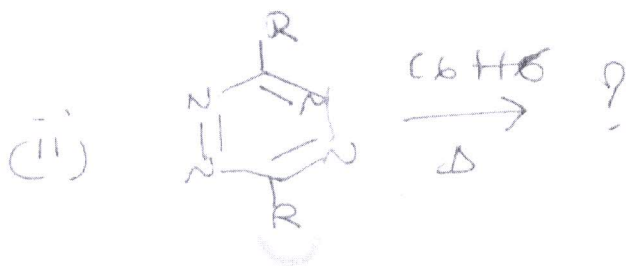
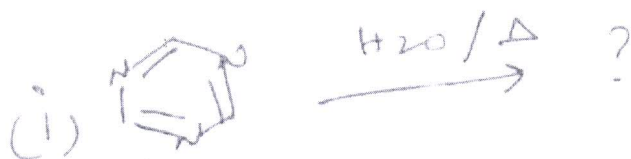
- Describe two reactions to explain the reactivity of oxetane.
 - Describe any two methods of preparation of aziridines.
- What are annulenes? Explain the aromatic character of such compounds with any two examples.
 - Complete the following reactions.



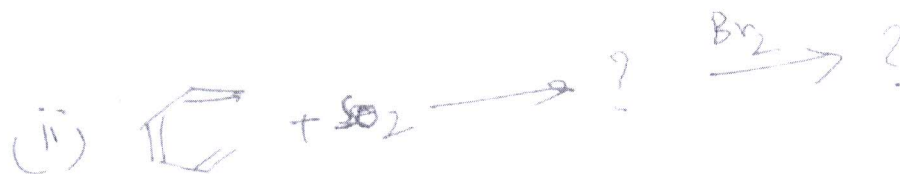
- 11 a) Describe the synthesis of thiazole and what happens when 2,4-dimethyl thiazole is treated with (i) $\text{H}_6\text{H}_5\text{CHO} / \text{ZnCl}_2 \Delta$ (ii) H_2O_2 .
 b) Outline any two methods of preparation of pyrimidines.
- 12 a) What happens when orthoamino thiophenol is treated with acetic acid in presence of P_2O_5 ? And complete the following reaction.



- b) Formulate any two methods of preparation of isothiazoles.
- 13 a) Write all possible tautomeric structures of purine ring. Describe the synthesis of 1,3,5-triazine.
 b) Complete the following reactions and outline their mechanisms.



- 14 a) Give any two methods of preparation of 1,3,4-oxadiazole.
 b) Formulate the synthesis of theophylline and write the structure of 2-amino-4-phenyl-5-methyl thiazole.
- 15 a) Give any two methods of preparation of benzo oxapines.
 b) Give any two reactions of benzodiazepines.
- 16 a) Give a method of synthesis of selenophenes.
 b) Complete the following reactions:



FACULTY OF SCIENCE

M. Sc. IV – Semester (CBCS) (Old) Examination, October 2020

**Subject: Chemistry (Organic Chemistry)
Paper – IV: (Advanced Natural Products)**

Time: 2 Hours

Max. Marks: 80

PART – A

Note: Answer any five questions.

(5x7=35 Marks)

1. What are Laboratory synthesis and biosynthesis? Explain the differences between them.
2. Write the biosynthesis of L-phenylalanine from Shikimic acid.
3. Write the synthesis of rotenone.
4. Write the stereochemical structures of cholesterol and abietic acid.
5. How do you differentiate iso flavone from flavone by UV and Mass spectral data.
6. Discuss about INEPT spectrum of menthol.
7. Write the stereochemical structure of paeoriflorin and taxol.
8. Give the Takasago synthesis of menthol.

PART – B

Note: Answer any three questions.

(3x15=45 Marks)

9. (a) Discuss about different types of feeding experiments.
(b) Explain the biosynthesis of aromatic compounds by Acetate-Malonate pathway.
10. (a) How do you identify the position of isotopic labels in labeled natural products by chemical degradation method?
(b) Write the biosynthesis of cholesterol from squalene.
11. (a) How do you establish the stereochemistry in morphine? Discuss.
(b) Discuss about the determination of the following in cholesterol.
(i) nature and location of side chain (ii) angular methyl groups
12. (a) Deduce the structure for reserpine.
(b) Write the synthesis of morphine.
13. (a) Draw and discuss about the NOESY of Buxaquamarine.
(b) Discuss about the Heterocosity and NOE spectra of Geraniol.
14. (a) Sketch the following spectra.
(i) 2D-INADEQUATE of β -methyltetrahydrofuran.
(ii) APT spectrum of apparicine.
(b) Discuss about the IR, UV, $^1\text{H-NMR}$, $^{13}\text{C-NMR}$ and Mass spectra of coumarins.
15. (a) Write the Woodward synthesis of reserpine.
(b) Write the synthesis of azoninone from methyl 3-azidopropionate during the Danishefsky synthesis of indolizomycin.
16. (a) Outline the Sharpless synthesis of any one of L-hexoses.
(b) Give the synthesis of biotin.

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