

FACULTY OF SCIENCE
M.Sc. IV-Semester Examination, July 2021

Sub: Chemistry (Organic Chemistry / Pharmaceutical Chemistry)
Paper – I : Drug Design and Drug Discovery

Time: 2 Hours

Max.Marks:80

PART – A

Answer any five questions.

(5x7=35 Marks)

- 1 Explain about pharmacokinetics (ADME) and pharmacodynamics.
- 2 Write a short note on folklore drugs and me too drugs.
- 3 Explain the use of Chain homologation and branching in lead modification strategies in drug designing.
- 4 What is the lead modification strategy that is applied on cocaine to get procaine? Explain.
- 5 Write a short note on Lipinski's rule of five.
- 6 Write about Hammett constant and lipophilicity constant.
- 7 Discuss about types of resins and linkers used in solid phase synthesis.
- 8 Write a short note on Haughton's tea bag procedure.

PART – B

Answer any three questions.

(3x15=45 Marks)

- 9 (a) Explain induced fit and Macromolecular perturbation theory.
(b) Write a short note on clinical trials.
- 10 (a) What is serendipity in drugs discovery ? Explain with an example.
(b) Explain how salbutamol is designed as agonist.
- 11 (a) Discuss briefly about SAR studies in taxol analogues.
(b) How Cimitidine is discovered? Explain.
- 12 (a) Discuss about simplification and rigidification of lead in drug designing.
(b) Discuss about SAR studies in benzodiazepines.
- 13 Briefly discuss the following:
(a) Hansch analysis
(b) Differences between ligand and structure based drug design.
- 14 Briefly discuss the following:
(a) Cluster significant analysis.
(b) Craig's plot.
- 15 (a) Discuss about mixed combinatorial synthesis.
(b) Write a short note High throughput screening.
- 16 Explain the following in detail:
(a) Automation in combinatorial synthesis
(b) Tagging and use of decoded sheets.

Code No. 17425 / CORE

FACULTY OF SCIENCE
M.Sc. IV-Semester Examination, July 2021

Sub: Chemistry (Organic Chemistry/Pharmaceutical Chemistry)
Paper – II : Drug Synthesis and Mechanism of Action

Time: 2 Hours

Max.Marks:80

PART – A

Answer any five questions.

(5x7=35 Marks)

- 1 Write a note on Lipids and proteins as macromolecular targets in drug action.
- 2 Write a note on discovery of sulfonamides.
- 3 Write a note on Immune system.
- 4 What are intercalating agents ? Give the synthesis of chloroquine.
- 5 Define the terms (i) Agonist (ii) Antagonist Give two examples for each.
- 6 Give the biosynthesis of Dopamine.
- 7 Formulate the synthesis and mechanism of action of Nateglinide.
- 8 Write a note on three point contact model.

PART – B

Answer any three questions.

(3x15=45 Marks)

- 9 (a) Explain the mechanism of action of β -Lactam antibiotics.
(b) What are β -lactamase inhibitors? Comment on their mode of action with examples.
- 10 (a) How are drugs classified based on pharmacological action and Receptors?
(b) Write the synthesis of Cephalosporin-C.
- 11 (a) Outline the synthesis and mechanism of action of metronidazole and Tinidazole.
(b) Depict the partial synthesis and role of Rifampicin in transcription process.
- 12 (a) Give the synthesis and pharmacological activity of Norfloxacin and ciprofloxacin.
(b) Write a note on mechanism of action of drugs interfering with translational process taking any two examples.
- 13 (a) Discuss in detail the mode of action of β -receptor antagonists and outline the synthesis of propranolol.
(b) Explain the different types of cholinergic receptors and give the synthesis of succinyl choline.
- 14 (a) How do you explain the mechanism of action of metoclopramide? Give its synthesis.
(b) What are ion channel ? Give the significance and synthesis of Ca^{2+} ion channel blockers taking any two examples?
- 15 (a) Explain with examples, the role of chirality on biological activity
(i) Diastomers with undesirable side effects (ii) combination products having therapeutic advantages.
(b) Depict the synthesis of (i) Fluvastatin (ii) Oxybutynin hydrochloride
- 16 (a) Outline the synthesis and mode of action of Dextropropoxyphen.
(b) Write the synthesis and pharmacological activity of Levocetrazine and S,S,S-Enalaprilate.

FACULTY OF SCIENCE
M.Sc. IV-Semester Examination, July 2021

Code No. 17426 / CORE

Sub: Chemistry (Organic Chemistry)
Paper – III : Advanced Heterocyclic Chemistry

Time: 2 Hours

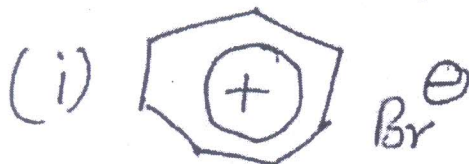
PART – A

Max.Marks:80

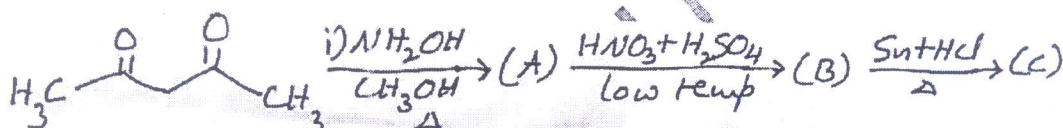
Answer any five questions.

(5x7=35 Marks)

- 1 Describe any two major routes for the preparation of azirines.
- 2 Explain why the following compounds are usually stable.



- 3 How will you convert acetophenone into 2-amino-4-phenylthiazole?
- 4 Write the structures of A, B and C in the following reactions.



- 5 Compare the aromatic character of the following heterocyclic compounds and give reasons.
(i) 1,2,5-Thiadiazole (ii) 1,2,5-oxadiazole
- 6 Write the synthesis of Tetrazole and Tetrazine.
- 7 Write one synthesis each for Benzoxepines and selenophenes.
- 8 What happens when oxepine is treated with maleic anhydride? Write the reaction.

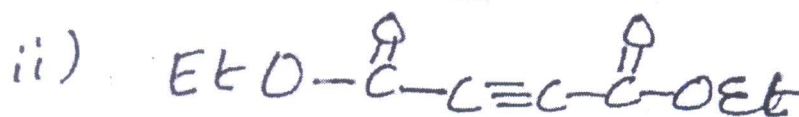
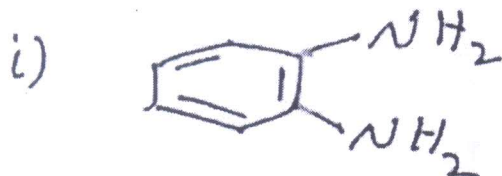
PART – B

Answer any three questions.

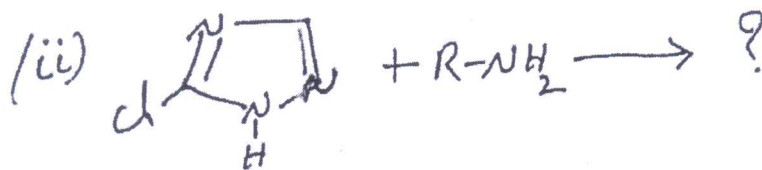
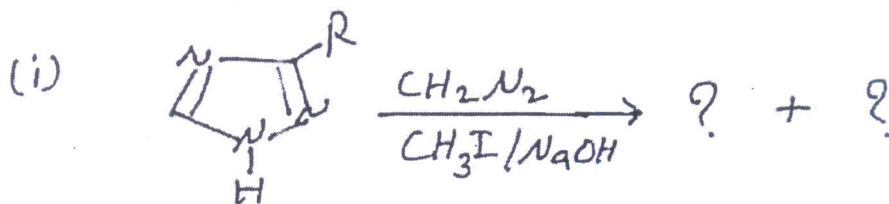
(3x15=45 Marks)

- 9 (a) Starting from a ketone how do you prepare diaziridine and oxaziridine systems.
(b) Give any two methods of preparation of thietane and what happens when thietane reacts with (i) NH_3 (ii) excess of H_2O_2 . Formulate the reactions.
- 10 (a) What products are formed when 2, 2-diphenyl oxirane is treated with
(i) 98% H_2O_2 , Et_2O at room temperature (ii) LiAlH_4 .
(b) What are antiaromatic compounds? Give any three properties of such compounds.

- 11 (a) Formulate the products obtained in each of the following reactions when 5-methyl-2-phenyloxazole is treated with (i) POCl_3 / DMF (ii) NH_3
 (b) Outline any two methods of synthesis of benzothiazoles.
- 12 (a) Describe the synthesis of 2-methyl benzimidazole and what happens when it is treated with formaldehyde, dimethyl amine in presence of HCl.
 (d) Out line any two methods of preparation of thiazines.
- 13 (a) Write the synthesis of caffeine and Pteridine.
 (b) Write the products formed in each of the following reactions when 1,3,5-triazine is heated with



- 14 (a) Outline the synthesis of theobromine from uric acid and give its importance.
 (b) What happens when?



- 15 (a) How do you prepare 1-methylazepine starting from 1,4-cyclohexadiene ? Describe the mechanism.
 (b) Give a method of synthesis of boroles and azocine.
- 16 (a) Write the synthesis and reactivity of Thiepinines.
 (b) Give any two methods of synthesis of
 (i) Benzothiepinines (ii) phospholes

FACULTY OF SCIENCE
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Sub: Chemistry (Organic Chemistry)
Paper – IV: Advanced Natural Products

Time: 2 Hours

Max.Marks:80

PART – A**Answer any five questions.****(5x7=35 Marks)**

- 1 Explain the terms absolute incorporation and specific incorporation.
- 2 Explain the biosynthesis of tyrosine.
- 3 Depicts the stereochemistry of morphine.
- 4 How do you determine the stereochemistry of A/B ring fusion in cholesterol?
- 5 Discuss about ^1H NMR and ^{13}C NMR spectral data of coumarin.
- 6 Explain the ^1H NMR and mass spectral fragmentational pattern of flavones.
- 7 Draw the stereochemical structure of taxol.
- 8 Out line the synthesis of L-hexoses with one example.

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

- 9 (a) Discuss in detail the shikimic acid pathway.
 (b) Discuss the biosynthesis of β -amyrin.
- 10 (a) Describe acetate-malonate pathway for the biosynthesis of aromatic compounds.
 (b) Describe the biosynthesis of cholesterol.
- 11 (a) Give an account on the structural determination of morphine.
 (b) Explain the structure determination and stereochemistry of Rotenone.
- 12 (a) Discuss about the structural determination abietic acid.
 (b) Discuss the importance of Yobyrine skeleton in structural elucidation of reserpine.
- 13 (a) Using ^1H -NMR and ^{13}C -NMR spectral data, how quinolines and isoquinolines are differentiated?
 (b) Explain the INEPT spectrum of menthol.
- 14 (a) Discuss about 2D-INADEQUATE spectrum of geraniol.
 (b) Explain the NOESY of buxaquamarine.
- 15 (a) Outline the Corey's stereoselective synthesis of PGE₂.
 (b) Write the synthesis of Biotin.
- 16 (a) Describe the Danishefsky synthesis of Indolizomycin.
 (b) Describe the synthesis of menthol.
