

FACULTY OF PHARMACY

**M. Pharmacy (PCI) II - Semester (Pharmaceutical Chemistry) (Backlog) Examination,
June 2025**

Subject: Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Discuss the basic Principles of green chemistry.
(b) Write a note on solvents used in microwave assisted synthesis. (8+7)
2. (a) Give a note on Fmoc and t-Boc protocols in solid phase peptide Synthesis.
(b) Write a note on coupling reactions in peptide synthesis. (8+7)
3. (a) Discuss the basic principles of photochemical reactions.
(b) Explain in detail about Cycloaddition reactions mechanism with examples. (8+7)
4. (a) What is heterogeneous catalysis? Write the advantages and disadvantages.
(b) Discuss about phase transfer catalysis and its applications. (8+7)
5. (a) Discuss about relative and absolute configuration.
(b) Write the about catalytic asymmetric organic synthesis. (8+7)
6. (a) Write any five synthetic applications of Ultra sound assisted reactions.
(b) Discuss about side reactions in peptide synthesis. (8+7)
7. (a) Explain about photo oxidation and photo fragmentation.
(b) Write a note on applications of enzymes in organic synthesis. (8+7)
8. (a) Explain about Cahn, Ingold, Prelog sequence rule with examples.
(b) What are racemates? Explain resolution of recemates and its applications. (8+7)

FACULTY OF PHARMACY

**M. Pharmacy (PCI) II - Semester (Pharmaceutical Chemistry) (Backlog) Examination,
June 2025**

Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Write down the Woodward – Fieser rules for 1,3 – butadienes, cyclic dienes with examples.
(b) How do you interpret the following functional groups in IR NH₂, COOH, CHO, CO, OH. (8+7 Marks)
2. Give a detailed account on NOESY, COSY, HETCOR and explain how these techniques are useful in the interpretation of organic compounds. (15 Marks)
3. (a) Discuss Mc Lafferty rearrangement and Ring rule. (7+8 Marks)
(b) Discuss the fragmentation patterns of following functional groups in mass Spectrometry. (i) Alkanes (ii) Carbonyl compounds (iii) Amines (iv) Alcohols.
4. Discuss the principle, instrumentation and applications of (8+7 Marks)
(a) LC-NMR (b) Ion chromatography
5. Write the principle, instrumentation and applications of (8+7 Marks)
(a) DTA (b) CE-MS
6. Give brief account on the principle and applications of Raman spectroscopy and TGA. (15 Marks)
7. Discuss the principle, instrumentation and applications of (8+7 Marks)
(a) GC-AAS (b) Ion Exclusion Chromatography
8. Write a note on (8+7 Marks)
(a) Bioassay (b) RIA of digitalis

FACULTY OF PHARMACY

M. Pharmacy (PCI) II - Semester (Pharm. Chemistry) (Backlog) Examination, June 2025

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Explain the strategy and stages of scale up process.
(b) Explain in detail validation of Large scale Process. (7+8)
2. (a) Write a note on types of Extraction.
(b) Discuss the principle and general methods of preparation of polymorphs, hydrates, solvates and amorphous APIs. (9+6)
3. (a) Explain types of oxidation reactions and nonmetallic oxidizing agents.
(b) Write the kinetics and Mechanism of aromatic nitration. (8+7)
4. (a) Discuss the production of vitamins B1 and B12.
(b) Explain about aerobic and anaerobic fermentation with examples. (8+7)
5. (a) Write a detail note on OHSAS-18000.
(b) Write about fire hazards and types of fire and fire extinguishers. (8+7)
6. (a) Write the case study on Industrial reduction process.
(b) Write about hazard labels of chemicals and personal protection equipment. (8+7)
7. (a) Write a note on characteristics of expedient routes, cost effective routes, reagent selection for scale up.
(b) Discuss the types of evaporators used in evaporation. (8+7)
8. (a) Write about ISO-14001 in industrial safety.
(b) Write the types of impurities in API and their sources (8+7)

FACULTY OF PHARMACY

M. Pharmacy (PCI) II - Semester (Pharm. Chemistry) (Backlog) Examination, June 2025
Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Write the steps involved in QSAR using Hansch analysis to predict the biological activity of designed compounds.
(b) Explain Hammett and Taft constants.
2. (a) Write a note on application of Free Wilson analysis in drug design.
(b) Write a note on MLR in QSAR.
3. (a) Describe how does molecular mechanics used in drug design?
(b) Discuss about the energy minimization in molecular modeling.
4. (a) Discuss about Knowledge based and Consensus scoring techniques in docking.
(b) What is Homology modeling? Discuss its importance in drug design.
5. (a) Define Pharmacophore? Discuss the concept of Pharmacophore based virtual screening.
(b) Write a short note on Similarity based Virtual screening.
6. (a) Write a note on algorithms used in docking.
(b) Write a note on Fragment based drug design.
7. (a) Explain about Flexible docking and extra precision Docking.
(b) Explain, how new DHFR inhibitors are designed using molecular docking?
8. (a) Explain any one 3D QSAR approach used in drug design.
(b) Write briefly about Statistical methods used in QSAR.

FACULTY OF PHARMACY
M. Pharmacy (PCI) II - Semester (Pharmaceutical Chemistry) (Main & Backlog)
Examination, December 2024

Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Write down the Woodward-Fieser rules for 1,3-butadienes, cyclic dienes and α,β -unsaturated carbonyl compounds. (8+7)
(b) How do you interpret the presence of different functional groups in IR spectra? Indicate the wave number regions for different functional groups.
2. Write a detailed account on: (8+7)
(a) 1-D NMR (b) HECTOR
3. (a) Discuss McLafferty rearrangement and Ring rule. (7+8)
(b) Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
4. Discuss the principle, instrumentation and applications of (8+7)
(a) LC-MS (b) Super critical fluid chromatography
5. Write the principle, instrumentation and applications of (8+7)
(a) DSC (b) Raman spectroscopy
6. Give brief account on the principle and applications of DTA and TGA. (15)
7. Discuss the principle, instrumentation and applications of (8+7)
(a) HPTLC (b) GC-MS
8. Write a note on (8+7)
(a) ELISA (b) RIA of insulin

FACULTY OF PHARMACY

**M. Pharmacy (PCI) II - Semester (Pharm. Chemistry) (Main & Backlog) Examination,
December 2024**

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Define QSAR? Describe the methods to determine physicochemical parameters used in QSAR.
(b) Write about the pre-requisites to perform QSAR studies.
2. (a) Discuss, how Contour map analysis is used in 3D QSAR drug design?
(b) Write the applications and limitations of Hansch analysis.
3. (a) What are molecular docking studies? Discuss about the concept in detail.
(b) What is quantum mechanics? Describe the use of quantum mechanics in Drug design.
4. (a) Explain how ADMET prediction is useful in finding new potential drug candidates?
(b) Enumerate the steps involved in De novo drug design.
5. (a) What is homology modeling and enumerate steps involved in homology modeling?
(b) Write about various energy minimization methods.
6. (a) Explain about blind docking and active site directed docking?
(b) Write a short note on Receptor/Enzyme cavity prediction
7. (a) Write a note on Pharmacophore mapping.
(b) What is virtual screening? Discuss about drug likeness screening.
8. (a) Write the requirements to perform QSAR studies with suitable example.
(b) Give the step wise procedure to predict the biological activity using free Wilson analysis.

FACULTY OF PHARMACY

**M. Pharmacy (PCI) II - Semester (Pharmaceutical Chemistry) (Main & Backlog)
Examination, December 2024**

Subject: Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Explain the principle involved in the continuous flow reactors. Discuss their industrial Applications.
(b) Discuss the merits, demerits and any five applications of micro wave assisted reactions. (8+7)
2. (a) Write about various cleavage protocols employed in peptide synthesis.
(b) Give an account on solid supports and linkers used in solid phase peptide synthesis. (8+7)
3. (a) Discuss the basic principles of photo chemicals reactions.
(b) Explain in detail about Sigmatropic and Cycloaddition reactions with examples. (8+7)
4. (a) What is homogeneous catalysis? Write the advantages and disadvantages.
(b) Write a note on Transition metal catalysis. (8+7)
5. (a) Explain about chiral pool and chiral auxiliaries.
(b) Write a note on enantiopure separation and its applications. (8+7)
6. (a) Write any five synthetic applications of Ultra sound assisted reactions.
(b) Discuss about coupling reactions in peptide synthesis. (8+7)
7. (a) Explain about photo oxidation and photo fragmentation.
(b) Write a note on (i) Biocatalysis (ii) Catalytic asymmetric synthesis. (8+7)
8. (a) Explain about Cahn, Ingold, Prelog sequence rule with examples.
(b) Discuss Ziegler-Natta catalyst. (8+7)

FACULTY OF PHARMACY

**M. Pharmacy (PCI) II - Semester (Pharm. Chemistry) (Main & Backlog) Examination,
December 2024**

Subject: Pharmaceutical. Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks. (5 x 15 = 75 Marks)

1. (a) Write the case studies of some scale up process of APIs.
(b) Discuss the synthetic strategies in scale up process. (7+8)
2. (a) Write a note on types of filtration.
(b) Discuss the factors affecting Crystallization (9+6)
3. (a) Explain types of oxidation reactions and nonmetallic oxidizing agents.
(b) Explain the theory of filtration and its limitations (8+7)
4. (a) Discuss the production of Simvastatin and Lovastatin.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis. (8+7)
5. (a) Write a detail note on MSDS.
(b) Discuss about effluents and management system in industries. (8+7)
6. (a) Give a note on Impurities in API.
(b) Write about hazard labels of chemicals and personal protection equipment. (8+7)
7. (a) Explain about azeotropic distillation..
(b) Write a note on kinetics and different types of halogenation reactions. (8+7)
8. (a) Write about ISO-14001.
(b) Explain about different types of reducing agents. (8+7)

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Backlog) Examination,
June 2024**

Subject: Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. Discuss different types of Pericyclic reactions with suitable examples.
2. Write a short notes on,
 - (a) Phase transfer catalysis.
 - (b) Ziegler-Natta catalysis.
 - (c) Add a note on effect of solvents in microwave assisted synthesis.
3.
 - (a) Discuss various solid supports, linkers, protecting groups used in Solid –phase peptide synthesis. [9]
 - (b) Add a note on stereo selective synthesis with two examples. [6]
4.
 - (a) Discuss any three methods of resolution of racemic mixture. [9]
 - (b) Discuss sequence rules of R & S configuration with suitable examples. Explain how it is different from fishers D & L rotations. [6]
5. Explain in detail about the Principles of green chemistry and its applications in Organic synthesis.
6. Explain in detail about methods of asymmetric synthesis using chiral pool, chiral Auxiliaries and catalytic asymmetric synthesis.
7.
 - (a) What is biocatalysis. Describe the Organic synthesis by using Enzymes. [7]
 - (b) Write a note on Homogenous catalysis. [8]
8.
 - (a) Write in detail about types of sonochemical reactions. [7]
 - (b) Photo addition reactions. [8]

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Backlog) Examination,
June 2024**

Subject: Advanced Spectral Analysis

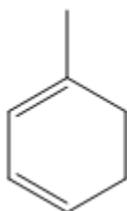
Time: 3 Hours

Max. Marks: 75

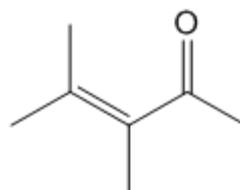
Note: Answer any five questions. All questions carry equal marks.

1. (a) Discuss Woodward Fieser rules with examples.
(b) Calculate the λ_{max} for the following.

(i)



(ii)



- (c) How do you interpret the following functional groups in IR [6+4+5]
NH₂, COOH, CHO, CO, OH.

2. (a) Explain the principle, instrumentation, and applications of NMR.
(b) Explain any two NMR techniques and applications.
3. (a) Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
(b) Explain the McLafferty rearrangement with examples. [10+5]
4. Discuss the principle, instrumentation, and applications of
(a) LCMS
(b) Ion exchange chromatography
5. Discuss the principle, instrumentation, and applications of
(a) HPTLC
(b) LC-FTIR
6. Give a brief account on the principle and applications of
(a) DTA
(b) Raman spectroscopy
7. Write a note on
(a) ELISA
(b) RIA of insulin
8. Give a brief note on
(a) Meta stable ions
(b) ATR-IR

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Backlog) Examination, June 2024
Subject: Pharmaceutical Process Chemistry

Time: 3 hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Write the Case studies of some Scale up Process of APIs.
(b) Discuss the synthetic strategies in scale up process. [7+8]
2. (a) Write a note on types of Extraction.
(b) Discuss the principle and general methods of preparation of polymorphs, hydrates, solvates and amorphous APIs [9+6]
3. (a) Write a note on oxidizing agents.
(b) Write the kinetics and Mechanism of aromatic nitration. [8+7]
4. (a) Discuss the production of penicillins and streptomycin.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis. [7+8]
5. (a) Write a detail note on PPE.
(b) Discuss about effluents and management system in industries [8+7]
6. (a) Give a note on Impurities in API.
(b) Write the Case study on Industrial Halogenation. [8+7]
7. (a) Discuss the types of evaporators used in evaporation.
(b) Write a note on characteristics of expedient routes, cost effective routes, and reagent selection for scale up. [8+7]
8. (a) Write about OHSAS-1800
(b) Write about ISO-14001 in industrial safety. [8+7]

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) II - Semester (PCI) (Backlog) Examination, June 2024

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Discuss in detail about various parameters used in QSAR.
(b) Discuss Taft steric and MR parameters in QSAR. [8+7]
2. (a) What is Hansch analysis and Discuss how it is used in predicting the Biological activity?
(b) Give the advantages and disadvantages of Hansch analysis. [9+6]
3. (a) Write a note on molecular mechanics.
(b) Explain Empirical and Semi Empirical methods in drug design. [9+6]
4. (a) What is Homology modeling? Discuss its importance in drug design.
(b) Write a note on fragment based drug design. [8+7]
5. (a) What is known as pharmacophore? Discuss the concept of Pharmacophore based virtual screening.
(b) Write a note on similarity based virtual screening. [8+7]
6. (a) Write a note on Scoring techniques in Molecular docking.
(b) Discuss various models for predicting ADMET properties. [7+8]
7. (a) Explain the techniques to predict the active site of a receptor in denovo drug Design.
(b) Explain, how new DHFR inhibitors are designed using molecular docking? [8+7]
8. (a) Write about statistical methods used in QSAR.
(b) What is Free Wilson analysis? What are the advantages and disadvantages over hansch analysis? [8+7]

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II Semester (PCI) (Main & Backlog)
Examination, October 2023
Subject: Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Discuss coupling reactions in peptide synthesis. [8]
(b) Write a note on solid phase combination synthesis. [7]
2. (a) Write the principle and applications of Microwave irradiation reactions. [8]
(b) Explain the basic principles of green chemistry in Organic synthesis. [7]
3. Discuss electrocyclic and sigma tropic reactions in presence of heat and light With suitable examples.
4. (a) Explain about chiral pool and chiral auxiliaries. [8]
(b) Biocatalysts. [7]
5. (a) Discuss the methods to obtain enantiopure compounds by separation in Organic synthesis. [8]
(b) Discuss the general principles of Photochemical reactions. [7]
6. (a) Write a note on various coupling agents used in peptide synthesis. [7]
(b) Discuss about side reactions in peptide synthesis. [8]
7. (a) Discuss about relative and absolute configuration. [8]
(b) Discuss applications of Ultra sound technology in Organic Synthesis. [7]
8. (a) Discuss the working principle, advantages and synthetic applications of Continuous Flow reactors. [8]
(b) Discuss Ziegler- Natta catalyst. [7]

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)
Examination, November 2023
Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) How do you interpret the presence of different functional groups in IR spectra. Indicate the wave number regions for different functional groups.
(b) Explain Woodward-Fieser rules with examples.
2. Discuss NOESY, COSY and inadequate techniques.
3. (a) Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
(b) Explain McLafferty rearrangement with examples.
4. Discuss the principle, instrumentation and applications of
(a) GCMS
(b) Flash chromatography
5. Discuss the principle, instrumentation and applications of
(a) HPTLC
(b) LC-NMR
6. Give brief account on the principle and applications of
(a) DSC
(b) Raman spectroscopy
7. Write a note on
(a) Bioassays
(b) RIA of Digitalis
8. Give a brief note on
(a) TGA
(b) CE-MS

FACULTY OF PHARMACY

**M. Pharmacy (Pharm. Chemistry) II Semester (PCI) (Main & Backlog) Examination,
November 2023**

Subject: Pharmaceutical. Process Chemistry

Time: 3 hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Explain the strategy and stages of scale up process.
(b) Explain in detail validation of Large scale Process. [7+8]
2. (a) Discuss the factors affecting Crystallization.
(b) Explain the Theory of filtration and its limitations. [7+8]
3. (a) Write the types of oxidation reactions and liquid phase oxidation reaction.
(b) Write the kinetics and Mechanism of aromatic nitration. [8+7]
4. (a) Explain about aerobic and anaerobic fermentation with examples.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis. [7+8]
5. (a) Write a detail note on MSDS.
(b) Write about fire hazards and types of fire and fire extinguishers. [8+7]
6. (a) Write the case study on Industrial reduction process.
(b) Write about hazard labels of chemicals and personal protection equipment. [8+7]
7. (a) Explain about azeotropic distillation.
(b) Write a note on kinetics and different types halogenation reactions. [8+7]
8. (a) Write about OHSAS-1800.
(b) Write the types of impurities in API and their sources. [8+7]

FACULTY OF PHARMACY

**M. Pharmacy (Pharm. Chemistry) II Semester (PCI) (Main & Backlog) Examination,
November 2023**

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) What is QSAR? Describe the physicochemical parameters used in QSAR. [8+7]
(b) Explain how QSAR helps in drug design or analogue design.
2. (a) Discuss, how Contour map analysis is used in 3D QSAR drug design? [8+7]
(b) Write the applications and limitations of Hansch analysis.
3. (a) What is quantum mechanics? Describe the use of quantum mechanics in Drug design. [8+7]
(b) What is molecular docking? Discuss the steps involved in molecular docking?
4. (a) Describe the steps involved in Homology modeling of a protein. [8+7]
(b) Discuss the concept of predicting ADMET properties and its importance in drug design.
5. (a) Explain about various docking methods and write their advantages. [8+7]
(b) Discuss about Knowledge based and Consensus scoring techniques in docking.
6. (a) Write a short note on : (a) Drug likeness screening [8+7]
(b) Write about structure based *in silico* virtual screening.
7. (a) Explain about rigid docking, Flexible docking and extra-precision docking. [8+7]
(b) Explain, how molecular docking is useful in rational design of new drugs?
8. Write a short note on: [8+7]
(a) Fragment based drug design
(b) Statistical methods used in QSAR

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II Semester (PCI) (Backlog) Examination,
April / May 2023**

Subject: Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- (a) Discuss the 12 principles of Green Chemistry.
(b) Discuss the Principle and advantages of Microwave Assisted Organic Synthesis.
- (a) What is coupling and activation of amino acid ? Discuss coupling agents used in peptide synthesis.
(b) Enumerate the steps in tBOC Peptide synthesis protocol.
- (a) Discuss about Photo oxidation and Photo fragmentation with examples.
(b) Explain in detail about Cycloaddition reactions mechanism with examples.
- (a) What is biocatalysis? Describe the organic synthesis using enzymes.
(b) What are catalysts? Differentiate Homogenous and Heterogeneous catalysis with examples.
- (a) Write the about catalytic asymmetric organic synthesis.
(b) Discuss chiral pool and chiral auxiliaries with examples.
- (a) Write the principle and applications of phase transfer catalysis.
(b) Write a note on Transition Metal catalysis.
- Write a note on
(a) Biocatalysis (b) Frontier Molecular orbital Theory in pericyclic reactions
- (a) Explain Proton abstraction and protonation as side reaction in peptide synthesis.
(b) Explain the mechanism of sigmatropic reactions with examples.

Code No: E-12239/PCI

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Backlog)
Examination, May 2023
Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Write the types and sources of impurities in API.
(b) Explain in detail validation of Large scale Process.
2. (a) Discuss the principle and general methods of preparation of polymorphs, hydrates, solvates and amorphous APIs.
(b) Discuss the factors affecting the evaporation.
3. (a) Explain types of oxidation reactions and nonmetallic oxidizing agents.
(b) Write the kinetics and Mechanism of aromatic nitration.
4. (a) Discuss the production of vitamins B1 and B12.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis.
5. (a) Write a detail note on MSDS.
(b) Write about fire hazards and types of fire and fire extinguishers.
6. (a) Write the Case study on Industrial Halogenation.
(b) Write a note on different types of fire hazards and of fire extinguishers.
7. (a) Explain about azeotropic distillation.
(b) Write a note on kinetics and different types halogenation reactions.
8. (a) Write about OHSAS-1800.
(b) Write about ISO-14001 in industrial safety.

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Code No: E-12238/PCI

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II Semester (PCI) (Backlog)
Examination, April / May 2023
Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- (a) What is QSAR? Describe the methods to determine physicochemical parameters used in QSAR.

(b) Explain Hammett and Taft constants.
- (a) What is Hansch analysis? Discuss its advantages and disadvantages.

(b) Write a note on MLR in QSAR.
- (a) Describe how does molecular mechanics used in drug design?

(b) What is molecular docking? Discuss about the concept in detail.
- (a) Describe about sequence alignment in protein structure prediction using Homology Modeling.

(b) Explain, How ADMET prediction could enhance the speed of drug discovery?
- (a) What is virtual screening? Discuss the concept of structure based virtual screening.

(b) Write a note on Similarity based Virtual screening.
- (a) Write a note on algorithms used in docking.

(b) Write a note on Fragment based drug design.
- (a) Write a note on pharmacophore mapping.

(b) Write a note on pharmacophore modeling?
- (a) Discuss the importance of quantum Mechanics in drug design.

(b) What is Free Wilson analysis? What are the advantages and disadvantages over Hansch analysis?

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FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Backlog)

Examination, April / May 2023

Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

(5 x 15 = 75 Marks)

1. (a) Write down the woodward-fieser rules for 1,3- butadienes, cyclic dienes and α,β - unsaturated carbonyl compounds. Explain how woodward–fieser rules are applied in the calculation of λ_{max} of cyclic dienes and α,β -unsaturated carbonyl compounds.
(b) How do you interpret the presence of different functional groups in IR spectra. Indicate the wave number regions for different functional groups. [8+7]
2. Discuss any two 2D NMR techniques.
3. Discuss Mc Lafferty rearrangement and Ring rule. Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
4. Discuss the principle, instrumentation and applications of
(a) GCMS (b) HPTLC
5. Discuss the principle, instrumentation and applications of
(a) LC-MS (b) Flash chromatography
6. Give brief account on the principle and applications of DTA and TGA.
7. Write a note on
(a) ELISA
(b) RIA
(c) Bioassays
8. Give a brief note on
(a) Raman Spectroscopy
(b) Ion Chromatography

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II Semester (PCI) (Main & Backlog)
Examination, December 2022**

Subject: Advanced Organic Chemistry - II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Write the principle and applications of Ultra sound assisted organic synthesis
(b) Discuss the working principle, advantages and synthetic applications of continuous flow reactors
2. (a) Write about sequential strategies for solution phase peptide synthesis
(b) Write about various cleavage protocols employed in peptide synthesis
3. (a) What are pericyclic reactions? Explain any two types of pericyclic reactions with examples
(b) Discuss the general principles of photochemical reactions
4. (a) Explain Transition Metal catalysis with any two metal catalyzed reactions
(b) Explain about Wilkinsons, Hydroformylation and hydrocyanation reactions as homogenous catalytic reactions .
5. (a) Explain about chiral pool and chiral auxiliaries
(b) Write a note on stereo chemistry of alkenes
6. (a) Enumerate the steps involved in the solid phase peptide synthesis ?
(b) Write a note on Heterogenous catalysts
7. Write a note on
(a) Biocatalysts b) Solution phase peptide synthesis
8. (a) Discuss various Sono chemical reactions and add a note on their applications
(b) Discuss the methods to obtain enantiopure compounds by separation in organic synthesis

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II Semester (PCI) (Main & Backlog)
Examination, December 2022**

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Write the Case studies of Scale up Process of some APIS.
(b) Discuss the synthetic strategies in scale up process.
2. (a) Write a note on types of Extraction.
(b) Discuss the factors affecting Crystallization
3. (a) Write a note on nitrating agents, equipment for technical nitration.
(b) Write the kinetics and Mechanism of aromatic nitration.
4. (a) Discuss the production of Simvastatin and Lovastatin.
(b) Explain about aerobic and anaerobic fermentation with examples.
5. (a) Write a detail note on OHSAS-18000.
(b) Discuss about effluents and management system in industries
6. (a) Give a note on Impurities in API.
(b) Write the case study on Industrial reduction process.
(c) Write about hazard labels of chemicals and personal protection equipment.
7. (a) Write a note on characteristics of expedient routes, cost effective routes, reagent selection for scale up.
(b) Discuss the types of evaporators used in evaporation.
8. (a) Write about ISO-14001
(b) Explain about different types of reducing agents.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II - Semester (PCI) (Main & Backlog)

Examination, December 2022

Subject: Advanced Spectral Analysis

Time: 3 Hours

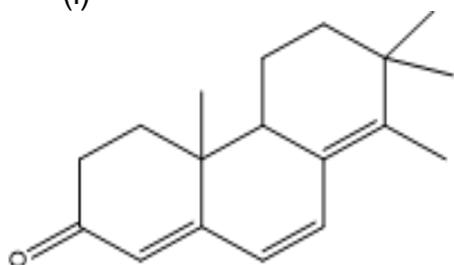
Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

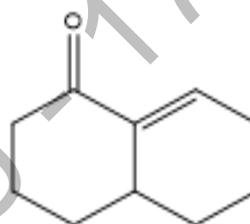
1. (a) How do you apply Woodward–Fieser rules in the calculation of λ_{max} of cyclic dienes and α,β -unsaturated carbonyl compounds. Give some examples.

- (b) Calculate the λ_{max} for the following

(i)



(ii)



- (c) How do you interpret the following functional groups in IR NH₂, COOH, CHO, CO, OH. [6+4+5]

2. Give a detailed account on NOESY, COSY, HETCOR and explain how these techniques are useful in the interpretation of organic compounds.
3. (a) Discuss the fragmentation pattern of important functional groups in mass spectroscopy.
(b) Explain Mc Lafferty rearrangement with examples. [10+5]
4. Discuss the principle, instrumentation and applications of
(a) GCMS (b) Super critical fluid chromatography
5. Discuss the principle, instrumentation and applications of
(a) HPTLC (b) LC-MS
6. Give brief account on the principle and applications of
(a) DSC (b) Raman spectroscopy
7. Write a note on
(a) ELISA
(b) RIA of insulin and Digitalis
8. Give a brief note on
(a) Ion Exclusion Chromatography.
(b) ATR-IR

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II - Semester (PCI) (Main & Backlog)
Examination, December 2022
Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. (a) Discuss about Substituent Hydrophobicity constant and Taft steric constant.
(b) Write about the pre-requisites to perform QSAR studies.
2. (a) Enumerate the steps involved in 3D QSAR studies to predict the biological activity.
(b) Discuss about Free Wilson analysis and its advantages.
3. (a) Write a note on molecular mechanics.
(b) Discuss about the energy minimization in molecular modeling.
4. (a) Explain about various docking methods and write the advantages.
(b) Describe the importance of scoring techniques in docking.
5. (a) What is homology modeling and discuss the steps involved in homology modeling?
(b) Write a short note on FBDD
6. Write a short note on
(a) Receptor/Enzyme cavity prediction
(b) Pharmacophore modeling
7. (a) Explain about blind docking and active site directed docking?
(b) Explain any one scoring functions to score the protein-ligand complexes in docking.
8. Write a short note on
(a) SBDD
(b) Partial Least Square Analysis in QSAR

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Supply)
Examination, May 2022**

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Write the case studies of some scale up Process of APIS.
(b) Write the In-Process control and validation of Large scale process.
- 2 (a) Write a note on types of filtration.
(b) Discuss the factors affecting Crystallization.
- 3 (a) Explain types of oxidation reactions and nonmetallic oxidizing agents.
(b) Write the kinetics and mechanism of aromatic nitration.
- 4 (a) Discuss the production of Simvastatin and Lovastatin.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis.
- 5 (a) Write a detail note on OHSAS-18000.
(b) Write about fire hazards and types of fire and fire extinguishers.
- 6 (a) Give a note on Impurities in API.
(b) Write about hazard labels of chemicals and personal protection equipment.
- 7 (a) Discuss in detail about types of extraction.
(b) Write the case study on Industrial Halogenation.
- 8 (a) Write about ISO-14001.
(b) Explain about different types of reducing agents.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Supply)

Examination, May 2022

Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Write down the woodward-fieser rules for 1,3-butadienes, cyclic dienes and α , β -unsaturated carbonyl compounds. How do you calculate λ_{\max} ? Give some examples.
(b) How do you interpret the presence of different functional groups in IR spectra? Indicate the wave number regions for different functional groups.
- 2 Discuss any two 2D NMR techniques.
- 3 Discuss Mc Lafferty rearrangement and Ring rule. Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
- 4 Discuss the principle, instrumentation and applications of
(a) HPTLC (b) LC-MS
- 5 Discuss the principle, instrumentation and applications of
(a) Super Critical fluid chromatography
(b) Flash chromatography
- 6 Give brief account on the principle and applications of
(a) DTA
(b) Raman spectroscopy
- 7 Write a note on:
(a) ELISA
(b) RIA of insulin
(c) Bioassays
- 8 Give a brief note on:
(a) Isotopic peaks
(b) TGA

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II - Semester (PCI) (Supply)

Examination, May 2022

Subject: Advanced Organic Chemistry – II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Write the principle and applications of Microwave assisted organic synthesis.
(b) Discuss the principles of Green Chemistry.
- 2 (a) Write a note on various coupling agents used in peptide synthesis.
(b) Write about side reactions in Peptide synthesis.
- 3 (a) Discuss the basic principles of photo chemicals reactions.
(b) Explain in detail about Sigmatropic and Cycloaddition reactions with examples.
- 4 (a) What is biocatalysis? Describe the organic synthesis using enzymes.
(b) Discuss hydrogenation reactions using homogeneous catalysts.
- 5 (a) Write the about asymmetric organic synthesis using chiral pool and chiral auxiliaries.
(b) Discuss any two methods of resolution of racemic mixtures.
- 6 (a) Write the principle and applications of phase transfer catalysis.
(b) Write a note on Fmoc and t-BOC protocols in peptide synthesis.
- 7 Write a note on
 - (a) Ziegler-Natta catalysts
 - (b) Continuous flow reactors
- 8 (a) Explain stereo selective synthesis with examples.
(b) Explain the mechanism of sigmatropic reactions with examples.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Supply)

Examination, May 2022

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Discuss about substituent Hydrophobicity constant, Hammett constant and Taft steric constant.
(b) Write the steps involved in QSAR using Hansch analysis to predict the biological activity of designed compounds.
- 2 (a) Enumerate the steps involved in 3D QSAR studies to predict the biological activity.
(b) Write the advantages of Free Wilson analysis.
- 3 (a) Write a note on molecular mechanics.
(b) Discuss about the importance of energy minimization in molecular modeling.
- 4 (a) Explain about various docking methods and write their advantages.
(b) Discuss about knowledge based and consensus scoring techniques in docking.
- 5 (a) What is homology modeling and enumerate steps involved in homology modeling?
(b) Write a short note on de novo drug design.
- 6 Write a short note on:
(a) Receptor / Enzyme cavity prediction
(b) Pharmacophore based virtual screening
- 7 (a) Explain about Flexible docking and extra precision Docking.
(b) Explain, how new DHFR inhibitors are designed using molecular docking?
- 8 Write a short note on:
(a) Fragment based drug design
(b) Statistical methods used in QSAR

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)
Examination, December 2021**

Subject: Computer Aided Drug Design

Time: 2 Hours

Max. Marks: 75

**Note: Answer any three questions. All questions carry equal marks.
(3 x 25 = 75 Marks)**

- 1 (a) What is QSAR? Describe the physicochemical parameters used in QSAR.
(b) Explain how QSAR helps in drug design or analogue design.
- 2 (a) Discuss in detail about Hansch analysis and its applications.
(b) Write a note on 3D QSAR and its applications.
- 3 (a) What is quantum mechanics? Describe the uses of quantum mechanics in drug design.
(b) What is molecular docking? Discuss the general method of molecular docking.
- 4 (a) Describe the steps involved in protein structure prediction using Homology modeling.
(b) Write about predicting ADMET and its significance in drug design.
- 5 (a) What is virtual screening? Discuss the concept of Pharmacophore based virtual screening.
(b) Write a note on Similarity based Virtual screening.
- 6 (a) Write a note on Scoring techniques in Molecular docking.
(b) Write a note on Fragment based drug design.
- 7 (a) Write a note on structure based virtual screening.
(b) Write a note on Privileged structures.
- 8 (a) Discuss the importance of molecular Mechanics in drug design.
(b) What is Free Wilson analysis? What are the advantages and disadvantages over hansch analysis?

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)
Examination, November 2021**

Subject: Advanced Organic Chemistry – II

Time: 2 Hours

Max. Marks: 75

**Note: Answer any three questions. All questions carry equal marks.
(3 x 25 = 75 Marks)**

- 1 (a) Write the principle and applications of Microwave assisted organic synthesis.
(b) Discuss the principles of Green Chemistry.
- 2 (a) Write a note on various coupling agents used in peptide synthesis.
(b) Write about side reactions in Peptide synthesis.
- 3 (a) Discuss the basic principles of photo chemicals reactions.
(b) Explain in detail about Sigmatropic and Cycloaddition reactions with examples.
- 4 (a) What is biocatalysis? Describe the organic synthesis using enzymes.
(b) Discuss hydrogenation reactions using homogeneous catalysts.
- 5 (a) Write the about asymmetric organic synthesis using chiral pool and chiral auxiliaries.
(b) Discuss any two methods of resolution of racemic mixtures.
- 6 (a) Write the principle and applications of phase transfer catalysis.
(b) Write a note on Fmoc and t-BOC protocols in peptide synthesis.
- 7 Write a note on
 - (a) Ziegler-Natta catalysts
 - (b) Continuous flow reactors
- 8 (a) Explain stereo selective synthesis with examples.
(b) Explain the mechanism of sigmatropic reactions with examples.

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)
Examination, December 2021**

Subject: Advanced Spectral Analysis

Time: 2 Hours

Max. Marks: 75

**Note: Answer any three questions. All questions carry equal marks.
(3 x 25 = 75 Marks)**

- 1 (a) Write down the Woodward-Fieser rules for 1,3-butadienes, cyclic dienes and α, β -unsaturated carbonyl compounds. How do you calculate λ_{max} ? Give some examples.
(b) How do you interpret the presence of different functional groups in IR spectra? Indicate the wave number regions for different functional groups.
- 2 Give a detailed account on NOESY, COSY, HETCOR and explain how these techniques are useful in the interpretation of organic compounds.
- 3 (a) Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
(b) Explain Mc Lafferty rearrangement with examples.
- 4 Discuss the principle, instrumentation and applications of
(a) GCMS (b) HPTLC
- 5 Discuss the principle, instrumentation and applications of
(a) Ion Exclusion Chromatography
(b) Flash chromatography
- 6 Give brief account on the principle and application of
(a) DSC
(b) Raman spectroscopy
- 7 Write a note on
(a) ELISA
(b) Bioassays
- 8 Give a brief note on
(a) LC-MS
(b) Isotopic peaks

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)
Examination, December 2021**

Subject: Pharmaceutical Process Chemistry

Time: 2 Hours

Max. Marks: 75

**Note: Answer any three questions. All questions carry equal marks.
(3 x 25 = 75 Marks)**

- 1 (a) Explain the strategy and stages of scale up process.
(b) Explain in detail validation of Large scale Process.
- 2 (a) Discuss the principle and general methods of preparation of polymorphs, solvates, and amorphous APIS.
(b) Explain the Theory of filtration and its limitations.
- 3 (a) Write the case study on industrial halogenation.
(b) Write the kinetics and mechanism of aromatic nitration.
- 4 (a) Discuss the production of vitamin B1 and B12.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis.
- 5 (a) Write a detail note on MSDS.
(b) Discuss about effluents and management system in industries.
- 6 (a) Write the case study on Industrial reduction process.
(b) Write a note on different types of fire hazards and different types of fire extinguishers.
- 7 (a) Discuss in detail about types of extraction.
(b) Write a note on kinetic and different types halogenation reactions.
- 8 (a) Write about OHSAS-1800.
(b) Write the types of impurities in API and their sources.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.)

Examination, August 2021

Subject: Advanced Spectral Analysis

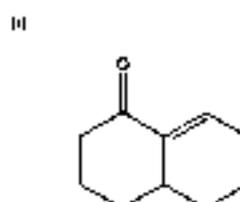
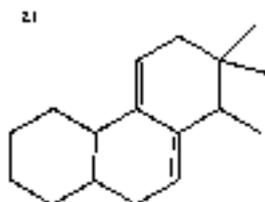
Time: 2 Hours

Max. Marks: 75

Note: Answer any Three Questions.

(3 x 25 = 75 Marks)

1. a) Write down the Woodward-Fieser rules for 1,3-butadienes, cyclic dienes and α, β -unsaturated carbonyl compounds.
 b) Calculate the λ_{max} for the following



- c) How do you interpret the following functional groups in IR show by drawing schematic IR spectra NH₂, COOH, CHO, CO, OH.
2. Discuss any two 2D NMR techniques.
- 3 a) Discuss the fragmentation patterns of important functional groups in mass spectroscopy.
 b) Explain McLafferty rearrangement with examples.
- 4 Discuss the principle, instrumentation and applications of
 a) GCMS
 b) Super critical fluid chromatograph
- 5 Discuss the principle instrumentation and applications of
 a) HPTLC
 b) Flash chromatography
- 6 Give brief account on the principle and applications of
 a) DSC
 b) Raman spectroscopy
- 7 Write a note on
 a) ELISA b) RIA of insulin c) Bioassays
- 8 Give a brief note on
 a) LC-MS b) Isotopic peaks c) ATR-IR

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Suppl.)

Examination, July 2021

Subject : Pharmaceutical Process Chemistry

Time: 2 Hours

Max. Marks: 75

Note: Answer any Three Questions.

(3 x 25 = 75 Marks)

1. a) Explain in detail validation of Large scale Process.
b) Write the Case studies of some Scale up Process of APIS.
2. a) Write a note on types of filtration.
b) Discuss the principle and general methods of preparation of polymorphs, hydrates, solvates and amorphous APIS.
3. a) Write the kinetics and Mechanism of aromatic nitration.
b) Write a note on types of oxidative reactions.
4. a) Explain the production of antibiotics.
b) Write a note on Hydrogen transfer reactions in reduction.
5. a) Write a detail note on OHSAS.
b) Discuss about effluents and management system in industries.
6. a) Write a note on characteristics of expedients routes, cost effective routes, reagent selection for scale up.
b) Write about hazard labels of chemicals and personal protection equipment.
7. a) Write the Case study on industrial halogenation.
b) Write the stages of scale up process.
8. a) Write the production of Vitamins.
b) Explain about steam distillation.

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II-Semester(PCI) (Suppl.)
Examination, July 2021

Subject : Computer Aided Drug Design

Time: 2 Hours

Max. Marks: 75

Note: Answer any Three Questions.

(3 x 25 = 75 Marks)

1. a) Explain the methods to determine Hammett Constant. How this parameter is used in QSAR?
b) Discuss Taft steric and MR parameters in QSAR.
2. a) Discuss, how Contour map analysis is used in 3D QSAR drug design?
b) Write the applications and limitations of Hansch analysis.
3. a) Discuss various molecular mechanic approaches used in drug design.
b) What is Molecular Docking? Discuss various types of Molecular Docking.
4. a) Explain how ADMET prediction is useful in finding new potential drug candidates?
b) Enumerate the steps involved in *De novo* drug design.
5. a) Explain various sequence alignment techniques used in Homology modeling of proteins.
b) Write a note on Fragment Based drug design?
6. a) What is Pharmacophore ? Explain about ligand based Pharmacophore mapping.
b) Write a note on pharmacophore based virtual screening.
7. a) Give the step wise procedure to predict the biological activity using free Wilson analysis.
b) Write about scoring techniques in docking?
8. a) Explain any one 3D QSAR approach used in drug design.
b) Write a note on Similarity based virtual screening methods.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.)

Examination, July 2021

Subject : Advanced Organic Chemistry-II

Time: 2 Hours

Max. Marks: 75

Note: Answer any Three Questions.

(3 x 25 = 75 Marks)

- 1 a) Discuss the effects solvents used in microwave assisted synthesis.
b) Discuss the principle of ultrasound assisted synthesis?
- 2 a) Write a note on action mechanism in peptide synthesis?
b) Give an account on solid supports and linkers used in solid phase peptide synthesis.
- 3 a) What are pericyclic reactions? Discuss about cycloaddition reactions with its Mechanism.
b) Explain about photo addition reactions.
- 4 a) Write a note on a pplications of transition metal catalyst in drug synthesis.
b) Discuss about phase transfer catalysis and its applications.
- 5 a) Explain about Cahn Ingold Prelog sequence rule with examples.
b) Write a note on enantiopure separation and its applications
- 6 a) Write a note on various protecting group protocols employed in soled phase peptide synthesis.
b) Write a note on i) biocatalysis ii) Chiral pool.
- 7 a) Explain the methods used in asymmetric synthesis
b) Write a note on Stereo selective synthesis using chiral auxiliaries
- 8 a) Write a note on Continuous flow reactors, their advantages and Disadvantages.
b) Discuss about microwave technology in process optimization.

FACULTY OF PHARMACY

**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog) Examination,
October 2020**

Subject : Advanced Organic Chemistry - II

Time: 2 Hours

Max. Marks: 75

Note : Answer any Three questions

(3 x 25=75 Marks)

1. Discuss in details about the principles of green chemistry and its applications in organic synthesis.
2. a) Give an account on Fmoc and t-Boc protocols in solid phase peptide Synthesis.
b) Write a note on side reactions in peptide synthesis
3. a) What are pericyclic reactions? Discuss any two types of pericyclic reactions with Mechanism.
b) Explain Photo-oxidation and photo addition with examples.
4. a) What is heterogenous catalyst? Write the preparation and characterization of heterogenous catalyst.
b) Discuss in detail about the homogenous catalysis used in drug synthesis with example.
5. a) Write an note on catalytic asymmetric synthesis .
b) Discuss about relative and absolute configuration.
6. Write a short note on
 - a) Phase transfer catalysis
 - b) Rules governing cyclo addition product formation
7. a) Discuss about protection, solid supports, linkers activation procedures in solid phase peptide synthesis.
b) HF cleavage protocols
8. Write a short note on
 - a) Applications of ultrasound technology in organic synthesis.
 - b) Ziegler-Natta catalyst.

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Main & Backlog)

Examination, October 2020

Subject: Pharmaceutical Process Chemistry

Time: 2 Hours

Max. Marks: 75

Note : Answer any Three questions

(3 x 25=75 Marks)

- 1 (a) Discuss the synthetic strategies in Scale up Process.
(b) Write the In-Process control and validation of Large scale Process.
- 2 (a) Explain the Theory of filtration and its limitations.
(b) Discuss the types of Extraction
- 3 (a) Write the kinetics and Mechanism of aromatic nitration.
(b) Explain types of oxidation reactions and nonmetallic oxidizing agents.
- 4 (a) Discuss the production of penicillin by Fermentation.
(b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis.
- 5 (a) Write a detail note on ISO-1400.
(b) Write about fire hazards and types of fire and fire extinguishers.
- 6 (a) Give a note on Impurities in API (Sources, Types including genotoxic impurities).
(b) Write a note on MSDS.
- 7 (a) Discuss about the types evaporators used in evaporation.
(b) Write a note on kinetics of halogenation and types of halogenation reactions.
- 8 (a) Write a note on hydrogen transfer reactions and case study on industrial reduction.
(b) Explain about azeotropic distillation.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main & Backlog)

Examination, October 2020

Subject : Computer Aided Drug Design

Time: 2 Hours

Max. Marks: 75

Note : Answer any Three questions

(3 x 25=75 Marks)

- a) Write the applications of Hansch Analysis and its limitations
 - b) Write a note on Substituent Hydrophobicity constants and its application in QSAR.
2. Discuss in detail about various physicochemical parameters used in Hansch Analysis.
3.
 - a) Write a note on molecular mechanics.
 - b) Explain Empirical and Semi Empirical methods in drug design.
4.
 - a) Enumerate the steps involved in Molecular docking.
 - b) Discuss about Knowledge based and Consensus scoring techniques in docking.
5.
 - a) Write in detail about the prediction of 3D structures of protein using Homology Modeling.
 - b) Write a short note on Fragment based drug design.
6. Write a short note on.
 - a) Statistical methods used in QSAR
 - b) Docking as virtual screening
7.
 - a) Write a note on Prediction of pharmacokinetic properties and its application in drug design.
 - b) Write a note on Pharmacophore mapping.
8. Discuss in detail about various 3D QSAR techniques, Write their advantages, disadvantages and limitations.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.) Examination,
January 2020

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Discuss about Lipophilic and electronic parameters used in QSAR.
(b) Give a hypothetical Hansch equation for predicting biological activity and explain the importance of each term. (8+7)
- 2 (a) Discuss the statistical terms Correlation coefficient, re-validation and cross-validation.
(b) Write the advantages of Free Wilson analysis. (8+7)
- 3 (a) Write a note on molecular mechanics in drug design.
(b) Discuss about various energy minimization techniques in molecular modeling. (8+7)
- 4 (a) How do you predict Absorption of new molecules ? Discuss any three models.
(b) Write a short note on de novo drug design. (8+7)
- 5 (a) What is homology modeling? Enumerate steps involved in homology modeling. (9+6)
(b) Write a note on agents acting on DHFR and HMGC_oA reductase.
- 6 Write a short note on :
(a) Drug likeness screening
(b) Structure based *in silico* virtual screening (8+7)
- 7 (a) Explain about rigid docking, Flexible docking and extra-precision docking.
(b) Explain, how molecular docking is useful in rational design of new drugs? (8+7)
- 8 Write a short note on :
(a) Hansch analysis
(b) Statistical methods used in QSAR (8+7)

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.) Examination,
January 2020

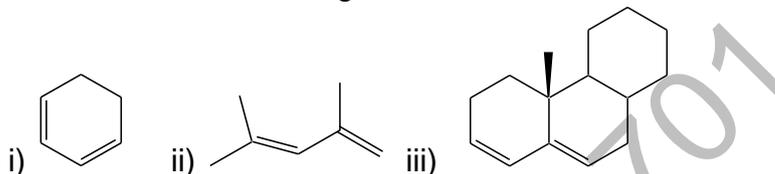
Subject: Advanced Spectral Analysis

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Explain Woodward Fieser rules for α , β -carbonyl compounds and 1,3-butadienes and calculate the λ max for the following.



- (b) How do you interpret the following functional groups in IR

(i) -OH (ii) Ar-NH₂ (iii) -C=O (iv) -COOH (v) -CN (vi) -Cl ? (9+6)

- 2 Draw schematic 1-D & 2-D NMR spectra and explain the interpretation giving one example. (15)
- 3 (a) Discuss the fragmentation pattern of various functional groups. (8)
(b) Explain Mc-Leffety rearrangement and isotopic peaks. (7)
- 4 Explain the Principle, instrumentation and applications of following :
(a) HPLC (b) GC-MS (8+7)
- 5 (a) Explain the Principle, instrumentation and applications of LCMS.
(b) Write a note on super critical chromatography. (10+5)
- 6 Explain the Principle instrumentation and applications of : (7+8)
(a) DSC
(b) TGA
- 7 (a) Explain the bio assay of insulin
(b) Write a note on Radioimmuno assay (8+7)
- 8 Draw and explain the proton NMR and Mass spectra of Benzyl alcohol and 4-hydroxy toluene (15)

FACULTY OF PHARMACY
M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Suppl.) Examination,
January 2020

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Explain in detail validation of Large scale process. (7)
(b) Write the types and sources of impurities in API. (8)
- 2 (a) Write a note on types of extraction. (8)
(b) Discuss the factors affecting the evaporation. (7)
- 3 (a) Write the kinetics and mechanism of aromatic nitration. (8)
(b) Write a note on types of oxidation reaction and oxidizing agents. (7)
- 4 (a) Explain the production of statins. (7)
(b) Discuss the case study on Industrial reduction process. (8)
- 5 (a) Write a detail note on MSDS. (8)
(b) Discuss about effluents and management system in industries. (7)
- 6 (a) Explain the kinetics of halogenations reaction. (6)
(b) Write about hazards labels of chemicals and personal protection equipment. (9)
- 7 (a) Discuss about cost effective routes, reagents selection and families to reagents useful for scale-up. (8)
(b) Explain hydrogen transfer reactions in reduction. (7)
- 8 (a) Write the importance of OHSAS. (8)
(b) Explain the production of streptomycin by fermentation. (7)

FACULTY OF PHARMACY**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.) Examination,
January 2020****Subject: Advanced Organic Chemistry – II****Time: 3 Hours****Max. Marks: 75****Note: Answer any five questions. All questions carry equal marks.**

- 1 (a) What is green chemistry? Discuss the general principles of green chemistry.
(b) Give the synthetic applications of ultrasound assisted reactions? (10+5)
- 2 (a) Write a note on coupling reactions in peptide synthesis?
(b) Discuss the principle and applications of solid phase peptide synthesis. (6+9)
- 3 (a) What are pericyclic reactions? Discuss about sigmatropic reactions with its mechanism?
(b) Explain about photo oxidation and photo fragmentation. (8+7)
- 4 (a) Write a note on applications of enzymes in organic synthesis. (8+7)
(b) Discuss about phase transfer catalysis and its applications.
- 5 (a) Explain about Cahn Ingold Prelog sequence rule with examples.
(b) Discuss about the Cis-Trans isomerism and E-Z notations in compounds containing carbon carbon double bonds. (8+7)
- 6 (a) Write a note on various protecting group protocols employed in solid phase peptide synthesis.
(b) Write a note on (i) Transition metal catalysis (ii) Chiral pool (7+8)
- 7 (a) Explain the methods used in asymmetric synthesis.
(b) Write a note on Stereo selective synthesis. (8+7)
- 8 (a) Write a note on continuous flow reactors, their advantages and disadvantages. (8+7)
(b) Discuss the principle of microwave assisted synthesis.

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main) Examination,
August 2019

Subject: Advanced Organic Chemistry – II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Explain the principle involved in the continuous flow reactors. Discuss their industrial Applications.
(b) Write a note on solvents used in microwave assisted synthesis. (8+7)
- 2 (a) Discuss the sequential strategies for solution phase peptide synthesis.
(b) Write a note on side reactions in peptide synthesis. (8+7)
- 3 (a) What are pericyclic reactions? Discuss any two types of pericyclic reactions with mechanism.
(b) Discuss the basic principles of photo chemical reactions. (10+5)
- 4 (a) What is heterogeneous catalysis ? Write the advantages and disadvantages
(b) Discuss in detail about the homogenous catalysis used in drug synthesis with example. (8+7)
- 5 (a) Write a note on chiral auxiliaries and catalytic asymmetric synthesis. (9+6)
(b) What are racemates? Explain resolution of racemates and its applications.
- 6 Write a short note on : (3+6+6)
(a) Specific rotation
(b) Protecting agents in peptide synthesis
(c) Ultra sound assisted synthesis
- 7 (a) Discuss about protection, solid supports, linkers activation procedures in solid phase peptide synthesis.
(b) HF cleavage protocols. (10+5)
- 8 Write a short note on:
(a) Applications of Microwave technology in organic reactions.
(b) Phase transfer catalysis (8+7)

FACULTY OF PHARMACY**M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main) Examination,
August 2019****Subject: Advanced Spectral Analysis****Time: 3 Hours****Max. Marks: 75****Note: Answer any five questions. All questions carry equal marks.**

- 1 (a) Discuss Woodward Fieser rule with examples ? Discuss the calculation of λ_{max} for cyclic dienes and unsaturated carbonyl compounds with examples. (8+7)
(b) Discuss how IR spectra is useful in structural elucidation of organic compounds with any four structures .
- 2 Write a detailed account on : (8+7)
(a) 1-D NMR
(b) INADEQUATE
- 3 (a) Discuss Mc Lafferty rearrangement and Ring rule.
(b) Give the mass fragmentation rule for amine, carbonyl compounds and halides. (7+8)
- 4 Explain the Principle, instrumentation and applications of following (8+7)
(a) HPTLC (b) GC-MS
- 5 Give the instrumentation and applications of following : (8+7)
(a) DTA (b) DSC
- 6 Write a short note on : (8+7)
(a) HPTLC
(b) Super critical fluid chromatography
- 7 Explain the Principle and applications of following : (8+7)
(a) COSY (b) HECTOR
- 8 Write a short note on : (8+7)
(a) ELISA
(b) Bio assay of digitalis

FACULTY OF PHARMACY**M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Main) Examination,
August 2019****Subject: Pharmaceutical Process Chemistry****Time: 3 Hours****Max. Marks: 75****Note: Answer any five questions. All questions carry equal marks.**

- 1 (a) Explain in detail validation of Large scale process. (7)
(b) Write a note on case studies of APIS in scale up process. (8)
- 2 (a) Write a note on factors affecting crystallization. (6)
(b) Write a note on types of types of extraction. (9)
- 3 (a) Write the kinetics, mechanism and types of halogenations reactions. (8)
(b) Explain types of oxidation reactions and nonmetallic oxidizing agents. (7)
- 4 (a) Explain the production of Vitamins. (8)
(b) Discuss the case study on Industrial reduction process. (7)
- 5 (a) Write a detailed note on ISO-14001. (8)
(b) Discuss about effluents and management system in industries. (7)
- 6 (a) Explain about aerobic and anaerobic fermentation with examples. (6)
(b) Write the mechanism of aromatic nitration and process equipment for technical nitration. (9)
- 7 (a) Write a note on characteristics of expedients routes, cost effective routes, reagent selection for scale up. (9)
(b) Explain hydrogen transfer reactions in reduction. (6)
- 8 (a) Write the importance of OHSAS. (8)
(b) Write a detailed note on Azeotropic distillation. (7)

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main) Examination,
August 2019

Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 (a) Discuss in detail about various parameters used in QSAR.
(b) How substituent hydrophobicity constant is used in the QSAR? Discuss with an example equation. (10+5)
- 2 (a) What is Hansch analysis and Discuss how it is used in predicting the biological activity?
(b) Give the advantages and disadvantages of Hansch analysis. (9+6)
- 3 (a) What is quantum mechanics? Describe the use of quantum mechanics in drug design.
(b) What is molecular docking? Discuss the steps involved in molecular docking? (8+7)
- 4 (a) What is Homology modeling? Discuss its importance in drug design. (8+7)
(b) Write a note on fragment based drug design.
- 5 (a) What is known as pharmacophore? Discuss the concept of Pharmacophore based virtual screening.
(b) Write a note on pharmacophore modeling. (8+7)
- 6 (a) Write a note on Scoring techniques in Molecular docking.
(b) Discuss various models for predicting ADMET properties. (7+8)
- 7 (a) What is virtual screening ? Discuss about druglikeness screening.
(b) Write a note on Privileged structures. (8+7)
- 8 (a) What is bioactive conformation ? Discuss various energy minimization techniques. (8+7)
(b) Write a note on application of Free Wilson analysis in drug design.

FACULTY OF PHARMACY

**M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Suppl.) Examination,
February 2019**

Subject : Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 a) Discuss the Principle and applications of microwave irradiation reactions
b) Explain the basic principles of green chemistry in organic synthesis. (7+8)
- 2 Discuss asymmetric synthesis using chiral pool, chiral auxiliaries, chiral catalysts and chiral solvents with suitable examples
- 3 a) Write a note on transition – metal catalysed reactions in organic synthesis
b) What is biocatalysis? Describe the organic synthesis by using enzymes.
c) Discuss hydrogenation reactions using homogenous catalysts.
4. Discuss electro cyclic and sigma tropic reactions in presence of heat and light with suitable examples
5. a) Write a note on solid phase combinatorial synthesis.
b) Discuss Various solid supports, linkers, protecting and deprotecting groups used in solid-phase peptide synthesis
6. a) Discuss any two methods of resolution of racemic mixtures. 9
b) Discuss sequence rules of R & S configuration with suitable examples. Explain how it is different from Fisher's D & L notations? 6
7. Write a note on
a) Photo – addition reactions
b) Phase – transfer catalysis
c) Ultra sound assisted reactions (5+5+5)
8. a) Discuss cycloaddition reactions with mechanism and stereochemistry in presence of heat and light.
b) Discuss coupling reactions in peptide synthesis (8+7)

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.)
Examination, February 2019

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. a) Explain in detail validation of Large scale Process.
b) Write the Case studies of some Scale up Process of APIs. (7+8)
2. a) Write a note on types of filtration.
b) Discuss the principle and general methods of preparation of polymorphs, hydrates, solvates and amorphous APIs. (7+8)
3. a) Write a note on nitrating agents, equipment for technical nitration.
b) Write a note on types of halogenations, Catalytic halogenations. (8+7)
4. a) Explain about aerobic and anaerobic fermentation with examples.
b) Write a note on cost effective routes, families of reagents useful for scale up (6+9)
5. a) Write a detail note on MSDS.
b) Discuss about effluents and management system in industries. (6+9)
6. a) Give a note on fire hazards and types of fire extinguishers.
b) Write about personal protection equipment. (8+7)
7. a) Discuss the types of extraction.
b) Explain hydrogen transfer reactions in reduction. (8+7)
8. a) Write the Importance of OHSAS.
b) Explain about steam distillation. (8+7)

FACULTY OF PHARMACY
M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.)
Examination, February 2019

Subject: Computer Aided Drug Design

Time : 3 Hours

Max. Marks: 75

Note: Answer any Five questions. All questions carry equal marks

1. a) What is QSAR? Describe the physicochemical parameters used in QSAR.
b) Explain how hydrophobicity constant and Hammett constants of a substituent are measured experimentally? (10+5)
2. a) Discuss in detail about Hansch analysis and its applications.
b) Write a note on 3D QSAR studies. (9+6)
3. a) What is quantum mechanics? Describe the use of quantum mechanics in drug design.
b) What is molecular docking? Discuss the general method of molecular docking. (8+7)
4. a) Describe the steps involved in Homology modeling of a protein. (8+7)
b) Discuss the concept of predicting ADMET properties and its importance in drug design.
5. a) What is known as pharmacophore? Discuss the concept of Pharmacophore based virtual screening.
b) Write a note on Similarity based Virtual screening (8+7)
6. a) Write a note on Scoring techniques in Molecular docking.
b) Write a note on Fragment based drug design. (7+8)
7. a) What is virtual screening? Enumerate various virtual screening techniques.
b) Write a note on Privileged structures. (8+7)
8. a) Discuss the importance of molecular Mechanics in drug design.
b) What is Free Wilson analysis? What are the advantages and disadvantages over Hansch analysis?

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Suppl.) Examination,
February 2019

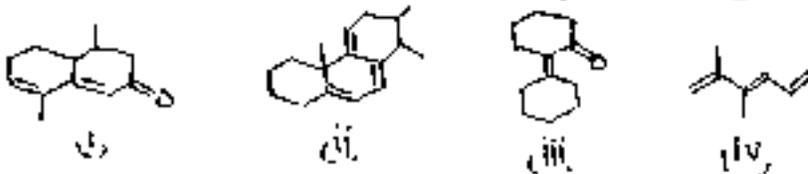
Subject : Advanced Spectral Analysis

Time: 3 Hours

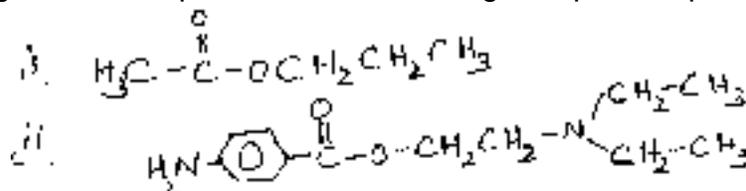
Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

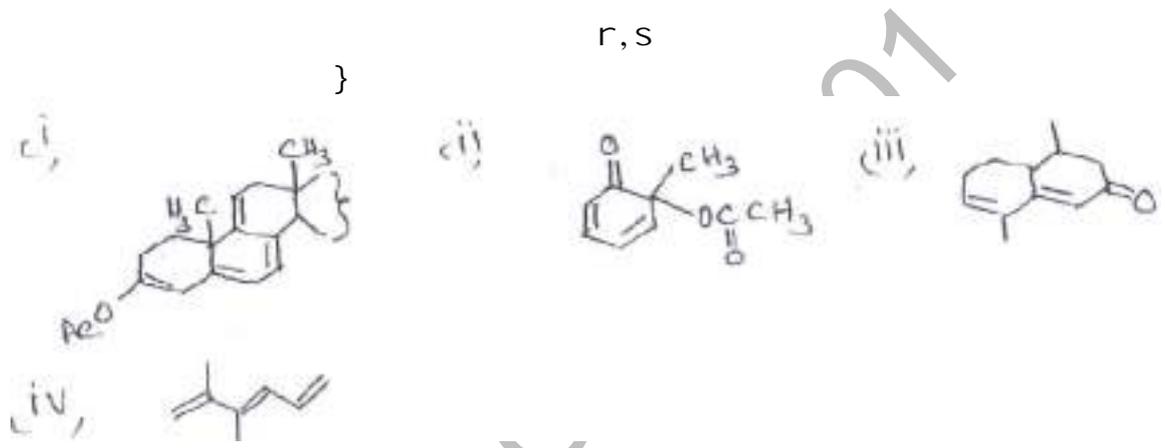
- 1 a) Write down the Woodward – Fieser rules for 1,3-butadienes and α, β -Carbonyl Compounds. Calculate the λ_{max} for the following.



- b) How do you know the presence of $C \equiv N$, NH_2 , OH , SO_2 and NO_2 groups in IR? (Indicate the wave number ranges). (10+5)
- 2 Discuss about any two 2-D NMR techniques in interpretation of structure of organic compounds.
3. a) Discuss the fragmentation patterns of following functional groups in mass Spectrometry
 a) Alkanes b) Carbonyl compounds c) Amines d) Alcohols.
 b) Explain Mc Lafferty rearrangement.
 c) How do you detect the isotopic peaks in mass spectrometry? (8+4+3)
4. Discuss the principle, instrumentation and applications of any two of the following:
 a) GC-MS b) HPTLC c) Flash chromatography
5. Discuss the principle, instrumentation and applications of
 a) DSC b) Raman Spectroscopy
6. a) Explain the principle and applications of ELISA
 b) Discuss radio immune assay of insulin (8+7)
7. Write a note on the following (any two)
 a) Super Critical fluid chromatography
 b) LC-MS
 c) Ion-exclusion chromatography
8. a) Draw a rough 1H NMR Spectra for the following with proton splitting pattern

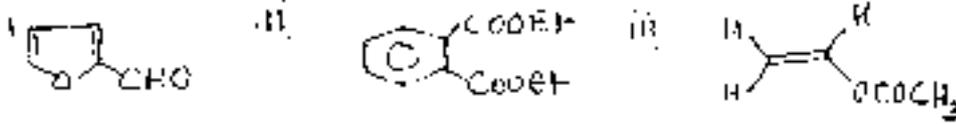


- b) Where shall we expect the $C=O$ stretchings for the following aromatic compounds?
 a) Aldehydes b) Ketones c) Carboxylic acids d) esters
 e) β -lactams f) amides g) anhydrides
 h) α, β -Unsaturated carbonyl compounds (8)



OU - 1701

8. a) Draw a rough 'HNMR Spectra for the following compounds with proton splitting



b) How do you interpret the following functional groups in IR? (any six)

- | | | | | |
|--------------------|---------------------|----------------------|--|---------|
| i) NO ₂ | ii) SO ₂ | iii) NH ₂ | iv) R - $\overset{\text{O}}{\parallel}{\text{C}}$ - OR | v) CONH |
| vi) COOH | vii) CN | viii) CHO | ix) - $\overset{\text{O}}{\parallel}{\text{C}}$ - | v) OH |

(9+6)

OU - 1701 OU - 1701

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) II-Semester (PCI) (Main) Examination,
August 2018

Subject : Advanced Organic Chemistry-II

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

- 1 a) Discuss the basic Principles of green chemistry
b) Discuss the merits, demerits and any five applications of micro wave assisted reactions. (8+7)
- 2 What are pericyclic reactions? Discuss Cycloaddition and electrocyclic reactions in presence of heat and photo light with mechanism and stereochemistry.
3. a) What is homogenous and heterogonous catalysis? Explain advantages and disadvantages. Discuss examples of drug syntheses involving Wilkinson catalyst and Ziegler – Natra catalyst (one each)
b) Discuss the theory and applications of phase transfer catalysts (8+7)
4. Discuss different methods of asymmetric synthesis with suitable examples
- 5 Explain the basic principles of solid phase peptide synthesis. Write about solid supports, linkers, protecting and de protecting groups used in solid phase peptide synthesis
6. a) Discuss any five synthetic applications of Ultra sound assisted reactions
b) Discuss sequential strategies in solution phase peptide synthesis with two case studies (5+10)
7. a) Explain Cahn, Ingold, Prelog (CIP) sequence rules with suitable examples
b) Discuss cis-trans isomerism in cyclic and double bond containing compounds (7+8)
8. Write a note on: (5+5+5)
 - a) Photo-oxidation reactions
 - b) Sigmatropic reactions
 - c) Bio catalysts

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main) Examination,

August 2018

Subject: Pharmaceutical Process Chemistry

Time: 3 Hours

Max. Marks: 75

Note: Answer any five questions. All questions carry equal marks.

1. a) Discuss the synthetic strategies in Scale up Process
b) Write the validation of Large scale Process (7+8)
2. a) Explain the Theory of filtration and its limitations
b) Discuss the factors affecting Crystallization (9+6)
3. a) Write the kinetics and Mechanism of aromatic nitration.
b) Discuss the different oxidizing agents used in oxidation
4. a) Discuss the production of penicillin by Fermentation
b) Write a note on streamlining reaction steps and route of selection in reaction progress kinetic analysis. (7+8)
5. a) Write a detail note on OHSAS – 18000
b) Write about fire hazards and types of fire and fire extinguishers (8+7)
6. a) Give a note on Impurities in API (Sources, Types including genotoxic impurities) (7+8)
b) Write about Effluent Management system in Industries.
7. a) Discuss about the types of evaporators used in evaporation
b) Write the Case study on Industrial Halogenation (8+7)
8. a) Write the Importance of ISO-14001 in Industrial Safety
b) Explain about azeotropic distillation (9+6)

FACULTY OF PHARMACY

M.Pharmacy (Pharmaceutical Chemistry) II-Semester (PCI) (Main)

Examination, August 2018

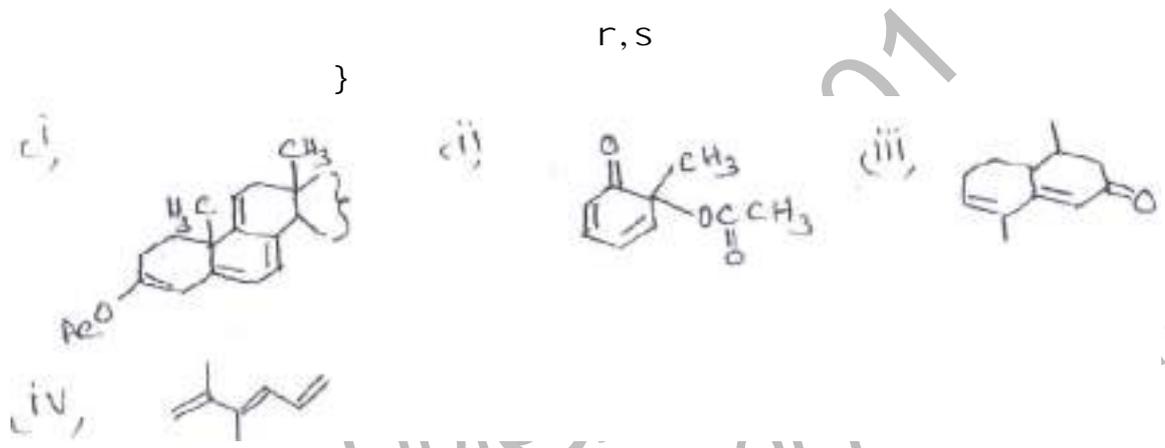
Subject: Computer Aided Drug Design

Time: 3 Hours

Max. Marks: 75

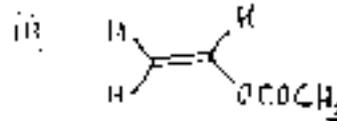
Note: Answer any Five questions. All questions carry equal marks

1. a) Discuss about Substituent Hydrophobicity constant, Hammett constant and Taft steric constant
b) Give a hypothetical Hansch equation for compounds with higher log p Values and explain each term (8+7)
2. a) Enumerate the steps involved in 3D QSAR studies to predict the biological activity
b) Write the advantages of Free Wilson analysis (8+7)
3. a) Write a note on molecular mechanics
b) Discuss about the importance of energy minimization in molecular modeling (8+7)
4. a) Explain about various docking methods and write their advantages
b) Discuss about Knowledge based and Consensus scoring techniques in docking (8+7)
5. a) What is homology modeling and enumerate steps involved in homology modeling (9+6)
b) Write a short note on de novo drug design
6. Write a short note on
a) Drug likeness screening
b) Pharmacophore based virtual screening (8+7)
7. a) Explain the techniques to predict the active site of a receptor in de novo drug design
b) Explain, how new DHFR inhibitors are designed using molecular docking? (8+7)
8. Write a short note on
a) Requirements to perform QSAR studies with suitable example
b) Statistical methods used in QSAR (8+7)



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8. a) Draw a rough 'HNMR Spectra for the following compounds with proton splitting



b) How do you interpret the following functional groups in IR? (any six)

i) NO₂

ii) SO₂

iii) NH₂

iv) R - $\overset{\text{O}}{\parallel}$ C - OR

v) CONH

vi) COOH

vii) CN

viii) CHO

ix) - $\overset{\text{O}}{\parallel}$ C -

v) OH

(9+6)
