Code No. G-13122/PCI

FACULTY OF PHARMACY

M. Pharmacy (PCI) I – Semester (Main & Backlog) Examination, June 2025
Subject: Modern Pharmaceutical Analytical Techniques
(Common to All)

Time: 3 Hours **Max. Marks: 75**

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

1. (a) Write Beer –Lambert's law and explain the deviations to it. (7 Marks)
   (b) Explain the instrumentation of FTIR. (8 Marks)

2. (a) Write principle involved in proton NMR spectroscopy. Discuss on chemical shift (7 Marks)
   (b) Explain the instrumentation of NMR with labelled schematic diagram. (8 Marks)

3. (a) Discuss about different ionization techniques of mass spectroscopy. (7 Marks)
   (b) Brief out the fragmentation patterns and rules of different organic compounds. (8 Marks)

4. (a) Write instrumentation details of HPLC with labelled schematic diagram. (10 Marks)
   (b) Differentiate between HPTLC and HPLC. (5 Marks)

5. (a) Explain about gel electrophoresis. (8 Marks)
   (b) What is X-ray crystallography? Write Brag's law. (7 Marks)

6. Write notes on
   (a) Sampling in IR spectroscopy
   (b) FT-NMR. (2 x 7.5 = 15 Marks)

7. Give informative note on
   (a) Flame emission spectroscopy
   (b) Gas chromatography (2 x 7.5 = 15 Marks)

8. (a) Explain the instrumentation of UV-Visible spectrophotometer. (10 Marks)
   (b) Write about any one X-ray crystallographic method. (5 Marks)

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Code No. G-13130/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, June 2025

Subject: Advanced Organic Chemistry - I

Time: 3 Hours **Max. Marks: 75**

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

1. (a) Explain the structure and stability of free radicals and carbenes. (8+7 Marks)
   (b) Write a note on Elimination reactions using Hoffman & saytzeff's rule.

2. (a) Write the mechanism and applications of
   (i) Ugi reaction (ii) Michael addition reaction
   (b) Discuss the method of formation, stability and synthetic applications of carbocations. (8+7 Marks)

3. Discuss the method of preparation, mechanism and applications of (15 Marks)
   (a) Triphenylphosphine (b) Diazopropane (c) Wilkinson reagent

4. (a) How do you protect carbonyl and carboxyl functional groups in Organic reactions?
   (b) Write a note on role of protection in organic synthesis. (8+7 Marks)

5. Give the synthesis of following: (15 Marks)
   (a) Celecoxib (b) Ketoconazole (c) Quinacrine

6. Write a note on: (15 Marks)
   a) Smiles rearrangemet b) Knorr pyrrole synthesis
   c) Bernthsen Acridine Synthesis

7. (a) Give a note on FGI and FGA.
   (b) Discuss the retro synthetic strategies for four and five membered ring systems. (7+8 Marks)

8. (a) Explain C-C disconnection of alcohols and carbonyl compounds.
   (b) Write a note on:
   i) Mercaptopurine synthesis ii) Vilsmeyer-Haack Reaction (7+8 Marks)

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Code No: G-13132/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I – Semester (PCI) (Main & Backlog) Examination, June 2025

Subject: Chemistry of Natural Products

Time: 3 hours **Max. Marks: 75**

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

1. Explain how natural products acted as lead molecules while designing drugs? Explain by taking any three classes of drugs.

2. a) Write the Isolation, classification and biological activity of alkaloids.
   b) Discuss the structure elucidation of Ephedrine.

3. Write the structural elucidation (i) Reserpine (ii) Ergot.

4. a) Discus the general methods to elucidate the structure of Terpenoids.
   b) Write the structural elucidation of menthol.

5. Write the structural characterization of following compounds using IR, ^{1}H NMR, ^{13}C NMR and Mass spectral data (with approximate values).
   (i) Quercetin (ii) Vitamin D (iii) Digitoxin (iv) Camphor (v) Morphine

6. Write a note on
   (a) Recombinant DNA technology and drug discovery
   (b) Chemistry of Vitamin A

7. Write any five crude drugs used in the indigenous system for diabetes therapy and discuss about their active constituents in detail.

8. Write a note on
   (a) Gene therapy
   (b) Chemistry & physiological significance of Vitamin B1, B2.

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Code No: G-13131/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I - Semester (PCI) (Main & Backlog) Examination, June 2025

Subject: Advanced Medicinal Chemistry

Time: 3 hours **Max. Marks: 75**

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

1. a) What is drug discovery? Discuss about lead discovery and lead optimization.
   b) Explain the theories of drug receptor interactions. (8+7 Marks)

2. a) How ADMET properties improved through prodrug design.
   b) Discuss the Bioisosteric replacement strategies for Analog Design. (8+7 Marks)

3. a) Give an account on COX-II inhibitors
   b) Classify antihypertensive drugs with example. (7+8 Marks)

4. a) Discuss how chirality of drugs influences the pharmacological action? (8+7 Marks)
   b) Define drug resistance and discuss the mechanisms of anticancer drug resistance.

5. a) Give an account on enzyme inhibitors in medicine and basic research.
   b) Discuss about Non-covalently binding enzyme inhibitors and their pharmacological significance (8+7 Marks)

6. a) Give the classification of anticonvulsant drugs with suitable examples
   b) Write a note on AchE inhibitors (8+7 Marks)

7. a) Write a note on modification of amino acid in peptidomimetic design.
   b) Write a note on manipulation of peptide back bone and incorporation of conformational constraints in peptidomimetic drug design. (8+7 Marks)

8. a) Discuss, how does the stereochemistry of drug influences absorption, distribution and elimination.
   b) Classify antiviral agents with suitable examples. (9+6 Marks)

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Code No : G-13001/PCI

FACULTY OF PHARMACY

M. Pharmacy I-Semester (PCI) (Common to All) (Backlog) Examination, December 2024

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

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

1. (a) State and explain Beer-Lambert's law. Add a note on the deviations from Beer's law. 9
   (b) Explain the electronic transitions in UV spectroscopy. 6

2. Explain the principle, sample handling techniques and any three 3 detectors of IR spectroscopy. 2+5+8

3. Explain the principle, working of Hallow cathode lamp, any three Interferences with remedy and Applications of Atomic Absorption Spectroscopy. 2+5+5+3

4. (a) What is the significance of chemical shift? What are the factors affecting chemical shift? 8
   (b) Write a note on spin-spin coupling, coupling constant and its Importance. 7

5. (a) Write different modes of fragmentation and fragmentation rules in Mass Spectroscopy. 9
   (b) Define Base peak, molecular ion peak and metastable ion. 6

6. (a) Write the principle and instrumentation of Capillary electrophoresis. 8
   (b) Write the principle and Instrumentation of Gel Electrophoresis. 7

7. (a) Define Braggs law and its importance. 5
   (b) Write in detail about rotating crystal technique and the applications of X-ray Diffraction. 10

8. Discuss the principle, instrumentation, working and application of 8+7
   (a) Affinity Chromatography
   (b) Gel Chromatography

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Code No: G-13005/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Backlog) Examination, December 2024

Subject: Advanced Organic Chemistry - I

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1. (a) Give a note on method of formation, stability and important reactions of carbenes and nitrenes.
   (b) Write the types of rearrangement reactions and discuss the mechanism of any two. (8+7)

2. (a) Write the synthesis of following:
   (i) Miconazole (ii) Antipyrin
   (b) Explain in detail about the uni and bi-molecular substitution reactions with mechanism. (8+7)

3. Write the mechanism and applications of following named reactions. (15)
   (a) Vilsmeyer-Haack Reaction (b) Sandmeyer Reaction (c) Mannich Reaction.

4. (a) Explain the mechanism and applications of Ugi reaction and Baeyer-Villiger oxidation.
   (b) Give an account of method of preparation and applications of Diazopropane and Diethyl azodicarboxylate. (8+7)

5. (a) Discuss the role of protecting groups in organic synthesis.
   (b) How do you protect amino and carbonyl functional groups in Organic reactions? (8+7)

6. (a) Write a note on: (15) (i)
   (i) Combs quinoline synthesis (ii) Traube purine synthesis
   (iii) Debus Radziszewski imidazole synthesis

7. (a) Outline the synthesis of following: (15)
   (i) Celecoxib (ii) Triamterene (iii) Theophylline

8. (a) Write a note on Functional group interconverting and addition (FGI and FGA).
   (b) Discuss the retro synthetic strategies for five and six membered ring systems. (8+7)

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Code No: G-13006/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I – Semester (PCI) (Backlog) Examination, December 2024

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max.Marks:75**

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

1. (a) Discuss about various stages involved in the drug discovery. [8]
   (b) Explain the theories of drug receptor interactions. [7]

2. (a) Define prodrug and discuss the applications of prodrugs with suitable examples. [9]
   (b) Describe the various screening techniques used in lead discovery. [6]

3. (a) Give the classification of H1 and H2 histamine receptor antagonists with examples. [9]
   (b) Explain how the chirality of a drug is important for its pharmacological activity of chiral drugs. [6]

4. (a) Discuss the mechanisms of antibiotic resistance and methods to overcome it in details. [10]
   (b) Discuss the rational design of reversible enzyme inhibitors. [5]

5. (a) Write a note on modification of amino acid in peptidomimetic design. [8]
   (b) Write a note on manipulation of peptide back bone and incorporation of conformational constraints in peptidomimetic drug design. [7]

6. (a) Discuss the chemistry of prostaglandins. [8]
   (b) Write a note on AchE inhibitors. [7]

7. Write a note on:
   (a) Lead optimization [7]
   (b) Molecular modifications in analogue design. [8]

8. (a) Discuss about receptor theories to describe the terms Partial agonist, antagonist and Inverse agonist. [8]
   (b) Classify antiviral agents with suitable examples and discuss the mechanisms of action of Acyclovir. [7]

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Code No: G-13007/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Backlog) Examination, December 2024

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1. Discuss how the natural products acts as a leads in the following classes of drugs
   (a) Antimalarial drugs (b) Macrolide & beta lactam antibiotics.

2. (a) Write the general methods for the structural elucidation of alkaloids.
   (b) Write briefly about isolation and purification of Flavanoids.

3. (a) Write a note on Sapogenins and Adrenocorticoids.
   (b) Discuss chemistry of cardiac glycosides.

4. (a) Give classification, isoprene and special isoprene rules of Terpenoids.
   (b) Discuss in brief the structural elucidation of Triterpenoids.

5. (a) Write a note on chemistry and physiological significance of following vitamins
   (i) Vitamin B12 (ii) Vitamin E (iii) Vitamin C
   (b) Write in detail about Hybridoma technology.

6. Write down the active constituents present in the following crude drugs with structures.
   (i) Curcuma longa (ii) Salacia reticulate (iii) Gymnema sylvestre
   (iv) Phyllanthus niruri (v) Trigonella foenum graccum

7. Write the structural characterization of following compounds using IR, ^{1}H NMR, ^{13}C NMR and Mass spectral data (Write approximate values)
   (i) Quercetin (ii) Vitamin D (iii) Digoxin (iv) Camphor (v) Pencillin G

8. (a) Explain the principles of RNA & DNA estimation and its applications.
   (b) Write about Oligonucleotide Therapy.

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Code No: F-7239/PCI

FACULTY OF PHARMACY

M. Pharmacy I - Semester (PCI) (Common to All) (Main & Backlog) Examination, June 2024

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

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

1. (a) Explain different methods of single component and Multicomponent analysis of Pharmaceutical formulation by UV-Visible Spectroscopy. [9]
   (b) Explain the electronic transitions in UV spectroscopy. [6]

2. (a) Explain the molecular vibrations in IR. [8]
   (b) Write the sampling methods in IR spectroscopy. [7]

3. (a) Explain the principle of fluorescence. Add a note on quenching effect.
   (b) With a diagram explain the instrumentation for AAS. [8+7]

4. (a) Explain the principle and Instrumentation of NMR Spectroscopy. [8]
   (b) Write a note on spin-spin coupling and Applications of NMR [7]

5. (a) Classify the ionization techniques in MS. Explain any three methods in detail. [9]
   (b) Define Base peak, molecular ion peak and metastable ion. [6]

6. (a) Write the principle and instrumentation of flame photometry. [7]
   (b) Write notes on any two GC detectors with a neat labeled diagram. [8]

7. (a) Briefly explain the source of AA. [8]
   (b) List and explain the interferences. [7]

8. Discuss the principle, instrumentation working and application of [7+8]
   (a) Paper electrophoresis
   (b) Gel electrophoresis

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Code No: F-7245/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, June 2024

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1. Discuss, how the natural products acts as a lead in the development of Anticancer drugs and Morphine alkaloids.

2. (a) Define Flavanoids and give the general methods for the determination of structure of flavanoids.
   (b) Discuss the structure elucidation of Reserpine.

3. Write the structural elucidations of (i) Ergot (ii) Morphine.

4. (a) Discus the general methods to elucidate the structure of Terpenoids.
   (b) Write the structural elucidation of Citral.

5. Write the structural characterization of following compounds using IR, ^{1}H NMR, ^{13}C NMR and Mass spectral data (with approximate values).
   (i) Quercetin (ii) Vitamin D (iii) Digitoxin (iv) Camphor (v) Morphine

6. Write a note on
   (i) Chemistry of Vitamin B1
   (ii) Stereochemistry and nomenclature of steroids
   (iii) Contraceptive agents

7. Write any five crude drugs used in the indigenous system for diabetes therapy and discuss about their active constituents in detail.

8. Write a note on
   (a) rDNA Technology
   (b) Clinical Applications and recent advances in gene therapy

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Code No: F-7244/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I – Semester (PCI) (Main & Backlog) Examination, June 2024

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max.Marks:75**

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

1. (a) What are leads? Discuss the concept of lead discovery. [8]
   (b) Discuss the criteria for the identification of target and its validation in drug discovery. [7]

2. (a) Discuss the concept of prodrug design with detailed applications. [8]
   (b) Describe the various stages of analog design. [7]

3. (a) Give the classification of antihypertensive agents with suitable examples. [8]
   (b) Discuss how chirality of drugs influences the absorption and distribution of drugs? [7]

4. (a) Define drug resistance and discuss the mechanisms of antibiotic drug resistance. [8]
   (b) Write a note on HIV protease inhibitors. [7]

5. (a) Give the classification of enzyme inhibitors with suitable examples. [8]
   (b) Discuss about the rational design of drugs as reversible enzyme inhibitors with example. [7]

6. (a) Classify antineoplastic agents with suitable examples and write the mechanism of action of methotrexate. [7]
   (b) Classify anti convulsants with examples and discuss the SAR of Barbiturates. [8]

7. (a) Define peptidomimetics and discuss the advantages of them over peptide drugs. [8]
   (b) Discuss about unnatural amino acids used in peptidomimetic drug design. [7]

8. (a) What are bio-isosters? Discuss their applications in analogue design. [8]
   (b) Write a note on cyclooxygenase inhibitors. [7]

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Code No: F-7243/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, June 2024

Subject: Advanced Organic Chemistry-I

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1. (a) Write the mechanism and stereochemistry of E1 and E2 eliminations.
   (b) Discuss the method of formation, stability and important reactions of carbocations and freeradicals. (8+7)

2. (a) Give a method of preparation and applications of
   (i) Aluminiumisopropoxide (ii) Witting reagent
   (b) Explain in detail about the uni and bi-molecular substitution reactions with mechanism. (8+7)

3. Discuss the mechanism and applications of following named reactions. (15)
   (i) Doebner-Miller Reaction (ii) Ozonolysis (iii) Dieckmann Reaction.

4. (a) Explain the mechanism and applications of Mannich reaction and Vilsmeyer-Haack Reaction.
   (b) Give an account of method of preparation and applications of Wilkinson reagent and titanium chloride. (8+7)

5. (a) Explain the terms Synthon and Synthetic equivalent with examples.
   (b) How do you protect hydroxy and carboxyl functional groups in Organic reactions. (8+7)

6. (a) Write a note on: (15)
   (i) Combs quinoline synthesis (ii) Traube purine synthesis
   (iii) Pinner pyrimidine synthesis

7. (a) Outline the synthesis of following: (15)
   (i) Hydroxychloroquine (ii) Quinine (iii) Promazine

8. (a) Explain C-C disconnection of alcohols and carbonyl compounds.
   (b) Discuss the retro synthetic strategies for five and six membered ring systems. (8+7)

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Code No: E-12421/PCI

FACULTY OF PHARMACY

M.Pharmacy I-Semester (PCI) (Common to all) (Backlog) Examination, November-2023

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

Note: Answer any Five Questions. All Questions carry Equal marks.

1. a) Explain the electronic transitions with suitable examples
   b) State and explain Beer- Lambert's law. Add a note on the deviations from Beer's law. (6+9)

2. a) Explain the sampling techniques in IR spectroscopy.
   b) What are the applications of IR spectroscopy (9+6)

3. a) What is the principles of flame photometrty? Explain the instrumentation.
   b) What are the factors affecting fluorescence? (9+6)

4. a) Explain chemical shift and the factors affecting chemical shift ?
   b) Draw a schematic NMR spectrum and explain splitting α signal intensity. (10+5)

5. With a neat labelled diagram, explain MS instrumentation. Draw MS spectrum for any two compounds α explain its peaks.

6. a) Classify the ionization techniques in MS. Explain any three methods in detail.
   b) Explain the fragmentation rules in MS. (9+6)

7. a) Explain HPLC instrumentation with a labelled diagram.
   b) Explain the factors affecting resolution & peak symmetry. (8+7)

8. a) Explain the principle and applications of capillary electrophoresis
   b) Classify the types of crystals and add a note on the applications of X-ray diffraction. (8+7)

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Code No: E-12427/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I Semester (PCI) (Backlog) Examination, November 2023

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

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

1. Write how the natural products acts as a leads in the following classes of drugs
   (a) Antimalarial drugs
   (b) Beta lactam antibiotics.

2. (a) Write the general methods for the structural elucidation of flavanoids.
   (b) Write the structural elucidation of quercetin.

3. (a) Write a note on Sapogenins and cardiac glycosides.
   (b) Discuss chemistry of contraceptive agents.

4. (a) Give classification, isoprene and special isoprene rules of Terpenoids.
   (b) Discuss in brief the structural elucidation of Citral and Retinol.

5. (a) Write a note on chemistry and physiological significance of following vitamins
   (i) Vitamin E (ii) Niacin (iii) Vitamin C
   (b) Write in detail about Hybridoma technology.

6. Discuss the active constituents & their uses in the following crude drugs.
   (i) Curcuma longa (ii) Pterocarpus marsupium (iii) Gymnema sylvestre
   (iv) Phyllanthus niruri (v) Swertia chirata

7. Write the structural characterization of functional groups in the following compounds using IR, ^{1}H NMR, ^{13}C NMR and Mass spectral data (Write approximate values)
   (i) Quercetin (ii) Vitamin D (iii) Digoxin (iv) Camphor (v) Pencillin G

8. (a) Explain the principles of RNA & DNA estimation and its applications.
   (b) Write a note on Adrenocorticoids.

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Code No: E-12426/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Backlog) Examination, November 2023

Subject: Advanced Medical Chemistry

Time: 3 Hours **Max. Marks: 75**

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

1. (a) What are leads? Discuss the concept of lead discovery.
   (b) Discuss the criteria for the identification of target and its validation in drug discovery. [8+7]

2. (a) Define prodrug and discuss the applications of prodrugs with suitable examples.
   (b) Discuss the strategies to overcome the drug resistance to antibiotics. [9+6]

3. (a) Give the classification of Antihypertensive agents with examples and write The synthesis of Captopril.
   (b) Explain how the chirality of a drug is important for its pharmacological activity of chiral drugs. [9+6]

4. (a) Give the classification of enzyme inhibitors with suitable examples.
   (b) Discuss the rational design of reversible enzyme inhibitors [10+5]

5. (a) Define and differentiate peptide drugs and peptidomimetics with examples and discuss the concept of peptidomimetic drug design.
   (b) Discuss the chemistry of prostaglandin. [8+7]

6. (a) Give the classification of antineoplastic drugs with suitable examples.
   (b) Write a note on AchE inhibitors [9+6]

7. Write a note on:
   (a) Lead optimization
   (b) Molecular modifications in analogue design. [7+8]

8. (a) Discuss about receptor theories to describe the terms Partial agonist, antagonist and Inverse agonist.
   (b) Classify antiviral agents with suitable examples and discuss the mechanisms of action of Acyclovir. [8+7]

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Code No: E-12425/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Backlog) Examination, November 2023

Subject: -Advanced Organic Chemistry-I

Time: 3 Hours **Max. Marks: 75**

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

1. (a) Write the mechanism and stereochemistry of E1 and E2 eliminations.
   (b) Enlist the types of rearrangement reactions and discuss the mechanisms of any two. [8+7]

2. (a) Give a method of preparation, mechanism and applications of
   (i) Aluminiumisopropoxide (ii) Witting reagent
   (b) Discuss the method of formation, structure, stability and synthetic applications of free Radicals. [8+7]

3. Discuss the mechanism and applications of following named reactions. [15]
   (a) Brook rearrangement (b) Sandmeyer Reaction (c) Vilsmeyer-Haack Reaction

4. (a) Discuss the mechanism and applications of Doebner-Miller Reaction and Baeyer-Villiger oxidation.
   (b) Give an account of synthetic applications of Mannich reaction & Michael addition reaction. [8+7]

5. (a) Discuss the synthetic importance of protecting reactive functional groups in organic synthesis.
   (b) Give an account on protection of Amine and Carboxyl groups and their synthetic importance. [8+7]

6. Write a note on: [15]
   (a) Combes Quinoline synthesis (b) Traube purine synthesis
   (c) Pinner pyrimidine Synthesis

7. Outline the synthesis of following: [15]
   (a) Celecoxib (b) Chlorpromazine (c) Mercaptopurine

8 (a) Discuss c-x disconnections in alcohols and carbonyl compounds.
   (b) Discuss the retro synthetic strategies for Four and Five membered ring systems. [8+7]

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Code No: E-12297/PCI

FACULTY OF PHARMACY

M. Pharmacy I Semester (PCI) (Common to all) (Main & Backlog) Examination, May 2023

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

Note: Answer any Five Questions. All Questions carry Equal marks.

1. a) With a neat labelled diagram explain UV/Visible instrumentation.
   b) What are the criteia in the solvent selection for UV spectroscopy? Give examples for solvents. What is meant by solvent effect? (9+6)

2. a) Explain the Principle, advantages and instrumentation of FTIR with a neat labelled diagram.
   b) Explain the molecular vibrations in IR spectroscopy. (10+5)

3. a) Explain the principle of fluorescence. Add a note on quenching effect
   b) With a diagram explain the instrumentation for AAS. (8+7)

4. a) Explain the principle of proton NMR spectroscopy.
   b) Explain the spin-spin coupling in NMR spectroscopy with suitable example. (7+8)

5. a) Explain the principle of mass spectroscopy.
   b) Explain any two mass analysers used in MS in detail. (7+8)

6. a) Explain GC instrumentation with a labelled diagram.
   b) Explain the applications of XRD technique. (9+6)

7. a) Explain the instrumentation & working of HPLC. (8+7)
   b) Explain the factors affecting resolution & Peak symmetry.

8. Define and classify the electrophoretic techniques. Explain the principle and applications of gel electrophoresis. (15)

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Code No: E-12303/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharm. Chemistry) I - Semester (PCI) (Main & Backlog) Examination, May 2023

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

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

(5 x 15 = 75 Marks)

1. Discuss, how the natural products acts as a lead in the development of Antimalarial and Cardiovascular drugs.

2. (a) Define Alkaloids and give the general methods for the determination of structure of alkaloids.
   (b) Discuss the structure elucidation of Ephedrine.

3. Write the structural elucidation (i) Reserpine (ii) Morphine.

4. (a) Discus the general methods to elucidate the structure of Terpenoids.
   (b) Write the structural elucidation of quercetin.

5. Write the structural characterization of following compounds using IR, ^{1}H NMR, ^{13}C NMR and Mass spectral data (with approximate values).
   (i) Quercetin (ii) Vitamin D (iii) Digitoxin (iv) Camphor (v) Morphine

6. Write a note on
   (a) Recombinant DNA technology and drug discovery
   (b) Chemistry of Vitamin A
   (c) Stereochemistry and nomenclature of steroids

7. Write any five crude drugs used in the indigenous system for diabetes therapy and discuss about their active constituents in detail.

8. Write a note on
   (a) Gene therapy
   (b) Chemistry & physiological significance of Vitamin B1, B2.

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Code No: E-12301/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main & Backlog) Examination, May 2023

Subject: Advanced Organic Chemistry-I

Time: 3 Hours **Max. Marks: 75**

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

(5 x 15 = 75 Marks)

1. (a) Explain SN^1 and SN^2 reactions in aliphatic compounds with their mechanism and stereochemistry.
   (b) Discuss the method of formation, stability and important reactions of free radicals and carbanions. [8+7]

2. (a) Give a method of preparation, mechanism and applications of
   (i) N-bromosuccinamide (ii) Diazomethane.
   (b) What are rearrangement reactions? Explain rearrangements to electron deficient carbon with suitable reactions. [8+7]

3. Discuss the mechanism and applications of following named reactions. [15]
   (a) Michael addition Reaction (b) Dieckmann Reaction (c) Mannich Reaction.

4. (a) Discuss the mechanism and applications of Sharpless asymmetric epoxidation and Baeyer-Villiger oxidation.
   (b) Give an account of synthetic applications of Ozonolysis & Sandmeyer Reaction. [8+7]

5. (a) Discuss the synthetic importance of protecting reactive functional groups in organic synthesis.
   (b) How do you protect carboxyl and carbonyl functional groups in Organic reactions. [8+7]

6. Write a note on: [15]
   (a) Pinner pyrimidine synthesis (b) Knorr pyrazole synthesis
   (c) Bernthsen Acridine Synthesis

7. Outline the synthesis of following: [15]
   (a) Trimethoprim (b) Metronidazole (c) Chloroquine

8. (a) Explain C-C disconnection of alcohols and carbonyl compounds.
   (b) Discuss the retro synthetic strategies for Five and six membered ring systems. [8+7]

Code No: E-12302/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, May 2023

Subject: - Advanced Medical Chemistry

Time: 3 Hours **Max. Marks: 75**

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

(5 x 15 = 75 Marks)

1. (a) Discuss about various stages involved in the drug discovery.
   (b) Explain the theories of drug receptor interactions. [8+7]

2. (a) Discuss the concept of prodrug design with detailed applications.
   (b) Discuss the Bioisosteric replacement strategies for Analog Design. [8+7]

3. (a) Give the classification of H1 and H2 histamine receptor antagonists with suitable examples.
   (b) Discuss how chirality of drugs influences the pharmacological action? [9+6]

4. (a) Define drug resistance and discuss the mechanisms of antibiotic drug resistance.
   (b) Classify anti convulsants with examples and discuss the SAR of Benzodiazepines. [7+8]

5. (a) Give an account on enzyme inhibitors in medicine and basic research.
   (b) Discuss about Non-covalently binding enzyme inhibitors and their Pharmacological significance [8+7]

6. (a) Give an account on COX-II inhibitors.
   (b) Classify adrenergic antagonists and discuss the SAR of B-blockers. [8+7]

7. (a) Write a note on modification of amino acid in peptidomimetic design.
   (b) Write a note on manipulation of peptide back bone and incorporation of conformational constraints in peptidomimetic drug design. [8+7]

8. (a) Discuss, how does the stereochemistry of drug influences absorption, distribution and elimination.
   (b) Write a note on Alkylating agents. [10+5]

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Code No. E-12084/PCI

FACULTY OF PHARMACY

M. Pharmacy (Common to All) I - Semester (PCI) (Backlog) Examination, December 2022

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

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

1 (a) With a neat labelled diagram explain UV/Visible spectrophotometer instrumentation.
(b) What are the applications of UV spectroscopy?

2 (a) Explain the molecular vibrations in IR.
(b) Write the sampling methods in IR spectroscopy.

3 (a) Explain the principle of fluorescence.
(b) With a diagram explain the instrumentation for flame photometry.

4 (a) Explain the principle of proton NMR spectroscopy.
(b) Explain the following in NMR spectroscopy: Shielding and deshielding, chemical shift.

5 (a) Explain the principle of mass spectroscopy.
(b) Explain any two mass analysers used in MS in detail.

6 (a) Explain GC instrumentation with a labelled diagram. Add a note on the different types of GC columns.
(b) List and explain any 2 GC detectors.

7 (a) Explain Braggs equation and derive the equation.
(b) Explain the principle and types of Paper electrophoresis.

8 (a) Explain the principle and applications of ELISA?
(b) Explain the principle and applications of capillary electrophoresis.

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Code No. E-12088/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Backlog) Examination, December 2022

Subject: Advanced Organic Chemistry – I

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Discuss the method of formation, structure, stability and synthetic applications of free Radicals.
(b) What are rearrangement reactions? Explain rearrangements to electron deficient carbon with suitable reactions.

2 (a) Explain in detail about the SN1 and SN2 substitution reactions with mechanism.
(b) Write a note on E1 reaction and mechanism.

3 Discuss the mechanism and applications of following named reactions.
(a) Baeyer-Villiger oxidation (b) Michael addition Reaction.

4 (a) Write about reaction mechanism and synthetic applications of Sharpless asymmetric epoxidation and Mannich reaction.
(b) Write the preparation and synthetic applications of Benzotriazol-1-yloxy) tris (dimenthylamino) phosphonium hexafluoro-phosphate (BOP) reagent and Diethyl azodicarboxylate (DEAD).

5 (a) Give an account on protection of Amine and Carboxyl groups and their synthetic importance.
(b) Write the preparation and synthetic applications Aluminiumisopropoxide and N-bromosuccinamide.

6 (a) Explain the reactions, mechanism and applications of Knorr pyrazole synthesis.
(b) Outline the synthesis of Alprazolam and Hydroxychloroquine.

7 (a) Explain the reactions, mechanism and applications of Debus - Radziszewski imidazole synthesis.
(b) Write a note on Functional group inter conversion and addition (FGI and FGA).

8 (a) Explain C-C disconnection of alcohols and Amines.
(b) Discuss the retro synthetic strategies for disconnection of Aldehydes and ketones.

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Code No. E-12090/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Backlog) Examination, December 2022

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Explain the chemistry of carbapenams.
(b) Discuss the development of antimalarial drugs from natural product leads.

2 Discuss the structural elucidation and stereochemistry of Quercetin and Ephedrine.

3 (a) Write the general methods for the structural elucidation of flavonoids.
(b) Write the structural elucidation of Emetine.

4 (a) Write the classifications of terpenoids, Discuss the structural elucidation of any one mono terpenoid.
(b) Write a note on the significance of DNA and RNA estimation.

5 (a) Discuss the chemistry of physiological significance of following vitamins
(i) Niacin (ii) Vitamin A (iii) Vitamin B12.
(b) Discuss about Hybridoma Technology.

6 (a) Write the classification of alkaloids with suitable examples and Give an account on general methods for structural determination.
(b) Discuss the chemistry of cardiac glycosides.

7 Write the active constituents and therapeutic uses of following crude drugs with their structures
(i) Curcuma longa (ii) Salacia reticulate (iii) Gymnema sylvestre
(iv) Phyllanthus niruri (v) Swertia chirata.

8 Write the structural characterization of following compounds using IR, H1NMR, C13NMR and Mass spectral data (with approximate values) of
(i) Ergot (ii) Quercetin (iii) Digoxin (iv) Camphor (v) Vitamin D.

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Code No. E-12089/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Backlog) Examination, December 2022

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Give an account on types of Receptors.
(b) Describe the sources for new lead identification.

2 (a) Describe various screening techniques used in lead discovery.
(b) Give an account on carrier linked prodrug design of drugs containing carboxylic and amine functional groups.

3 (a) Give the classification of Antihypertensive agents with examples and write the synthesis of Propranolol.
(b) Explain the terms Eutomer, Distomer and Eudesmic ratio with chiral examples.

4 (a) Discuss the mechanisms of antibiotic drug resistance and methods of overcome.
(b) Classify anti convulsants with examples and discuss the SAR of Barbiturates.

5 (a) Write a note on transition state analogues as enzyme inhibitors with examples.
(b) Discuss about covalently binding enzyme inhibitors and their significance.

6 (a) Describe about the incorporation of Local and Global conformational constrains in peptidomimetic drug design.
(b) Discuss about unnatural amino acids used in peptidomimetic drug design.

7 (a) Give an account on clinically useful prostaglandins with their structures.
(b) Write a note on enzyme kinetics of Reversible inhibitors with examples.

8 Write a short note on
(a) ACE inhibitors
(b) Reverse Transcriptase Inhibitors.

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Code No. D-8261/PCI

FACULTY OF PHARMACY

M. Pharmacy I - Semester (Common to All) (PCI) (Main & Backlog) Examination, May 2022

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1 (a) State and explain Beer-Lambert's Law. Add a note on the deviations from Beer's law.
(b) Explain the concept of chromophore, auxochrome and bathochromic shift with suitable examples.

2 (a) Explain the instrumentation of FTIR with a neat labelled diagram. Add a note on the advantages of FTIR.
(b) Explain the mplecular vibrations in IR.

3 (a) What is the principle AAS? Explain the instrumentation.
(b) List the differences between AAS and flame photometry.

4 What is the significance of chemical shift? What are the factors affecting chemical shift? Name the internal standard and justify its selection as internal standard in NMR spectroscopy.

5 What is the principle of Mass Spectrometry? With a neat labelled diagram briefly explain the components of MS instrumentation.

6 (a) Classify the ionization techniques in MS. Explain any three methods in detail.
(b) Define Base peak, molecular ion peak and metastable ion.

7 (a) Explain the principle of X-ray diffraction.
(b) Explain HPLC instrumentation with a labelled diagram.

8 (a) Explain the experimental set up required for gel electrophoresis.
(b) Describe the principle and applications of RIA.

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Code No. D-8267/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, May 2022

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1 (a) Define Flavonoids and give the general methods for the structure elucidation of Flavonoids.
(b) Discuss the chemistry of Macrolide antibiotics.

2 (a) Give an account of chemistry and Nomenclature of steroids.
(b) Write the general methods for the structure determination of Alkaloids.

3 (a) Discuss, Morphine and related analogues development from the natural product lead.
(b) Give an account on Natural leads for the development of anticancer drugs.

4 Write the structural characterization of following compounds using IR, H1NMR, C13NMR and Mass spectral data (with approximate values) of
(a) Penicillin (b) Vitamin D (c) Morphine

5 Write any five crude drugs used in the indigenous system for diabetes therapy and discuss about their active constituents in detail.

6 (a) Write a note on chemistry and physiological significance of following vitamins (i) Vitamin E (ii) Niacin (iii) Vitamin C.
(b) Write the general methods of structural determination of Menthol.

7 Discuss about
(a) Recombinant DNA technology
(b) Oligonucleotide Therapy.

8 Write the structural elucidation of
(a) Beta carotene (b) Squalene

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Code No. D-8266/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, May 2022

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1 (a) What is Drug discovery? Discuss about Lead Discovery and lead optimization.
(b) Write a note on drug receptor interactions.

2 (a) What are prodrugs? Discuss the utility of prodrugs and comment on its limitations.
(b) Discuss various strategies for Analog Design.

3 (a) Give the classification of H1 Antihistaminics with suitable examples.
(b) Discuss how stereochemistry of drugs influences the biological activity?

4 (a) Give an account on Enzyme Kinetic and enlist various plots used to understand enzyme inhibition.
(b) Discuss about the rational design of drugs as reversible enzyme inhibitors with example.

5 (a) What are peptidomimetics? Discuss their advantage over peptide drugs.
(b) Explain various approaches used in peptide modifications in peptidomimetics design.

6 (a) Classify antiviral agents with suitable examples and discuss the mechanisms of action of Acyclovir.
(b) Discuss the chemistry of prostaglandins give the structures of therapeutically useful prostaglandins.

7 Write a note on:
(a) Selective Cox-2 Inhibitors
(b) Competitive and Non-Competitive enzyme inhibition.

8 (a) Write a note on Drug resistance in cancer chemotherapy.
(b) Write a note on Alkylating agents.

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Code No. D-8265/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I - Semester (PCI) (Main & Backlog) Examination, May 2022

Subject: Advanced Organic Chemistry – I

Time: 3 Hours **Max. Marks: 75**

Note: Answer any five questions. **(5 x 15 = 75 Marks)**

1 (a) Discuss the method of formation, structure, stability and synthetic applications of free Radicals.
(b) What are rearrangement reactions? Explain rearrangements to electron deficient carbon with suitable reactions.

2 (a) Explain in detail about the SN1 and SN2 substitution reactions with mechanism.
(b) Write a note on E1 reaction and mechanism.

3 Discuss the mechanism and applications of following named reactions.
(a) Baeyer-Villiger oxidation (b) Michael addition Reaction.

4 (a) Write about reaction mechanism and synthetic applications of Sharpless asymmetric epoxidation and Mannich reaction.
(b) Write the preparation and synthetic applications of Benzotriazol-1-yloxy) tris (dimenthylamino) phosphonium hexafluoro-phosphare reagent and Diethyl azodicarboxylate (DEAD).

5 (a) Give an account on protection of Amine and Carboxyl groups and their synthetic importance.
(b) Write the preparation and synthetic applications Aluminiumisopropoxide and N-bromosuccinamide.

6 (a) Explain the reactions, mechanism and applications of Knorr pyrazole synthesis.
(b) Outline the synthesis of Alprazolam and Hydroxychloroquine.

7 (a) Explain the reactions, mechanism and applications of Debus-Radziszewski imidazole synthesis.
(b) Write a note on Functional group inter conversion and addition (FGI and FGA).

8 (a) Explain C-C disconnection of alcohols and Amines.
(b) Discuss the retro synthetic strategies for disconnection of Aldehydes and ketones.

Code No. D8001/PCI

FACULTY OF PHARMACY

M. Pharmacy I Semester (PCI) (Suppl) Examination, December 2021
(COMMON TO ALL)

Subject: Modern Pharmaceutical Analytical Techniques

Time: 2 Hours **Max. Marks: 75**

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

1 (a) State and explain Beer-Lambert's law. Add a note on the deviations from Beer's law.
(b) Explain the electronic transitions in UV spectroscopy.

2 (a) Explain the principle and instrumentation of FTIR with a neat labelled diagram.
(b) Explain the named advantages of FTIR.
(c) What are the major differences between Dispersive instruments and FTIR?

3 (a) What is the principle of Fluorescence? Explain the radiative and non radiative pathways of relaxation.
(b) Add a note on the factors affecting fluorescence.

4 (a) Explain NMR instrumentation with a diagram.
(b) Briefly explain shielding and deshielding with suitable example.

5 (a) What is the principle of MS? With a neat labelled diagram briefly explain the components of MS instrumentation.

6 (a) Classify the ionization techniques in MS. Explain any three methods in detail.
(b) Define Base Peak, molecular ion peak and metastable ion.

7 (a) Explain GC instrumentation with a labelled diagram.
(b) What are the applications of HPLC?

8 (a) Explain the experimental set up required for capillary electrophoresis.
(b) Describe the principle and application of ELISA.

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Code No. D8005/PCI

FACULTY OF PHARMACY

M.Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Suppl) Examination, December 2021

Subject: Advanced Organic Chemistry -I

Time: 2 Hours **Max. Marks: 75**

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

1 (a) Discuss the method of formation, structure, stability and synthetic applications of free Radicals.
(b) What are rearrangement reactions? Explain rearrangements to electron deficient carbon with suitable reactions.

2 (a) Explain in detail about the uni and bi-molecular substitution reactions with mechanism
(b) Write a note on E1cB reaction, mechanism and its significance in organic synthesis.

3 Discuss the mechanism and applications of following named reactions.
(a) Suzuki Shapiro (b) Dieckmann Reaction (c) Vilsmeier Haack Reaction.

4 (a) Write about reaction mechanism and synthetic applications of Sharpless asymmetric epoxidation and Mannich reaction.
(b) Write the preparation and synthetic applications Wilkinsons reagent and Diethyl azodicarboxylate (DEAD).

5 (a) Give an account on protection of Amine and Carboxyl groups and their synthetic importance.
(b) Write the preparation and synthetic applications Aluminium isopropoxide and N-bromosuccinamide.

6 (a) Explain the organic named reaction lead to the formation of Imidazoles and pyrazoles with mechanism and applications.
(b) Outline the synthesis of Celecoxib and metronidazole.

7 (a) Outline the synthesis of Chlorpromazine and antipyrin.
(b) Write a note on Functional group interconverting and addition (FGI and FGA).

8 (a) Explain C-C disconnection of alcohols and carbonyl compounds.
(b) Discuss the retro synthetic strategies for five and six membered ring systems.

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Code No. D8006/PCI

FACULTY OF PHARMACY

M.Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Suppl) Examination, December 2021

Subject: Advanced Medicinal Chemistry

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 Drug discovery? Discuss various stages involved in the drug discovery.
(b) Discuss various theories of drug receptor interactions.

2 (a) Discuss the concept of prodrug design with detailed applications.
(b) Discuss the Bioisosteric replacement strategies for Analog Design.

3 (a) Give the classification of H1 and H2 histamine receptor antagonists with suitable examples.
(b) Discuss how chirality of drugs influences the absorption and distribution of drugs.

4 (a) Give an account on Enzyme Kinetics of Reversible enzyme inhibitors.
(b) Discuss about the rational design of drugs as reversible enzyme inhibitors with examples.

5 (a) Write a note on how Peptidomimetics as alternative for the peptide drugs.
(b) Explain various approaches used in peptide modifications in peptidomimetics design.

6 (a) Classify antiviral agents with suitable examples and discuss the mechanism of action of Zidovudine and Oseltamivir.
(b) Discuss the chemistry of prostaglandins give the structures of therapeutically useful prostaglandins.

7 Write a note on:
(a) Selective Cox-2 Inhibitors.
(b) Drug receptor interactions.

8 (a) Write a note on Artificial Enzymes.
(b) Write a note on anticancer antibiotics.

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Code No. D8007/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Suppl) Examination, December 2021

Subject: Chemistry of Natural Products

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 chemistry of β-lactam antibiotics.
(b) Discuss the development of anticancer drugs from natural product leads.

2 Discuss the structural elucidation and stereochemistry of Quercetin and Vitamin D.

3 (a) Write the general methods for the structural elucidation of flavonoids.
(b) Write the structural elucidation of Ephedrine.

4 (a) Write the classification, general methods of structural elucidation of Terpenoids.
(b) Write the structural elucidation of Menthol.

5 (a) Discuss the chemistry & physiological significance of following vitamins-
(i) Niacin (ii) Vitamin C (iii) Folic acid.
(b) Discuss about Hybridoma Technology.

6 (a) Write the classification of alkaloids with suitable examples and Give an account on Molecular modifications in morphine to morphine analogues.
(b) Explain the principles of RNA & DNA estimation and its applications.

7 Write down the active constituents present in the following crude drugs with structures.
(i) Curcuma longa (ii) Pterocarpus marsupium (iii) Gymnema sylvestre
(iv) Phyllanthus niruri (v) Swertia chirata.

8 Write the structural characterization of following compounds using IR, H^1 NMR, C^{13} NMR and Mass spectral data (with approximate values).
(i) Ergot (ii) Morphine (iii) Digoxin (iv) Camphor (v) PencillinG.

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Code No. 12115/PCI

FACULTY OF PHARMACY
M.Pharmacy I Semester (PCI) (Main & Backlog) Examination, July 2021
(COMMON TO ALL)

Subject: Modern Pharmaceutical Analytical Techniques

Time: 2 Hours **Max. Marks: 75**

Note: Answer any three from the following questions. **(3 x 25 = 75 Marks)**

1 (a) With a neat labelled diagram explain UV/Visible instrumentation.
(b) Briefly explain the electronic transitions with examples.

2 (a) Explain the molecular vibrations in IR.
(b) Write the sampling methods in IR spectroscopy.

3 (a) Explain the principle of flame photometry.
(b) With a diagram explain the instrumentation for flame photometry.
(c) List some metals that can be analysed by flame photometry.

4 (a) Explain the principle of proton NMR spectroscopy.
(b) What is the significance of chemical shift? What are the factors affecting chemical shift?
(c) What is the internal standard used in NMR spectroscopy? Why it is selected as internal standard?

5 (a) List and explain the steps in MS.
(b) What are the mass analysers used in MS? Explain any two in detail.

6 (a) Explain HPLC instrumentation with a labelled diagram.
(b) List and explain any 2 GC detectors.

7 (a) Explain Bragg's equation and derive the equation.
(b) Explain the principle and the materials required for Paper electrophoresis.

8 (a) Explain the principle and types of RIA?
(b) Briefly explain Zone electrophoresis and Moving boundary electrophoresis.

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Code No. 12124/PCI

FACULTY OF PHARMACY
M.Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Main & Backlog) Examination, July 2021

Subject: Advanced Medicinal Chemistry

Time: 2 Hours **Max. Marks: 75**

Note: Answer any three from the following questions. **(3 x 25 = 75 Marks)**

1 (a) Give an account on various types of drug targets.
(b) Write in detail about the sources for lead discovery.

2 (a) Discuss about lead identification in drug discovery.
(b) Give an account on carrier linked prodrug design of drugs containing alcohol and amine functional groups.

3 (a) Give the classification of Antihypertensive agents with examples and write the synthesis of Captopril.
(b) Explain how the chirality of a drug is important for its pharmacological activity of chiral drugs.

4 (a) Discuss the mechanisms of antibiotic drug resistance and methods to overcome it in detail.
(b) Classify anti convulsants with examples and discuss the SAR of Benzodiazepines.

5 (a) How enzyme inhibitors are designed for therapeutic use? Give the detailed classification?
(b) Discuss about covalently binding enzyme inhibitors and their significance.

6 (a) Define peptidomimetics and discuss the advantages of them over peptide drugs.
(b) Discuss about unnatural amino acids used in peptidomimetic drug design.

7 (a) Discuss the chemistry of prostaglandins with structures and uses of clinically useful prostagadins.
(b) Write a note on enzyme kinetics of Reversible inhibitors with examples.

8 Write a short note on
(a) Angiotensin converting Enzyme inhibitors.
(b) HIV protease inhibitors.

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Code No. 12123/PCI

FACULTY OF PHARMACY
M.Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Main & Backlog) Examination, July 2021

Subject: Advanced Organic Chemistry - I

Time: 2 Hours **Max. Marks: 75**

Note: Answer any three from the following questions. **(3 x 25 = 75 Marks)**

1 (a) Write about types of organic reaction mechanisms, Outline the methods to determine mechanisms in organic reactions.
(b) Write a note on factors favorable to proceed Substitution reaction via SN_2 reaction.

2 (a) Write a note on Elimination reactions using Hoffman & saytzeff's rule.
(b) Give a detailed account on free radical reactions with examples.

3 (a) Discuss the mechanism and applications of Sharpless asymmetric epoxidation and Ullmann coupling reactions.
(b) Give an account of synthetic applications of Ozonolysis & Mitsunobu reaction.

4 (a) Write about reaction mechanism and synthetic applications of Aluminium iso-propoxide and N-bromosuccinamide.
(b) Write the synthetic applications of Wittig reagent, Diazomethane and Triphenylphosphine.

5 (a) Discuss the synthetic importance of protecting reactive functional groups in organic synthesis.
(b) How do you protect Hydroxyl groups, 1,2-diols and carbonyl functional groups in Organic reactions?

6 (a) Discuss the named reaction and mechanism for Pyrimidine and Purine synthesis.
(b) Give the Synthesis of following: Ketoconazole and Chlorpromazine.

7 (a) Discuss guidelines for disconnection of molecules containing hydroxyl functional groups.
(b) Explain the terms Synthon and Synthetic equivalent with examples.

8 Write a note on retrosynthetic strategies for
(a) Carbonyl compounds
(b) Five and six membered heterocycles.

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Code No. 12125/PCI

FACULTY OF PHARMACY
M.Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Main & Backlog) Examination, August 2021

Subject: Chemistry of Natural Products

Time: 2 Hours **Max. Marks: 75**

Note: Answer any three of the following questions. (3 x 25 = 75 Marks)

1 (a) Define Alkaloids and give the general methods for the determination of structure of alkaloids.
(b) Discuss the structure elucidation of Reserpine.

2 Write the structural elucidation (i) Ephedrine (ii) Emetine.

3 Discuss, how the natural products acts as a lead in the development of Antimalarial and Cardiovascular drugs.

4 Write the structural characterization of following compounds using IR, H^1 NMR, C^{13} NMR and Mass spectral data (with approximate values).
(i) Quercetin (ii) Vitamin D (iii) Digitoxin (iv) Camphor (v) Morphine.

5 Write down the active constituents present in the following crude drugs with structures
(i) Curcuma longa (ii) Trigonella foenum graccum (iii) Gymnema sylvestre
(iv) Phyllanthus niruri (v) Swertial chirata.

6 (a) Write a note on chemistry and physiological significance of following vitamins
(i) Vitamin A (ii) Vitamin B 2 (iii) Vitamin C.
(b) Write the general methods of structural determination of flavonoids.

7 Discuss about
(a) Chemistry of sapogenins and cardiac glycosides.
(b) General methods of structural determination of Terpenoids.

8 Write the structural elucidation of
(a) Beta carotene
(b) Retinol.

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Code No: 6337/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Suppl.) Examination, October 2020

Subject: Advanced Organic Chemistry-I

Time: 2Hours **Max. Marks: 75**

Note: Answer any three questions. **(3x25=75 Marks)**

1. a) Write about types of organic reaction mechanisms, Outline the methods to determine mechanisms
   b) Write a note on Saytzeff's rule of elimination reaction

2. a)What are SN2 reactions? Discuss factors effecting SN2 reactions
   b) Enumerate the steps involved in free radical substitution with examples

3. a) Discuss the mechanism and applications of Vilsmeir haack reaction and Dieckmann reaction
   b) Give an account on Shapiro & Suzuki reaction.

4. a) Write about reaction mechanism and synthetic applications of Mitsunobu reaction and Mannich reaction.
   b) Write the preparation and synthetic applications of Aluminium isopropoxide, N-bromosuccinamide,

5. a) Discuss the role of protection in organic synthesis
   b) How do you protect Hydroxyl groups, 1, 2-diols and carbonyl functional groups in organic reactions?

6. a) Give the reaction and explain mechanism of Pinner Pyrimidine and Smiles rearrangement - Purine synthesis
   b) Give the Synthesis of following
      i) Antipyrine
      ii) Chlorpromazine

7. a) Discuss any Six guidelines for disconnection of molecules with examples
   b) Explain the terms Synthon and Synthetic equivalent with examples.

8. Write a short note on following with retro synthetic reactions.
   a) FGI
   b) FGA

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Code No: 6339/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Suppl.)

Examination, November 2020

Subject : Chemistry of Natural Products

Time: 2 Hours **Max. Marks: 75**

Note: Answer any Three questions. **(3 x25=75 Marks)**

1. Write how the natural products acts as a leads in the following classes of drugs
   a) Anticancer drugs
   b) Macrolide & β - lactam antibiotics

2. a) Discus the structural elucidation and stereochemistry of Ephedrine.
   b) What are the alkaloids and classify alkaloids with one example for each class.

3. a) Write the general methods for the structural elucidation of flavonoids.
   b) Write the structural elucidation of quercetin.

4. a) Write the classification, general methods of structural elucidation of Terpenoids.
   b) Write the structural elucidation of camphor.

5. a) Discuss the chemistry & physiological significance of following vitamins
   i) Vitamin - A ii) Vitamin – C iii) Vitamin - E
   b) Discuss about r DNA technology

6. Write a note on
   a) Chemistry of cardiac glycosides
   b) Chemistry of Contraceptive agents
   c) Isoprene rule and Special isoprene rule

7. Write down the active constituents (minimum three from each crude drug) present in the following crude drugs with structures.
   i) Curcuma longa
   ii) Pterocarpus marsupium
   iii) Gymnema sylvestre
   iv) Phyllanthus niruri
   v) Swertia chirata

8 Write the structural characterization of following compounds using IR, H^1NMR, C^{13} NMR and Mass spectral data (Write approximate values)
   i) Quercetin ii) Vitamin D iii) Digoxin iv) Camphor v) Pencillin G

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Code No: 6338/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I Semester (PCI) (Main)

Examination, November 2020

Subject: Advanced Medicinal Chemistry

Time: 2 Hours **Max. Marks: 75**

Note: Answer any Three questions. **(3 x25=75 Marks)**

1. a) What is lead discovery? Discuss about various stages involved in the drug discovery.
   b) Discuss about receptor theories to describe the terms Partial agonist, antagonist and Inverse agonist.

2. a) Define prodrug and discuss the applications of prodrugs with suitable examples.
   b) Discuss the strategies to tackle Multi drug resistance in cancer treatment.

3. a) Give the classification of H1 and H2 histamine receptor antagonists with suitable examples.
   b) Discuss how chirality of drugs influences the pharmacological action?

4. a) Give the classification of enzyme inhibitors with suitable examples
   b) Discuss about the rational design of drugs as reversible enzyme inhibitors with example.

5. a) Define peptidomimetics and discuss the various types of peptidomimetics.
   b) Explain various approaches used in peptide modifications in peptidomimetics design.

6. a) Classify antineoplastic drugs with suitable examples and discuss the mechanism of action of methotrexate and chlorambucil.
   b) Discuss the chemistry of prostaglandins. Give the structures of therapeutically useful prostaglandins.

7. Write a note on
   a) Histamine H1 Receptor antagonists
   b) Drug receptor interactions

8. a) Write a note on molecular modification approaches used in analogue design
   b) Write a note on anti-viral agents?

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CODE NO: 6102/PCI

FACULTY OF PHARMACY

M. Pharmacy I – Semester (Main & Backlog) Examination, January 2020
(Common Paper for all Except Pharmacy Practice)

Subject : Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

Note: Answer any Five Questions. All Questions Carry Equal Marks.

1. (a) State and explain Beer- Lambert's law. Add a note on the deviations from Beer's law. 8
   (b) Explain solvents and the selection criteria for UV/Visible spectroscopy. 4
   (c) What is solvent shift? 3

2. (a) Explain the principle and instrumentation of FTIR with a neat labelled diagram. 8
   (b) Explain about the sampling techniques and applications of FR spectroscopy 7

3. (a) What is the principle of Fluorescence? Explain the radiative and non radiative pathways of relaxation. 7
   (b) Add a note on the factors affecting fluorescence and quenchers in fluorescence. 6
   (c) What are the criteria for a molecule to exhibit the phenomena of fluorescence 2

4. (a) Explain the principle of proton NMR spectroscopy. 5
   (b) What is the significance of chemical shift. What are the factors affecting chemical shift ? 6
   (c) Explain about spin-spin crippling and it's importance in NMR 4

5. (a) Classify the ionization techniques in MS. Explain any three methods in detail. 12
   (b) Differentiate between Base peak and molecular ion peak. 3

6. (a) Explain HPLC instrumentation. 10
   (b) What are the applications of HPLC? 5

7. (a) Explain Braggs equation and derive the equation. 8
   (b) What is the principle involved in rotating crystal technique? 7

8. Explain the principle, working and applications of
   (a) Capillary electrophoresis $7^{1/2}$
   (b) Gel electrophoresis $7^{1/2}$

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Code No: 6110/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main & Backlog) Examination, February 2020

Subject: Advanced Organic Chemistry-I

Time: 3 Hours **Max. Marks: 75**

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

1 a) Explain the structure and stability of carbocations and carbanions. 8M
b) Discuss SN^2 reactions with mechanism and stereo chemistry. 7M

2 a) Enlist the types of rearrangement reactions and discuss the mechanisms of any two.
b) Explain the mechanism of E1 elimination with examples. (9+6)

3 Discuss the mechanism and applications of any three named reactions 15M
a) Sandmayer reaction
b) Sharpless Epoxidation
c) Michael reaction
d) Mannich reaction

4 Write about reaction mechanism and synthetic applications of
a) Mitsunobu reaction and Mannich reaction.
b) Baeyer-Villiger oxidation and Doebner-Miller Reaction. (8+7)

5 Write the preparation and synthetic applications of any three of the following
a) Diazomethane
b) Aluminium isopropoxide
c) Dicyclohexyl carbodimide
d) Wilkinsons reagent (15)

6 a) Give an account of protection of Amine and Carboxyl groups and their synthetic importance.
b) Give the reaction and explain mechanism of Knorr pyrazole synthesis and combes quinoline synthesis. (5+10)

7 Outline the synthesis of following
a) Celecoxib
b) Ketoconazole
c) Chloroquine (15M)

8 a) Explain C-C disconnection of alcohols and carbonyl compounds.
b) Discuss the retro synthetic strategies for Five and six membered ring systems. (8+7)

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Code No: 6112/PCI

FACULTY OF PHARMACY

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

Subject: Chemistry of Natural products

Time: 3 Hours **Max. Marks: 75**

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

1 a) Define Alkaloids and write the general methods to determine the structure of Alkaloids.
b) Write the special isoprene rule in terpenoids. (8+7)

2 Write the structural elucidation of any two drugs. (8+7)

3 Write how the natural products acts as a leads in the following classes of drugs
i) Antimalarial drugs and analogues
ii) Cardiovascular drugs (8+7)

4 Write the structural characterization of following compounds using IR, H^1NMR, C^{13}NMR and Mass spectral data (Write approximate values) 5x3=15
i) Quercetin
ii) Vitamin D
iii) Digoxin
iv) Camphor
v) Pencillin G

5 Write down the active constituents present in the following crude drugs with Structures (minimum three from each crude drug)
i) Curcuma longa
ii) Pterocarpus marsupium
iii) Gymnema sylvestre
iv) Phyllanthus niruri
v) Swertia chirata (5x3=15)

6 a) Write a note on chemistry and physiological significance of following vitamins
i) Vitamin A
ii) Vitamin B 12
iii) Vitamin C (3x3=9)
b) Write the structural elucidation of quercetin 6

7 Discuss about
a) Chemistry of sapogenins and cardiac glycosides (9+6)
b) Gene therapy

8 Write the structural elucidation of (8+7)
i) Citral
ii) Carotenoids

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Code No: 6111/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main & Backlog) Examination, January 2020

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max. Marks: 75**

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

1 a) Give an account on various types of drug targets.
b) Discuss theories of drug receptor interactions. (6+9)

2 a) Discuss about lead optimization in drug discovery.
b) Give an account on pro-moieties for various functional groups in prodrug design. (8+7)

3 a) What is hypertension? Give the classification of Antihypertensive agents with examples.
b) Explain how the chirality of drugs is important for its pharmacological activity? (8+7)

4 a) Define drug resistance and discuss the mechanisms of antibiotic drug resistance.
b) Classify anti convulsants with examples and discuss the SAR of Benzodiazepines. (8+7)

5 a) Give an account on enzyme inhibitors in medicine and basic research.
b) Discuss about Non-covalently binding enzyme inhibitors and their pharmacological significance. (8+7)

6 a) Define peptidomimetics and discuss the advantages of them over peptide drugs
b) Discuss about unnatural amino acids used in peptidomimetic drug design. (8+7)

7 a) Discuss the chemistry of prostaglandins and leukotrienes.
b) Explain the concept of bio-isosterism. (8+7)

8 Write a short note on : (8+7)
a) Beta Blockers
b) HIV protease inhibitors

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Code No. 13303/PCI

FACULTY OF PHARMACY

M. Pharmacy (Common paper for all Specialization) I-Semester (PCI) (Suppl.) Examination, August 2019

Subject : Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

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

1 a) Write Beer-Lambert's law and derive the expression 5

b) Mention the different methods of quantitative analysis by uv-visible spectroscopy. Explain any one method in detail. 10

2. a) Explain the interpretation procedure of IR spectra of different organic compounds in detail. With examples of schematic IR spectra.

b) What is fluorescence? Write the factors affecting fluorescence. 5

3. a) What is chemical shift? Write the factors influencing chemical shift? 8

b) Write a note on FT-NMR 7

4. a) Explain the instrumentations and working of mass spectrometer with schematic diagram. 8

b) Write the fragmentation patterns of different organic compounds observed in mass spectroscopy. With the help of schematic mass spectra of a few compounds 7

5. Describe the components and working procedure of HPLC with a neat labeled block diagram. 15

6. a) Write the principle, instrumentation and working of zone electrophoresis. 8

b) Write the principle and theory of X-ray diffraction study using Brag's law 7

7. a) Write the principle and instrumentation of flame photometry 7

b) Write notes on any two GC detectors 8

8. Explain the principle, equipment, procedure, advantages and applications of IR Spectrophotometer 15

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Code No. 13309 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (Suppl.) Examination, August 2019

Subject : Chemistry of Natural Products

Time : 3 hours **Max. Marks : 75**

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

1 a) Discuss the structural elucidation of reserpine.
b) Give classification, isolation and biological activity of alkaloids. 9+6

2 How natural products acted as leads for the following classes of drugs? Explain.
a) Drugs affecting CNS
b) Anticancer drugs
c) Cardiovascular drugs 5+5+5

3 a) Discus the general methods to elucidate the structure of terpenoids.
b) Write the structural elucidation of menthol. 8+7

4 a) Give the chemistry and physiological significance of Vitamin A, Vitamin C and Folic acid.
b) Explain how recombinant DNA technology helped in new drug discovery. 8+7

5 a) Write a note on Sapogenins and cardiac glycosides.
b) Discuss chemistry of contraceptive agents.
c) Discuss clinical applications and recent advances in gene therapy. 5+5+5

6 How do you characterize the following natural compounds using IR, ^{1}H NMR and ^{13}C NMR spectral values? Give approximate spectral values.
a) Quercetin b) Vitamin-D
c) Morphine d) Benzyl penicillin
e) Digoxin 5 x 3 = 15

7 a) List out the active constituents present in the following crude drugs with their structures.
i) Curcuma longa linn ii) Trigonella foenumgraccum
iii) Pterocarpus marsupiam iv) Swertia chirata 4 x 2 = 8
b) Write in brief the structural elucidation of phytol. 7

8 Write a note on : (5+5+5)
a) Hofmann exhaustive methylation
b) Stereochemistry and nomenclature of steroids
c) Chemistry of flavanoids

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Code No. 13307 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (Suppl.) Examination, August 2019

Subject : Advanced Organic Chemistry – I

Time : 3 hours **Max. Marks : 75**

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

1 a) Discuss the method of formation, stability and important reactions of free radicals and carbanions. 8
b) Write the mechanism and stereochemistry of E_1 and E_2 eliminations. 7

2 Write a method of preparation, mechanism and applications of following synthetic reagents (any three)
a) Diazomethane b) Osmonium tetroxide
c) Triphenul phosphine d) Witting reagent
e) Aluminium isopropoxide 3 x 5 = 15

3 a) Discuss the important guidelines for disconnection of molecules.
b) What is FGI, FGA, synthon and synthetic reagent? Explain giving one example for each.
c) Discuss c-x disconnections in alcohols and carbonyl compounds. 6+4+5

4 Write the mechanism and synthetic applications of (any three)
a) Doebner-Miller reaction b) Sandmeyer reaction
c) Shapiro and Suzuki reaction d) Mannich addition 3 x 5 = 15

5 a) Write a note on (any two)
i) Knorr pyrazole synthesis
ii) Combes Quinoline synthesis
ii) Traube purine synthesis 2 x 4 = 8
b) Explain the methods for protection and deprotection of
i) Carbonyl group ii) Amino group 7

6 Mention the heterocyclic nucleus present and also the steps involved in the synthesis of following drugs (any three)
i) Micronazole ii) Antipyrin
iii) Chlorpromazine iv) Quinacrine
iv) Triamterene 5 x 5 = 15

7 a) Discuss any two rearrangement reactions.
b) Explain mechanism in SN^1 reaction and also mention its stereochemistry.
c) What is Saytzeff's rule? Explain with example? 6+5+4

8 Write a note on (any three)
a) Vilsmeyer-Hack reaction b) Wilkinson reagent
c) Sharpless asymmetric epoxidation d) BOP reagent 3 x 5 = 15

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Code No. 13308 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (PCI) (Suppl.) Examination, August 2019

Subject : Advanced Medicinal Chemistry

Time : 3 hours **Max. Marks : 75**

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

1 a) What are leads? Discuss the concept of lead discovery.
b) Discuss the criteria for the identification of target and its validation in drug discovery. 8+7

2 a) Explain the concepts of prodrug design and discuss its applications.
b) Write a note on resistance to antibiotics and anti cancer drugs. 9+6

3 a) Give the classification of antineoplastic drugs with suitable examples.
b) Write a note on HIV protease inhibitors. 9+6

4 Enumerate various classes of enzyme inhibitors with suitable examples and discuss about any one class of enzyme inhibitors. 15

5 a) Define and differentiate peptide drugs and peptidomimetics with examples and discuss the concept of peptidomimetic drug design.
b) Discuss the chemistry of prostaglandin. 8+7

6 a) Classify Antihypertensive drugs with suitable examples and give the synthesis of Diltiazem.
b) Explain how the chirality of the drug influences the biological activity. 9+6

7 Write a note on :
a) Lead optimization
b) Molecular modifications in analogue design 7+8

8 a) Write a note on AchE inhibitors
b) Write a note on cyclooxygenase inhibitors 8+7

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CODE NO: 13147/PCI

FACULTY OF PHARMACY

M. Pharmacy (Common Paper for all Specialization) I – Semester

(Main & Backlog) Examination, January 2019

Subject : Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

Note: Answer any Five Questions. All Questions Carry Equal Marks.

1) a) With a neat labeled diagram explain UV/Visible instrumentation. 8

b) Briefly explain the electronic transitions with examples 8

2) a) Explain the factors affecting vibrational frequencies in IR. 8

(b) Write the sampling methods in IR spectroscopy. 7

3 (a) Briefly explain the source of AAS. 8

(b) List and explain the interferences. 5

(c) List some metals that can be analysed by AAS. 2

4 (a) Explain NMR instrumentation. 8

(b) Briefly explain spin-spin coupling with a suitable example. 7

5 (a) What is the principle of MS. With a neat labelled diagram briefly explain the components of MS instrumentation. 8

(b)Explain Quadrupole and time of flight analysers in detail. 7

6. (a) What are the column efficiency parameters? 7

(b) List and explain any 2 GC detectors. 8

7. Explain the principle and application of capillary electophoresis. Give a labelled diagram to indicate the components of the instrument.

8 (a) Discuss the principle, instrumentation working and application of

a. Paper electrophoresis

b. Gel electrophoresis 7+8

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Code No. 13153 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (PCI) (Main & Backlog) Examination, February 2019

Subject : Chemistry of Natural Products

Time : 3 hours **Max. Marks : 75**

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

1 a) What are alkaloids? Classify alkaloids by giving one example for each class.
b) Write the general methods to determine the structure of alkaloids. 3+12

2 How natural products acted as leads for the following classes of drugs? Explain.
a) Macrolide and β-lactam antibiotics
b) Cardiovascular drugs 8+7

3 a) Give classification, isoprene and special isoprene rules of interpenoids.
b) Discuss in brief the structural elucidation of citral and retinol. 3+12

4 Write a note on :
a) Chemistry and physiological significance of vitamins
b) Gene therapy 9+6

5 How do you characterize the structure of following natural compounds using IR, ^{1}H NMR and ^{13}C NMR spectral data? (Write approximate spectral values)
a) Morphine
b) Penicillin G
c) Vitamin-D
d) Quercetin
e) Digoxin 5 x 3 = 15

6 Write a note on :
a) Chemistry of contraceptive agents
b) Stereochemistry and nomenclature of steroids
c) Recombinant DNA technology and drug discovery 3 x 5 = 15

7 Discuss in detail the structural elucidation of morphine. 15

8 a) Write down the active constituents present in the following crude drugs with structures
i) Swertia chirata ii) Phyllanthus niruri
iii) Curcuma longa iv) Gymnema sylvestre 4 x 2 = 8
b) Write the structural elucidation of Quercetin. 7

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Code No. 13152 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (Main & Backlog) Examination, February 2019

Subject : Advanced Medicinal Chemistry

Time : 3 hours **Max. Marks : 75**

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

1 a) Discuss the concept of rational drug design in new drug discovery.
b) Write a note on the sources of lead discovery. 9+6

2 a) Explain the development of resistance to anticancer drugs and underlying mechanisms.
b) How does ADME properties are improved through prodrug design? 8+7

3 a) Give an account on COX-II inhibitors.
b) Classify adrenergic antagonists and discuss the SAR of B-blockers. 8+7

4 a) Define drug resistance and discuss the strategies to overcome resistance to antibiotics.
b) Classify anti convulsants with examples and discuss the SAR of Benzodiazepines. 8+7

5 a) Give an account on rational design of enzyme inhibitors.
b) Explain about Non-covalently binding enzyme inhibitors. 8+7

6 a) Write a note on modification of amino acid in peptidomimetic design.
b) Write a note on manipulation of peptide back bone and incorporation of conformational constraints in peptidomimetic drug design. 8+7

7 a) Discuss, how does the stereochemistry of drug influences absorption, distribution and elimination.
b) Explain the concept of bio-isosterism. 10+5

8 Write a short note on :
a) ACE inhibitors b) H2 antihistaminics 8+7

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Code No. 13151 / PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I – Semester (PCI) (Main & Backlog) Examination, January 2019

Subject : Advanced Organic Chemistry – I

Time : 3 hours **Max. Marks : 75**

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

1 a) What are the commonly used methods for determining the mechanisms of a reaction? Explain with suitable examples.
b) Explain the stability of carbocations and carbanions. 7+8

2 Discuss the mechanism and synthetic applications of any three of the following named reactions.
a) Ullmann coupling reaction b) Dieckmann reaction
c) Sharpless asymmetric epoxidation d) Michael addition reaction
e) Baeyer-Villiger oxidation 3 x 5 = 15

3 a) Explain the role of protection in organic synthesis. Explain how hydroxyl group (1, 2- and 1, 3-diols), carboxyl group are protected and deprotected in organic synthesis. 6
b) Write the method of preparation, mechanism and applications of any three of the following synthetic reagents.
i) N-bromosucinamide ii) Dicyclohexyl carbodiimide
iii) Diethyl azodicarboxylate iv) Aluminium isopropoxide 3 x 3 = 9

4 Discuss the mechanism and stereochemistry of SN^1 and SN^2 reactions. Explain neighbouring group participation in such reactions. 15

5 a) Discuss the advantages and important guidelines for disconnection of simple molecules in retrosynthesis.
b) Explain 1, 2-, 1, 3-, 1, 4- and 1, 5- difunctionalized disconnections with suitable examples. 7+8

6 a) Mention the heterocyclic nucleus present and also the synthesis of following drugs (any three)
i) Metronidazole ii) Celecoxib
iii) Promazine iv) Triamterene 3 x 3 = 9
b) Discuss Saytzeff and Hoffman rules of elimination. 6

7 Write a note on (any three)
a) Pinner pyrimidine synthesis b) Smiles rearrangement
c) Wilkinson reagent d) BOP reagent 3 x 5 = 15

8 a) Write the steps involved in the synthesis and important use(s) of following drugs :
i) Ketoconazole ii) Alprazolam iii) Mercaptopurine 3 x 3 = 9
b) Discuss the strategies for synthesis of five and six membered rings through disconnection approach. 6

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Code No. 1289/PCI

FACULTY OF PHARMACY

M. Pharmacy (Common to All) I-Semester (PCI) (Suppl.) Examination,

August 2018

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Discuss the instrumentation of double beam UV visible spectrophotometer with a neat labeled diagram. (10)
(b) What is Isobestic point? Explain with a labeled UV spectrum giving tow examples. (5)

2 (a) Compare the instrumentation and working a dispersive and foruier transform IR spectrometers. Write the advantages and disadvantages of the two techniques. (10)
(b) Draw a schematic IR spectrum for any one compound and indicate the absorption wave number regions for any four functional groups in the compound. (5)

3 (a) Explain
(i) Chemical shift and factors influencing chemical shift. (6)
(ii) Spin-spin coupling and coupling constant. (6)
(b) Draw a schematic HNMR spectrum for any one compound and explain the following:
(i) Chemical shift values (ii) Nature of protons (iii) Number of protons (3)

4 (a) Discuss the theory and principle of mass spectroscopy and explain the instrumentation and working of mass spectrometer with a neat labeled diagram. (10)
(b) What is fragmentation? Explain the following by taking a simple example
(i) Fragmentation peaks (ii) Molecular ion peak (iii) Base peak (5)

5 (a) Discuss the theory of HPLC. Describe the instrumentation and working of HPLC with a neat labelled diagram. (10)
(b) Draw a schematic HPLC chromatomgram and explain
(i) Retention time (ii) Resolution (iii) Peak Asymmetry (5)

6 (a) Discuss the theory and principle of electrophoresis. Explain the method of capillary electrophoresis and its applications with examples. (12)
(b) What is isoelectric focusing? (3)

7 (a) Discuss the theory and principle of Gas chromatography. Explain the instrumentation and working of Gas chromatography and explain various stationary and mobile phases used in GC. (11)
(b) How non voralile compounds can be analysed by GC. Explain the technique with few examples? (4)

8 Write a note on :
(a) Flame emission spectroscopy (6)
(b) Instrumentation and application of Florescence spectroscopy (9)

Code No. 1295/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Supple.) Examination, August 2018

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

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

1 Discuss the structural elucidation of morphine (OR) reserpine. (15)

2 Discuss how natural products acted as leads while designing the drugs? Explain by taking any three categories of drugs.

3 (a) What are flavanoids? Discuss the structural elucidation of quercetin.
(b) Discuss the chemistry and mechanism of contraceptive steroids. (7+8)

4 What are isoprene and special isoprene rules? Discuss the structural elucidation of any one monoterpeniod and one diderpenoid. (15)

5 Write the approximate spectral values for the following natural drugs in IR, ^{1}HNMR and ^{13}CNMR spectra. (5x3)
(a) Morphine
(b) Any one Digitalis glycoside
(c) Benzyl penicillin
(d) Quercetin
(e) Vitamin – D

6 Write a note on : (3x5)
(a) Recombinant DNA technology and drug discovery
(b) Chemistry of Vitamin A
(c) Stereochemistry and nomenclature of steroids

7 (a) Explain how natural products acted as leads in the discovery of new β-lactam antibiotics and macrolide antibiotics.
(b) Discuss the structural elucidation of Ephedrine. (7+8)

8 (a) List out the active constituents that are isolated from the following crude drugs with their medicinal use
(i) Pterocarpus marsupiam
(ii) Swertia chirata
(iii) Phyllanthus niruri
(iv) Curcuma longa Linn (8)

(b) Write a note on Gene therapy. (7)

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Code No. 1293/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Supple.) Examination, August 2018

Subject: Advanced Organic Chemistry - I

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Explain the structure and stability of carbocations and carbanions.

(b) Discuss SN^1 and SN^2 reactions with mechanism and stereochemistry. (7+8)

2 (a) What is retrosynthesis? Discuss C – C disconnections in alcohols and carbonyls compounds having 1, 2, - 1, 3, - 1, 4, - and 1, 5 – difunctionalized groups.
(b) Explain the terms (i) Synthon (ii) Synthetic agent (iii) FGI (iv) FGA with suitable examples. (9+6)

3 Discuss the mechanism and synthetic applications of any three of the following named reactions.
(a) Ullmann coupling reaction
(b) Sandmeyer reaction
(c) Baeyer – villiger oxidation
(d) Michael addition
(e) Doebner – Miller reaction (3x5)

4 (a) Explain the role of protecting groups in organic synthesis.
(b) Explain how hydroxyl group, 1, 2, diols and carbonyl groups are protected during the reactions.
(c) Explain mechanism and applications of
(i) Aluminium isopropoxide
(ii) Diazomethane (5+5+5)

5 (a) Mention the heterocycle present and also outline the steps involved in the synthesis of any three of the following drugs: (3x3)
(i) Ketoconazole
(ii) Celecoxib
(iii) Chlorpromazine
(iv) Sulfamerazine
(v) Alprozolam
(b) Explain C – C and C – N rearrangement reactions. Give one example for each. (6)

6 Write notes on any thee of the following: (5x3)
(a) Hoffman and Saytzeff's rule
(b) Ozonolysis
(c) Traube purine synthesis
(d) Combes quinoline synthesis
(e) BOP reagent

..2

7 (a) Discuss E_1 and E_2 elimination reactions with mechanism and stereochemistry.
(b) Explain generation, structure, stability and reactions of free radicals.

8 (a) Discuss any eight guidelines for disconnection of molecules with simple examples. (8)
(b) Write the stops involved in the synthesis of
(i) Antipyrin (ii) Metronidazole (iii) Mercaptopurine (2+2+3)

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Code No. 1294/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Suppl.) Examination, August 2018

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max. Marks: 75**

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

1 a) Discuss about various stages involved in the drug discovery.
b) Explain the theories of drug receptor interactions. (8+7)

2 a) Define prodrug and discuss the applications of prodrugs with suitable examples.
b) Discuss the strategies to overcome the drug resistance to antibiotics. (9+6)

3 a) Give the classification of H1 and H2 histamine receptor antagonists with suitable examples.
c) Discuss how chirality of drug molecule influences the pharmacological action? (9+6)

4 a) Give the classification of enzyme inhibitors with suitable examples.
b) Discuss the rational design of reversible enzyme inhibitors. (10+5)

5 a) Define peptidomimetics and discuss the various types of peptidomimetics.
b) Explain the various approaches used in peptide modifications in peptidomimetics design. (7+8)

6 a) Classify antineoplastic drugs with suitable examples and discuss the mechanism of action of methotrexate and chlorambucil.
b) Discuss the chemistry of prostaglandins. Write the structures of therapeutically useful prostaglandins. (9+6)

7 Write a note on
a) Sources for lead identification
b) Drug receptor interactions (7+8)

8 a) What are bio-isosters? Discuss their applications in analogue design.
b) Write a note on cyclooxygenase inhibitors. (8+7)

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Code No. 1147/PCI

FACULTY OF PHARMACY

M. Pharmacy (Common to All) I-Semester (PCI) (Main) Examination,
February 2018

Subject: Modern Pharmaceutical Analytical Techniques

Time: 3 Hours

Max. Marks: 75

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

1 (a) Derive the expression for Beer-Lambert law and explain the deviations with examples. (9)
(b) Explain the solvent effect with examples. (3)
(c) Discuss about the principle and functions of monochromators in UV spectrophotometer. (3)

2 (a) Draw schematic IR spectrum for any one compound and indicate the absorption wave numbers regions for any four functional group in the compound. (5)
(b) Explain various kinds of IR vibraitonal modes and their energy levels. (5)
(c) Explain the sampling methods for liquids and solid samples for taking IR spectra. (5)

3 (a) Explain the principle and instrumentation of NMR spectroscopy. (10)
(b) Draw a schematic HNMR spectrum for any one simple compound and explain the following
(i) Chemical shift values (ii) Nature of protons (iii) Number of protons (5)

4 (a) Explain about the ionisation techniques – electron impact, chemical ionisaiton, FAB and MALDI and their advantages and disadvantages. (12)
(b) What are Isotopic peaks and how they are identified. What is the importance of isotopic peaks? (3)

5 (a) Discuss the theory of HPLC. Describe the instrumentation and working of HPLC with the help of a neat labeled diagram. (10)
(b) Draw a schematic HPLC chromatogram and explain (i) Resolution, (ii) tailing (iii) peak symmetry (5)

6 (a) Discuss the theory and principle of electrophoresis. Explain the method of gel electrophoresis and its applications with examples. (12)
(b) What is isoelectric focusing? (3)

7 (a) Discuss about various types of detectors used in gas chromatography. (11)
(b) Explain about moving boundary electrophoresis with required labeled diagram. (4)

8 Write a note on : (6)
(a) Emission spectroscopy (9)
(b) Instrumentation and application of florescence spectroscopy

Code No. 1162/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main) Examination, February 2018

Subject: Advanced Medicinal Chemistry

Time: 3 Hours **Max. Marks: 75**

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

1 a) Give an account on various types of drug targets.
b) Discuss types of Receptors and their activation mechanism. (6+9)

2 a) Discuss the various approaches used in the design of analogues from Lead Compound.
b) Give an account on pro-moieties for various functional groups in prodrug design. (8+7)

3 a) Classify antihypertensive drugs with example.
b) Explain how the chirality of a drug molecule influences it's pharmacokinetic properties ? (8+7)

4 a) Define drug resistance and discuss the mechanisms of antibiotic drug resistance.
b) Classify anti convulsants with examples and discuss the SAR of barbiturates. (8+7)

5 a) Give an account on enzyme inhibitors in medicine and basic research.
b) Explain about Non-covalently binding enzyme inhibitors. (8+7)

6 a) Define peptidomimetics and discuss the advantages of them over peptide drugs.
b) Explain the various approaches involved in peptidomimetic drug design. (8+7)

7 a) Discuss the chemistry of prostaglandins and leukotrienes.
b) Explain the concept of bio-isosterism. (8+7)

8 Write a short note on
a) ACE inhibitors
b) HIV protease inhibitors (8+7)

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Code No. 1161/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main) Examination, February 2018

Subject: Advanced Organic Chemistry - I

Time: 3 Hours **Max. Marks: 75**

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

1 (a) Explain SN^1 and SN^2 reactions in aliphatic compounds with their mechanism and stereochemistry.
(b) Explain how the following factors will affect the reactivity in nucleophilic substitution reactions?
(i) Substrate structure (ii) Solvent
(iii) leaving group (iv) attacking nucleophile (8+7)

2 (a) Give a method of preparation, mechanism and applications of
(i) N-bromosuccinamide (ii) Diazomethane (iii) DCC (3x3)
(b) Discuss the stability of carbocations. (6)

3 Discuss the mechanism and synthetic applications of any three of the following named reactions.
(a) Ugi reaction
(b) Dieckmann reaction
(c) Sandmeyer reaction
(d) Michael addition
(e) Baeyer-villiger oxidation

4 (a) Explain the role of protecting groups in organic synthesis. Explain how carbonyl, carboxyl and amino groups are protected during the synthesis?
(b) Mention the heterocyclic nucleus present and also the steps involved in the synthesis of
(i) Antipyrin (ii) Chlorpromazine (7+8)

5 (a) Explain the following terms with one example each.
(i) Retrosynthesis
(ii) Functional group interconversion
(iii) Functional group addition
(iv) Synthon and synthetic reagent
(b) Discuss C – X disconnections and C – C disconnections of 1,2-, 1, 3 -, 1, 4- and 1, 5 – difunctionalized compounds belonging to alcohols and carbonyl compounds. (8+7)

6 (a) Explain E_1 and E_2 elimination reactions with their mechanism and stereochemistry.
(b) Discuss Saytzeff and Hoffman rules. (9+6)

7 (a) Explain the structure, stability and important reactions of carbanions.
(b) Discuss mechanism and synthetic applications of following agents:
(i) Aliminium isopropoxide
(ii) Wittig reagent (8+7)

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8 (a) Write the mechanism and applications of
(i) Smiles rearrangement synthesis
(ii) Combes quinoline synthesis (6)
(b) Outline the synthesis of any three of the following drug (9)
(i) Celecoxib (ii) Ketoconazole
(iii) Chloroquine (iv) Alprazolam (v) Trimephoprim

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Code No. 1163/PCI

FACULTY OF PHARMACY

M. Pharmacy (Pharmaceutical Chemistry) I-Semester (PCI) (Main) Examination, February 2018

Subject: Chemistry of Natural Products

Time: 3 Hours **Max. Marks: 75**

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

1 Explain how natural products acted as lead molecules while designing drugs? Explain by taking any three clesses of drugs. (15)

2 (a) Write the classification and biological activity of alkaloids.
(b) Discuss the structural elucidation of Reserpine (OR) Ephedrine. (5+10)

3 (a) Discuss the stereochemistry and nomenclature of steroids.
(b) Write a note on contraceptive steroids.
(c) Explain structural elucidation of Quercetin (5+5+5)

4 (a) Explain isoperene rule and discuss general methods for structural elucidation of terpenoids.
(b) Discuss the chemistry and physiological significance of Vitamin A. (10+5)

5 Discuss the structural elucidation of any one monoterpenoid and one Diterpenoid. (15)

6 How do you characterize the structure of following natural compounds using IR, ^{1}HNMR and ^{13}CNMR ? (Give approximate specral values).
(a) Penicillin - G
(b) Morphine
(c) Quercetin
(d) Digoxin
(e) Vitamin – D (5x3)

7 (a) Write a note on Recombinant DNA technology and how it helped in new drug discovery?
(b) Write down the active constituents present in the following crude drugs by giving the structures for two compounds each:
(i) Gymnema sylvestre (ii) Trigonella foenumgraccum
(iii) Phyllanthus niruri (iv) Curcuma longa (7+8)

8 Write a note on :
(a) Anti inflammatory steroids
(b) Gene therapy
(c) Chemistry and biological significance of Vitamin B_1, B_2 and B_{12}

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