401 **SEPTEMBER 1991**

FIRST M.Pharm. DEGREE EXAMINATION,
SEPTEMBER 1991

(Special Papers)

Specialization B — Pharmaceutical Chemistry

Paper I — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. How the structure-activity relationship studies helped in developing a sound basis for designing new drug molecules. Illustrate your answer with examples.

2. Illustrate with suitable examples the utility of the following in the synthesis of medicinal agents :

(a) Carbonium ions.

(b) Carbenes.

(c) Carbanions.

3. (a) Give the principal organic products to be expected from the reaction of n-butyl bromide with each of the following :

(i) Warm alcoholic sodium hydroxide.

(ii) Sodium Iodide in acetone.

(iii) Benzene and Aluminium chloride.

(iv) $C_6H_5\ C{\equiv}C{-}Na$.

(b) Discuss the factors which favour α–elimination.

(c) Write notes on non–classical electron delocalization.

4. Explain with the mechanism :

(a) Wittig reaction and Wolf–Kischner reduction.

Or

(b) Beckmann rearrangement and Hoffman, Curtius and Lossen reactions.

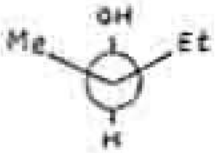
5. (a) Explain the term configuration. Draw the structures of two isomers of 1,2–dimethyl ethane which has different configurations.

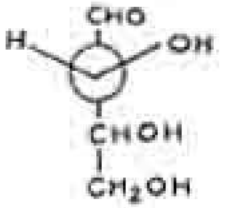
(b) Draw the structural formula for an optically active compound having the molecular formula $C_5H_{11}Cl$.

(c) Why a cis 1,3–disubstituted cyclohexane is more stable than the corresponding trans–structure.

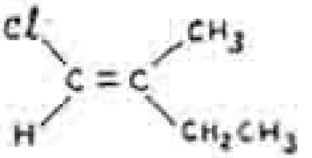
(d) Draw all possible stereoisomers of 2,3–dichloro butane. Indicate any enantiomeric pairs.

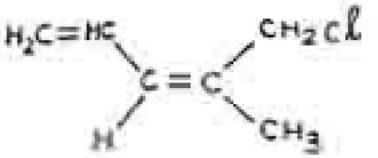
(e) Employing the sequential rules assign *R* and *S* configuration for the following chiral centres :





(f) Employing priority rules assign *E* and *Z* configurations for the following olefins :





401 **MARCH 1992**

FIRST M.Pharm. DEGREE EXAMINATION, MARCH 1992.

Specialization B — Pharmaceutical Chemistry

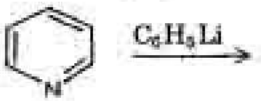
Paper II — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

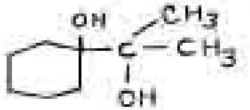
Answer any FOUR questions.

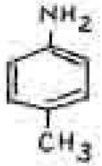
All questions carry equal marks.

1. (a) Predict the major products of the following reactions : (10)

(i)  $\xrightarrow{C_6H_5Li}$

(ii)  $\xrightarrow{KMnO_4}$

(iii)  $\xrightarrow{H^{\oplus}}$

(iv)  $\xrightarrow[\text{(ii) } Cr\,CN]{\text{(i) } Na\,NO_2 - HCl}$ $\xrightarrow{\text{(iii) } H_3O^{\oplus}}$

(v)  $\xrightarrow[\text{(ii) } Zn/H_2O]{\text{(i) } O_3}$

(b) Explain whether inductive and resonance effect controls reactivity in electrophilic addition to vinyl halides. (5)

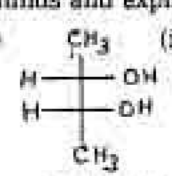
(c) Write notes on Aliphatic neucleophilic substitution. (10)

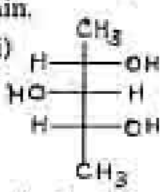
2. (a) Draw Fischer projections of all possible stereo isomers and indicate the relationship (evaliometic, diastereo isomeric) between each structure for the following compounds.

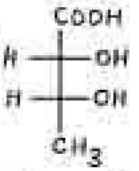
(i) 2 – methyl butanoic acid

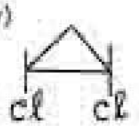
(ii) H, S – diethyl novane. (6)

(b) Which of the compounds shown below are meso compounds and explain. (4)

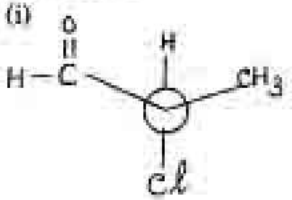
(i) 

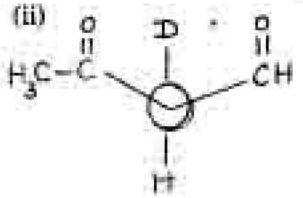
(ii) 

(iii) 

(iv) 

(c) Explain the significance of the terms R and S in regard to chiral centres. Assign (R) and (S) designation to each of the following chiral carbous mentioning the rules you employed in arriving at the result. (5)

(i) 

(ii) 

(d) Explain why the methyl groups in 1,3 – diaxial positions destabilize the cyclohexane ring? Indicate the most stable conformations for the cis and trans 1, 2 – dimethyl cyclohexane. (5)

(e) N – Brown succinamide (NBS) is a well known reagent for bromination of allylic hydrogen. Indicate the mechanism for the following reaction

$$CH_3CH = CH_2 + NBS \xrightarrow[\text{Peroxide in } CCl_4]{\text{Benzoyl}} Br\ CH_2 - CH = CH_2 + \underset{\text{anhydride}}{\text{Succinic}}$$

(5)

3. (a) Outline the syntheses of 1–methyl isoquinline. (10)

(b) Account for the following :

2–aminopyridine can be nitrated or sulfoarated under much milder conditions than pyridine itself. Substitution occurs chiefly at 5–position. (5)

(c) Explain with a suitable example the mechanistic details involved in Hoffmann reaction. (5)

(d) Explain why secondary amides (such as RCONHR') fail to undergo Hoffmann rearrangement. (5)

4. Explain the following and the underlying mechanism. (25)

(a) Bayer – Villiger oxidation

(b) Wittig reaction

(c) Clemarson reduction.

5. (a) "Biological and physiological activities are related to specific interactions between receptor cells and chemical compounds with specific structures". Justify the statement with suitable examples. (18)

(b) Describe the non–specific action of drugs with suitable examples. (7)

NOVEMBER 1994

[ND 278]

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All question carry equal marks.

(a) Discuss various types of mechanisms of elimination reactions and the factors that play a major role in these reactions. (15)

(b) Give an account of participation of neighbouring groups in nucleophilic substitution reactions. (10)

2. Explain the following reactions and give two specific examples to bring out their synthetic importance :

(a) Hoffmann rearrangement. (9)

(b) Mannich reaction. (8)

(c) Meerwein–Ponndorf reduction. (8)

3. Discuss the following with examples :

(a) Stereo selective synthesis. (10)

(b) Stereo chemistry of allenes. (15)

4. Account for the following :

(a) Iodine is used as a catalyst for aromatic bromination. (6)

(b) Sulfonation of aniline with dilute H_2SO_4 gives ortho and para amino sulfonic acids while that with conc H_2SO_4 yields meta amino sulfonic acid. (6)

(c) Phenol is more reactive towards electrophilic substitution than anisole although $-OCH_3$ group has a greater +I effect than $-OH$ group. (6)

(d) When a mixture of benzene, conc H_2SO_4 and tertiary butanol is heated, tertiary butyl benzene is isolated as a product. (7)

5. Give the synthesis of phenothiazine and purine. Discuss the chemistry and synthesis of the purine and phenothiazine derivatives possessing different pharmacological properties. (25)

———————

APRIL 1995

[SE 307]

M.Pharm. DEGREE EXAMINATION.

First Year

(New Regulations)

Branch II — Pharmaceutical Chemistry

ADVANCED ORGANIC CHEMISTRY

Time : Three hours. Maximum : 100 marks.

Answer ALL questions.

All questions carry equal marks.

1. (*a*) Discuss the mechanism and stereo-chemistry of bimolecular nucleophilic substitution reactions. (12)

(*b*) What is free radical ? What are the steps involved in the free radical substitution reactions ? Discuss the configuration, stereo-chemistry and stability of free radical reactions. (13)

2. Explain the following reactions and give two specific examples to bring out their synthetic importance :

(*a*) Michael reaction. (9)

(*b*) Beckmann rearrangement. (8)

(*c*) Diels Alder reaction. (8)

3. (*a*) What is stereo-selective synthesis ? Illustrate with examples. (10)

(*b*) Give an account of optical rotatory dispersion and its importance. (15)

4. (*a*) What is tricovalent carbon ? Explain with examples. (5)

(*b*) Write the conformations of the following pairs of geometrical isomers. (5)

(i) trans and cis 1,2-dimethyl cyclohexane.

(ii) cis and trans 1,3-chloromethyl-cyclo-pentane.

(iii) cis and trans 2-methyl-1-cyclohexanol.

(*c*) Explain why cyclopropane is more strained than cyclobetane. (5)

(*d*) Why trichloroethylene fails to show geometrical isomerism ? (5)

(*e*) Why is cis-1,3-disubstituted cyclohexanes are more stable than the corresponding trans structures ? (5)

5. How is acridine synthesized ? Discuss the chemistry and synthesis of three acridine derivatives possessing different therapeutic actions. (25)

———

APRIL 1996

[AK 308]

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer ALL questions.

All questions carry equal marks.

1. Explain the following reactions giving two specific examples of each :

(a) Grignard reaction.

(b) Catalytic hydrogenation reaction.

(c) Reformatsky reaction.

2. Discuss electrophilic and nucleophilic addition reactions to a double bond. What is the evidence available for the brominium ion intermediate? How will you prepare cis and trans glycols? Comment on the reactivity of allyl bromide and vinyl bromide.

3. (a) Describe briefly the stereochemistry of

(i) Biphenyl.

(ii) Allenes.

(iii) Spiranes.

(b) Draw all possible stereochemical structures of

(i) 2, 3 Hexadiene.

(ii) 2, 3, 4 – Hexatriene.

(c) D(–) chloramphenicol has been shown to exist in three crystalline forms. Explain which is the most stable isomer? Why?

(d) Which geometrical isomer of 1, 3 dimethyl–cyclohexane is more stable?

4. Account for the following :

(a) O–chlorotoluene when treated with ammonia in presence of sodamide gives a mixture of ortho and para toluidines.

(b) Treatment of benzene with isobutene in presence of HF forms tertiary butyl benzene.

(c) Nitrosogroup activates the benzene ring towards both types of substitution rections.

(d) 3–pentene–2–one reacts with $EtMgBr|H^+$ to form 4–methyl–2 hexanone.

(e) Alkyl halides are more reactive than Aryl halides towards nucleophilic substitution reactions.

5. How is triazole synthesised? Classify the compounds belonging to this nucleus. Discuss the chemistry and synthesis of triazole derivatives possessing different therapeutic actions.

OCTOBER 1996

[PK 204]

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. (a) Explain the mechanism and stereochemistry of Free radical reaction.

(b) Discuss the mechanism and stereochemistry of Addition reaction.

2. Expalin the mechanism of the following reactions, giving examples :

(a) Beckmann rearrangement,

(b) Grignard reaction,

(c) Michael reaction.

3. (a) Explain the stereochemistry of substituted cyclohexanes.

(b) Discuss the importance of stereo selective synthesis, giving examples.

(c) Explain 'Colton effect' and octant rule.

4. (a) Discuss the mechanism and reactivity of Aromatic Electrophilic substitution.

(b) Explain the methods used for the resolution of Racemic mixture.

(c) Write a note on Deel's Aldes reaction.

5. Discuss the chemistry of purines. Describe the synthesis and uses of any three purine derivatives having different therapeutic uses.

APRIL 1997

M.Pharm. DEGREE EXAMINATION

MP256

(New Regulations)

First Year

Branch II - Pharmaceutical Chemistry

Paper II - ADVANCED ORGANIC CHEMISTRY

Time: Three hours Max.marks:100

Answer any FOUR questions

All questions carry equal marks.

1. (a) A trans-1,3 - cyclo hexyl derivative ($BrC_6H_{10}COO^-$) spontaneously eliminates bromide ion to give a lactone, while the cis isomer is inert. Explain.

   (b) Why do not cyclopropyl halides display SN2 reactions?

   (c) Primary halides of the type $ROCH_2X$ apparently display SN1 reactivity while most primary halides do not. Propose a resonance based explanation.

2. (a) Write the mechanism involved in the Birch reduction of substituted benzenes.

   (b) How can tropinone be prepared from the Mannich reaction between acetone, methylamine and butanedial(Succinaldehyde)?

   (c) Write the mechanism of Oppenauer oxidation in the steroid field.

3. Explain the chemistry of Xanthine derivatives. Write different methods of synthesis of Caffeine.

4. Write the stereochemistry of:

   (a) Tropanes

   (b) Biphenyl

   (c) Allenes

5. Explain the following reactions giving two examples of synthetic importance:

   (a) Reformatsky reaction

   (b) Hoffmann rearrangement

   (c) Meerwin Pondroff's reduction.

MS 240

OCTOBER 1997

M.Pharm. DEGREE EXAMINATION

(New Regulations)

First Year

Branch II - Pharmaceutical Chemistry

Paper II - Advanced Organic Chemistry

Time: Three hours Max.marks:100

Answer any FOUR questions

All questions carry equal marks

1. (a) Compare the mechanism and stereochemistry of SN^1 reactions with SN^2 reactions.

   (b) Discuss the mechanism of elimination reactions and explain its stereochemistry.

2. Explain the following reactions, giving their important industrial uses:

   (a) Mannich reaction

   (b) Oppeneaur oxidation

   (c) Ozonolysis

3. Explain the following giving examples:

   (a) Conformation analysis

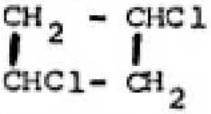
   (b) Enantiomers and diastereo isomers

   (c) Stereospecific synthesis

   (d) Syn and anti addition

4. (a) 'The more stable conformeric form of n-propyl chloride is the gauche'- Explain.

   (b) Draw stereochemical formulas for all the possible stereo isomers of



   Label pairs of enantiomers.

   (c) Predict the products of addition of bromine to trans-2-pentene. Explain.

5. How is phenothiazine synthesised? Discuss the chemistry and synthesis of three phenothiazine derivatives possessing different therapeutic uses.

IR, ν_{max}^{KCl} (cm^{-1}): 3000-2600 (s, broad series of ragged bands)

1709(s)

MS m-z : 206 (63% $C_{13} H_{18} O_2$)
163 (90% $C_{10} H_{11} O_2$)
161 (100% $C_{12} H_{17}$)
119 (73% $C_9 H_{11}$)
91 (82% $C_7 H_7$) (10)

b. What is quenching? How is quenching of flourescence demonstrated? (15)

VI. Write briefly on:

a. Ion-selective electrodes (5X5=25)

b. Separation of a mixture of sulphonamides by TLC

c. Plate theory of Chromatography

d. X-ray diffraction analysis

e. Ilkovic Equation.

[SV 272] APRIL 1998

M. Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

Paper II — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. Discuss how the ORD data make use of the Octant Rule to determine the configuration. Show the sign of cotton effect of 5α – Cholestan–6–one.

2. Describe the chemical structure and biological activity of phenothiazine derivatives. Write a method to synthesise chlorpromazine.

3. Elucidate the following reactions giving two examples of synthetic importance.

   (a) Oppenauer oxidation.

   (b) Meerwin Pondroff's reduction.

   (c) Reformataky reaction.

4. Describe in detail the sigmatropic thermal rearrangements. Explain with examples the intramolecular and intermolecular migration from Nitrogen to Carbon in aromatic compounds.

5. (a) Write the structures of the geometric isomers of 1–2–cyclopentane diol and comment on their stereochemistry.

   (b) Write briefly the stereo chemistry of

   (i) Biphenyl (ii) Allenes.

———————

[KA 272] **OCTOBER 1999**

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch I — Pharmaceutical Chemistry

Paper II — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. (a) What are purines? How are purines synthesised? (15)

(b) Write a brief note on the importance of purines in medicinal chemistry. (5)

(c) Write a short note on antifungal Triazole derivatives of therapeutic importance. (5)

2. Explain with specific examples the importance of the following reactions in the synthesis of medicinal agents :

(a) Grignard reaction. (8)

(b) Beckmann rearrangement. (8)

(c) Mannich reaction. (9)

3. (a) Discuss the reactivity, orientation and mechanism of aromatic nucleophilic substitution reactions with suitable examples. (20)

(b) Write applications of addition reactions to carbon–carbon multiple bonds. (5)

4. (a) Describe the geometrical isomerism and stereochemistry of allenes. (20)

(b) Write a brief note on stereo regulated polymerisation. (5)

5. (a) Explain the stereochemistry of five membered rings and six membered rings. (15)

(b) Write a note on determination of configuration of geometrical isomers. (10)

[KB 272] **APRIL 2000**

M. Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

Paper II — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. Give a detailed account of S_N1 and S_N2 reactions with suitable examples and discuss the various factors affecting reactivity of S_N1 and S_N2 reactions. (25)

2. (a) Why do carbonium ion rearrangements take place for more readily than those involving either a free radical (or) a carbanion?

(b) Discuss the intermolecular and intramolecular rearrangements in which the migrating group shifts from Carbon to Nitrogen. (5 + 20 = 25)

3. Discuss the following reactions giving suitable examples of synthetic importance :

(a) Birch reduction

(b) Reformatsky reaction

(c) Michael addition

(d) Mannich reaction

(e) Ozonolysis. (5 × 5 = 25)

4. Discuss the stereochemistry of

(a) Fused ring systems

(b) Allenes

(c) Biphenyl compounds. (25)

5. (a) Discuss the chemistry of purine derivatives of Biological importance. Give the synthesis of caffeine.

(b) Give the chemical structures and biological activity of phenothiazine derivatives. Write a method to synthesise chlorpromazine. (12 + 13 = 25)

6. Write short notes on: (25)

(a) Oppenauer oxidation

(b) E_2 Elimination

(c) Hoffman rearrangement

(d) Geometrical isomerism.

[KC 272] OCTOBER 2000

M.Pharm. DEGREE EXAMINATION.

(New Regulations)

First Year

Branch II — Pharmaceutical Chemistry

Paper II — ADVANCED ORGANIC CHEMISTRY

Time : Three hours Maximum : 100 marks

Answer any FOUR questions.

All questions carry equal marks.

1. Give a detailed account of mechanism and Stereochemistry of E_1 and E_2 reactions with particular reference to aliphatic and alicyclic compounds. Discuss the orientation of double bond with reference to Saytzeff and Hoffmann rules. (15 + 10 = 25)

2. Write short notes on the following :

(a) Hydride transfer/Alkyl transfer

(b) Carbonium ion, its structure and stability

(c) Ozonolysis and its synthetic importance

(d) Optical rotation and optical rotatory dispersion. (6 + 6 + 6 + 7 = 25)

3. (a) What is Geometrical isomerism? Discuss various methods of determination of configuration of Geometrical isomers with suitable examples.

(b) Write briefly the Stereo chemistry of (i) Decalin and Decanols (ii) Biphenyl compounds (iii) Allenes. (10 + 15 = 25)

4. Discuss the following reactions giving suitable examples of synthetic importance :

(a) Beckmann rearrangement

(b) Reformatsky reaction

(c) Birch reduction

(d) Diel's–Alder reaction

(e) Grignard reaction. (5 × 5 = 25)

5. (a) Discuss the physical and chemical properties of pyrimidines. How are pyrimidines synthesised? Briefly discuss the important derivatives used in Medicinal chemistry?

(b) Discuss the chemistry of purine derivatives of biological importance. Give the synthesis of Theophylline. (13 + 12 = 25)

6. (a) Describe the synthesis of important Phenothazine derivatives and the chemistry of phenotheazine necleus.

(b) Write a brief note on tetrazole derivatives and their synthesis.
