

Total No. of Questions : 6]

SEAT No. :

PE-5330

[Total No. of Pages : 6

[6512]-301

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-360 : Advanced Analytical Methods

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

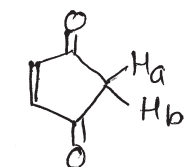
Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right side indicate full marks.
- 3) Answers to the two sections should be written in separate answer books.

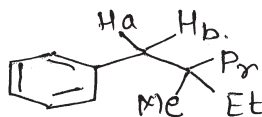
SECTION - I

Q1) a) Answer any four of the following : [8]

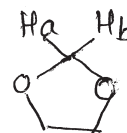
- i) Explain the observed coupling constant values in the following molecules.



$$J_{ab} = 21.5 \text{ Hz}$$



$$J_{ab} = 14 \text{ Hz}$$



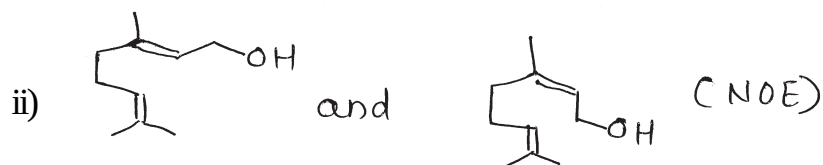
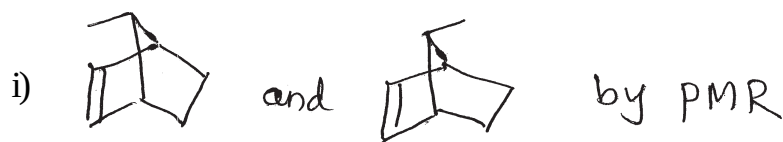
$$J_{ab} = 0 \text{ Hz}$$

- ii) Sensitivity of ^{13}C signals is about 6000 times less than ^1H signals. Explain.
- iii) Acetone d_5 shows ten lines in its CMR spectrum while quintet in its PMR spectrum. Explain.
- iv) Explain Mc-Lafferty rearrangement with suitable example.
- v) Benzene in its mass spectrum shows peak at m/e -51. Explain.

P.T.O.

b) Distinguish following compounds.

[3]



Q2) Deduce the structures of any four of the following :

[12]

- i) MF :- $C_5H_8O_2$
IR :- $1780, 1170\text{ cm}^{-1}$
PMR :- 1.35 (d, 6 Hz, 9 mm), 1.5 - 2.6 (m, 12 mm), 4.55 (distorted sextet, 6 Hz, 3 mm)
Mass :- 100 (4.2), 85 (55), 56 (100%), 43 (33)
- ii) MF :- $C_{10}H_{15}NO$
UV. λ_{max} :- 225 (7000), shows bathochromic shift on addition of alkali
IR :- 3300 broad, 1590, 1495, 850 cm^{-1}
PMR :- 1.85 (quin., 8 Hz, 12 mm), 2.45 (S, 18 mm), 2.60 (t, 6 Hz, 12 mm), 2.72 (t, 6 Hz, 12 mm), 4.85 (bs, exch., 12 mm), 6.75 (d, 8 Hz, 12 mm), 7.1 (d, 8 Hz, 12 mm)
- iii) MF :- $C_5H_{10}O$
CMR :- 18, 41, 67, 116, 141
DEPT 1 :- 18, 41, 141 all up. 67, 116 down
DEPT 2 :- 41, 141 up
- iv) MF :- $C_6H_{10}O_2$
CMR :- 12 (9), 13 (9), 22 (t), 127 (S), 147 (d), 174 (S)
PMR :- 1.17 (t, 7.5 Hz, 3H), 1.85 (d, 1.5 Hz, 3H), 2.2 (dq, 7.5 & 6.3 Hz, 2H), 6.9 (tq, 1.5 & 6.3 Hz, 1H), 12.7 (bs, 1H)
- v) MF :- $C_5H_{10}O_2$
PMR :- 4.1 (4H, S), 1.5 (6H, S)
CMR :- 25 (q, strong), 68 (t), 95 (s)

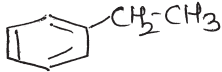
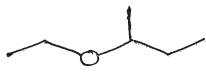
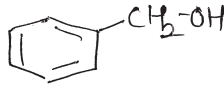
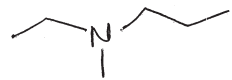
Q3) Write short notes on any four of the following :

[12]

- i) Isotopic peaks in mass spectrum
- ii) Nuclear overhauser effect
- iii) APT and DEPT techniques
- iv) ABC spin systems
- v) Long range couplings

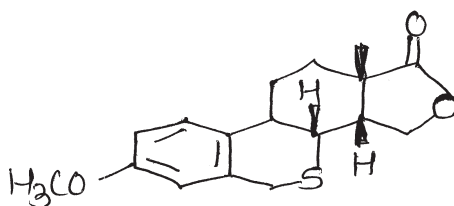
SECTION - II

Q4) a) Give the genesis of fragment ions for any four of the following : [8]

- i)  106, 105, 93, 79, 53
- ii)  102, 87, 59, 57, 45, 31
- iii)  120, 91, 71, 43
- iv)  108, 107, 77, 51
- v)  101, 100, 86, 72

- b) A compound with molecular formula $C_{10}H_{12}O_2$ shows positive bicarbonate test and exhibits ion at m/e - 164 (M^+), 149 (100%), 119, 105, 91, 79, 77. Deduce the structure.

Q5) a) Assign the chemical shifts and comment on the observed coupling constants and chemical shifts in the following compound. [6]



1.46 (s, 3H), 2.3 (m, 2H), 2.76 (m, 1H), 3.46 (d, 2 Hz, 1H), 3.74 (s, 3H), 3.8 (s, 2H), 3.94 (t, 8 Hz, 1H), 4.3 (t, 8 Hz, 1H), 6.1 (m, 1H), 6.58 (d, 4 Hz, 1H), 6.72 (dd, 8 & 4 Hz, 1H), 7.3 (d, 8 Hz, 1H)

Decoupling Experiment

Irradiation at

Change at

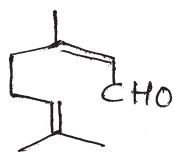
6.1

2.3 → less lines

2.76

3.46 → s

- b) i) Assign the signals to the carbon atoms in the following molecule. Justify. [4]

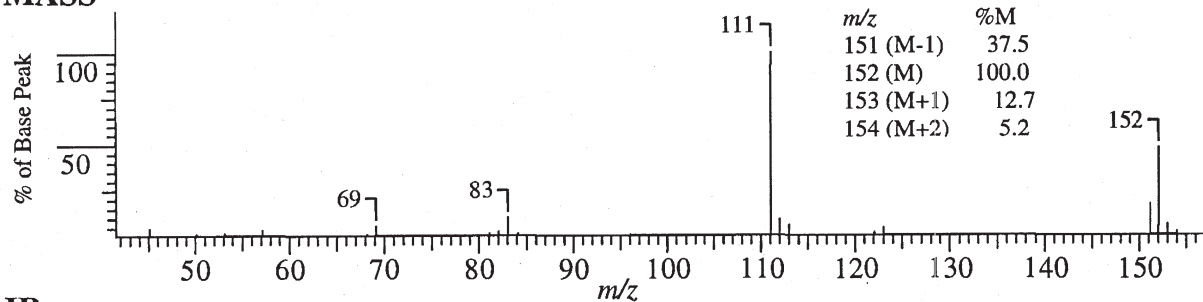


189 (d), 133 (S), 128 (d), 162 (S), 123 (d),
32.5 (t), 27.2 (t), 25.3 (q), 24.4 (q), 17.4 (q)

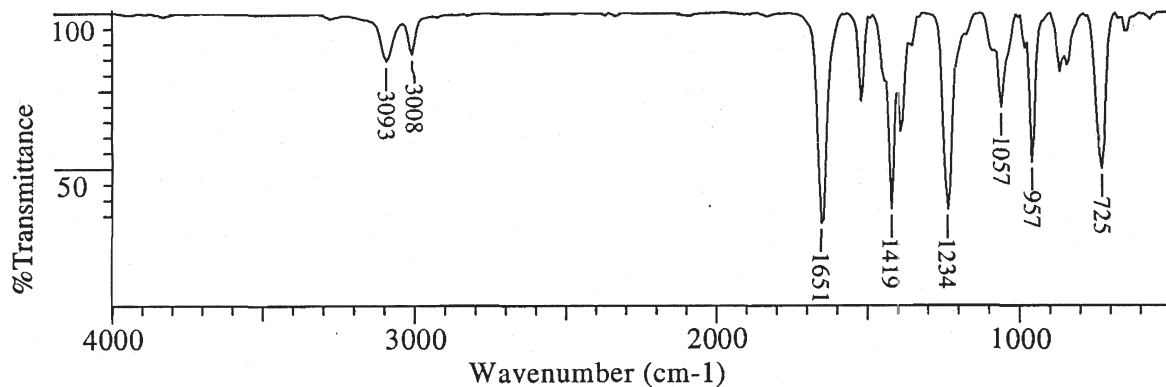
- ii) A compound with MF - C_4H_8O shows 14 (q), 16 (t), 46 (t), 203 (d). Deduce the structure. [2]

Q6) A compound exhibits following spectral properties shown on the attached paper. Deduce the structure of the compound. Explain the spectral data. [12]

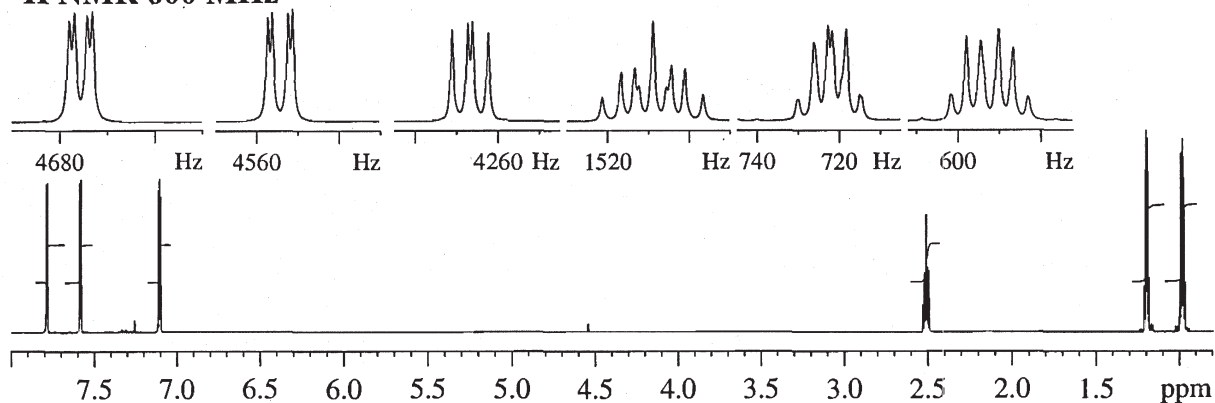
MASS



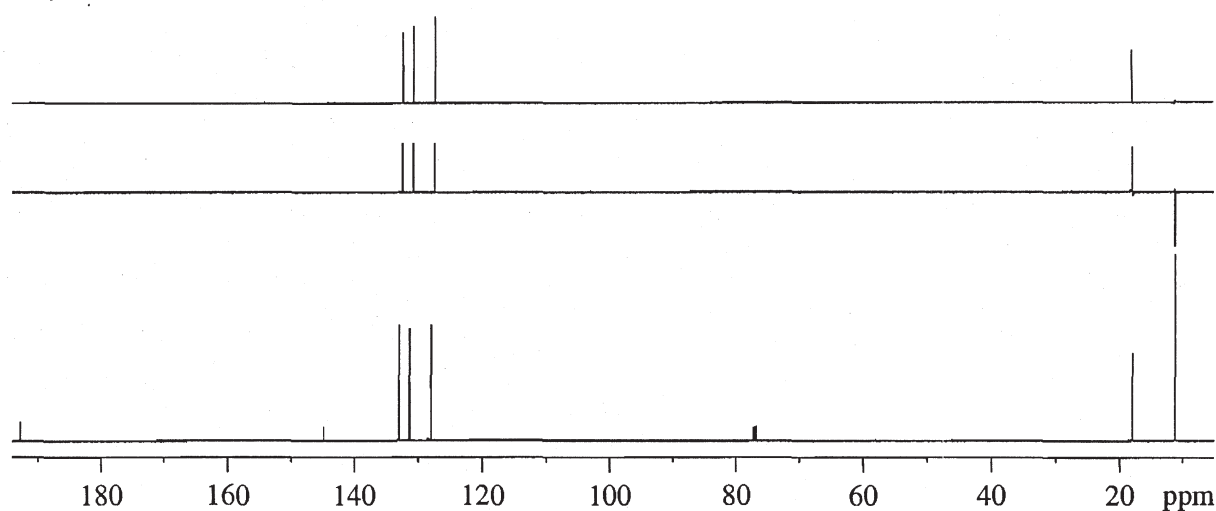
IR

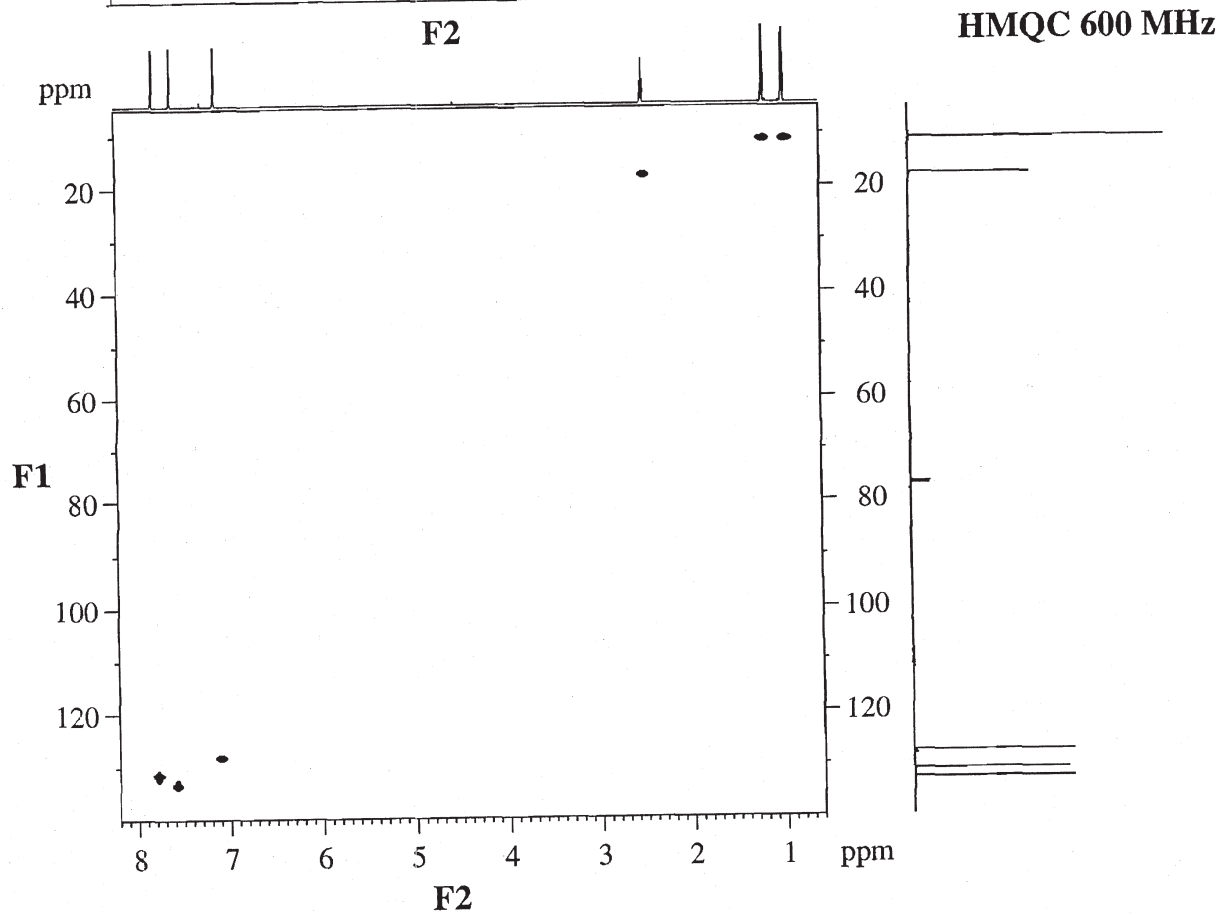
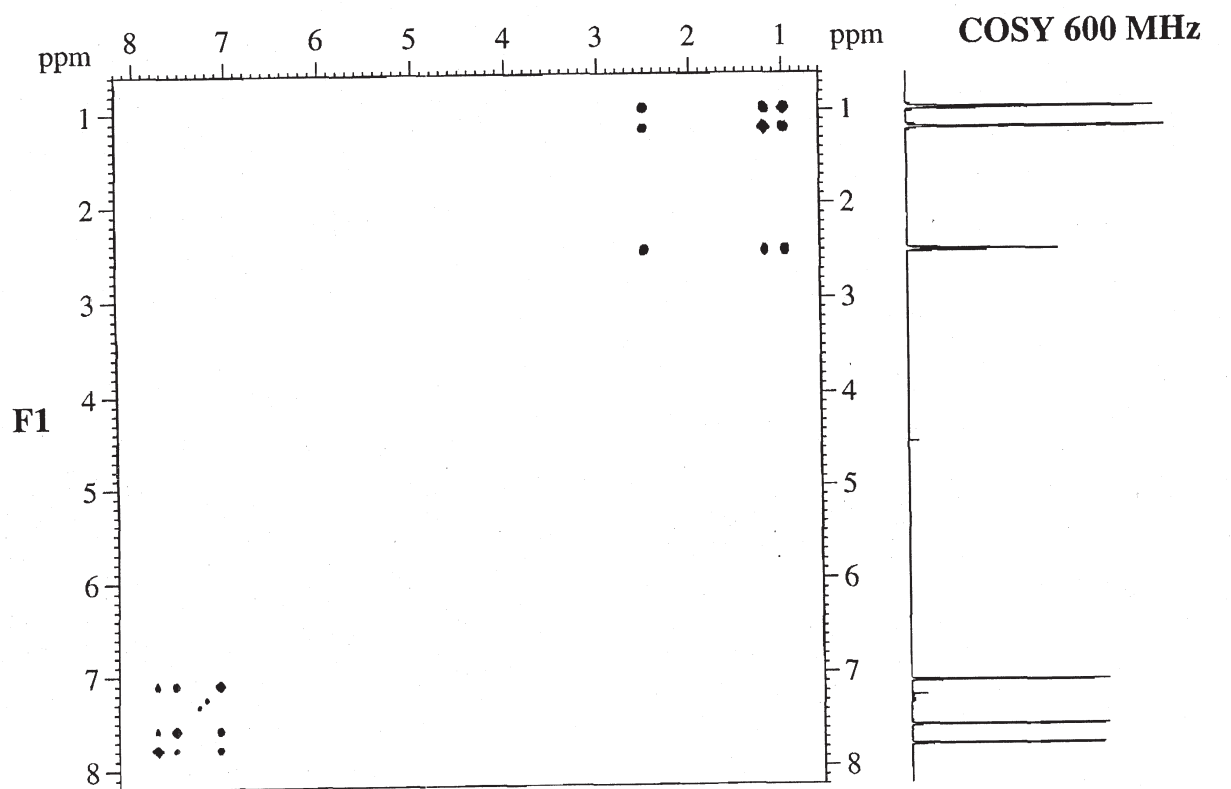


¹H NMR 600 MHz



¹³C/DEPT NMR 150.9 MHz





Total No. of Questions : 6]

SEAT No. :

PE-5331

[Total No. of Pages : 2

[6512]-302

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-361 : Drug Discovery and Development

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Answer to the two sections should be written in separate answer books.*
- 3) *Figures to the right indicate full marks.*

SECTION - I

Q1) a) Define the following: **[8]**

- i) Agonist
- ii) Pharmacophore
- iii) Efficacy
- iv) Bioisosteres

b) Make a overview on History of drugs with examples. **[3]**

Q2) a) Answer any one of the following. **[6]**

- i) What is Lead? Discuss the different strategies used in lead discovery.
- ii) Explain the different types of dosage forms used in the formulation of drug dosage forms.

b) How can we screened lead compounds from the followings with examples (any two)? **[6]**

- i) Natural ligands
- ii) Natural products
- iii) Medical folklore

Q3) a) Answer any one of the following. **[6]**

- i) Define Pharmacokinetics. How are drugs metabolised in human body? Discuss the reactions of Phase-I and Phase-II metabolism.
- ii) Explain all the phases involved in clinical trials.

P.T.O.

- b) Write a short note on (any two). [6]
- i) Lead development
 - ii) Rule of five
 - iii) Nucleic acid as a drug target

SECTION - II

- Q4) a)** Define the following: [8]
- i) Trademark
 - ii) Claim
 - iii) Placebo
 - iv) First pass effect
- b) What is mean by GMP? Explain the various guidelines used in GMP? [3]

- Q5) a)** Answer Any one of the following: [6]
- i) Explain all the phases involved in clinical trials.
 - ii) What is Patent? Give its basic and formal requirements of patents.
- b) Discuss the following (any two): [6]
- i) Dose-ranging studies
 - ii) Genotoxicity studies
 - iii) Sub-acute toxicity studies

- Q6) a)** Answer any one of the following: [6]
- i) Explain different routes of drug administration with examples.
 - ii) Give a brief account of the function performed by the following in a pharma industry.
 - 1) R and D
 - 2) GLP
 - 3) Documentation
- b) Write a short note on (any two): [6]
- i) Role of FDA and Institutional review board in clinical trials.
 - ii) Approach to rational drug discovery.
 - iii) Filling a patent application.



Total No. of Questions : 6]

SEAT No. :

PE-5332

[Total No. of Pages : 4

[6512]-303

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-362 : Stereochemical Principles and Applications (2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

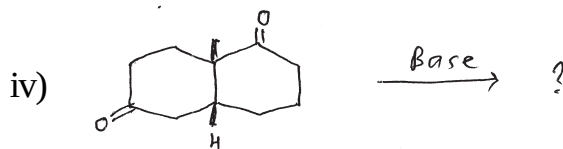
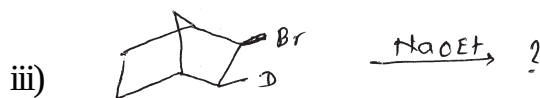
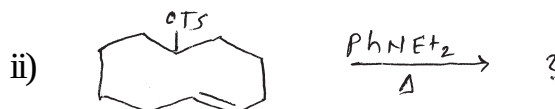
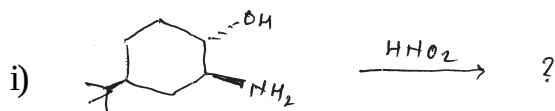
Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Answers to the two sections should be written in separate answer book.

SECTION - I

(Stereochemistry)

Q1) a) Predict the product of the following and explain the stereochemical principles involved. [8]

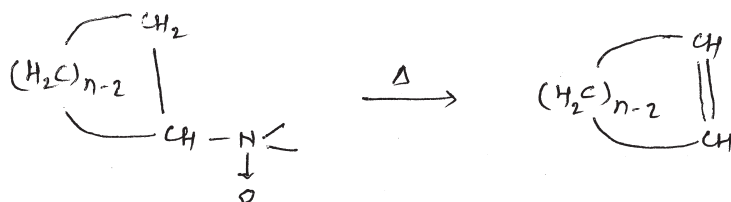


b) Draw trans-syn-trans and cis-anti-trans perhydroanthracene. Compare their stability and comment on their optical activity. [3]

P.T.O.

Q2) a) Answer any three of the following. **[6]**

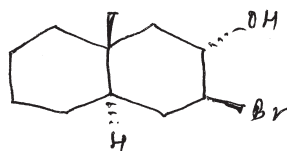
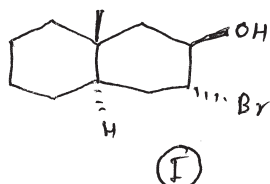
- i) Write a note on I-strain.
- ii) Cyclohexene on treatment with performic acid followed by hydrolysis gives 1, 2-diol, whereas trans-cyclodecene on similar reaction gives trans 1, 6-diol. Explain.
- iii) Explain the following observations.



$n = 6, 7, 8 \rightarrow$ only cis olefin.

$n = 9, 10 \rightarrow$ only trans olefin.

- iv) Which of these compounds would form an epoxide on treatment with base? Explain.



b) Answer any two of the following. **[6]**

- i) Draw stable conformations of cis-syn-cis and cis-anti-cis perhydrophenanthrene. Calculate their energies and comment on their optical activities.
- ii) Explain with examples trans annular interactions.
- iii) Draw the most stable conformations for
 - 1) Bicyclo [2, 2, 2] octane
 - 2) Trans 1, 3-ditert-butyl cyclohexane

Q3) a) Answer any two of the following. **[6]**

- i) Write a note on 'Abiraterone'.
- ii) Which form of bicyclo [3, 3, 1] nonane is more stable? Why?
- iii) Why trans decaline is more stable than cis decaline? Explain with stereostructure.

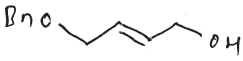
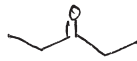
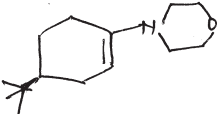
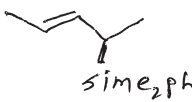
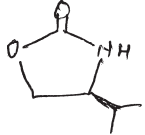
b) Answer the following. (any two) **[6]**

- i) Equatorial 2-chloro cyclohexanone shows higher IR stretching frequency than axial isomer. Explain.
- ii) Reduction of camphor with LAH gives mainly isoborneol. Explain.
- iii) Chair boat interconversion is more facile in cyclohexanone than in cyclohexane. Explain.

SECTION - II

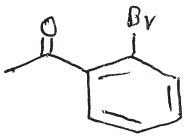
(Principles and Applications of Asymmetric Synthesis)

Q4) a) Predict the product of the following and explain stereochemical principles involved. Justify. (any four) **[8]**

- i)  $\xrightarrow[\text{Ti(OiPr)}_4, \text{t-BuOOH}]{(+)\text{DIPT}}$?
- ii)  $\xrightarrow[\text{ii) LDA, iii) PrI, iv) O}_3]{\text{i) SAMP}}$?
- iii)  $\xrightarrow[\text{then H}_3\text{O}^+]{\text{CH}_2=\text{CHCO}_2\text{CH}_3}$?
- iv)  $\xrightarrow{\text{MCPBA}}$? + ?
Major Minor
- v)  $\xrightarrow[\text{ii) PrCOCl, iii) LDA, iv) PhCH}_2\text{Br}]{\text{i) n-BuLi, -78}^\circ\text{C}}$

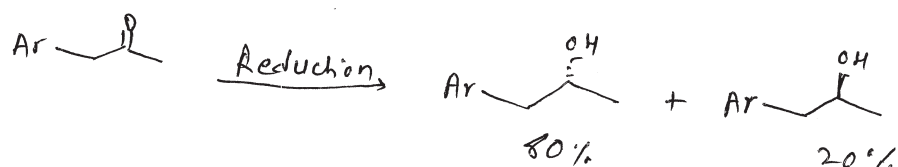
b) Describe the method of resolution via molecular complexes. **[3]**

Q5) a) Predict the product in any two of the following and explain stereochemical principles involved. Justify. **[6]**

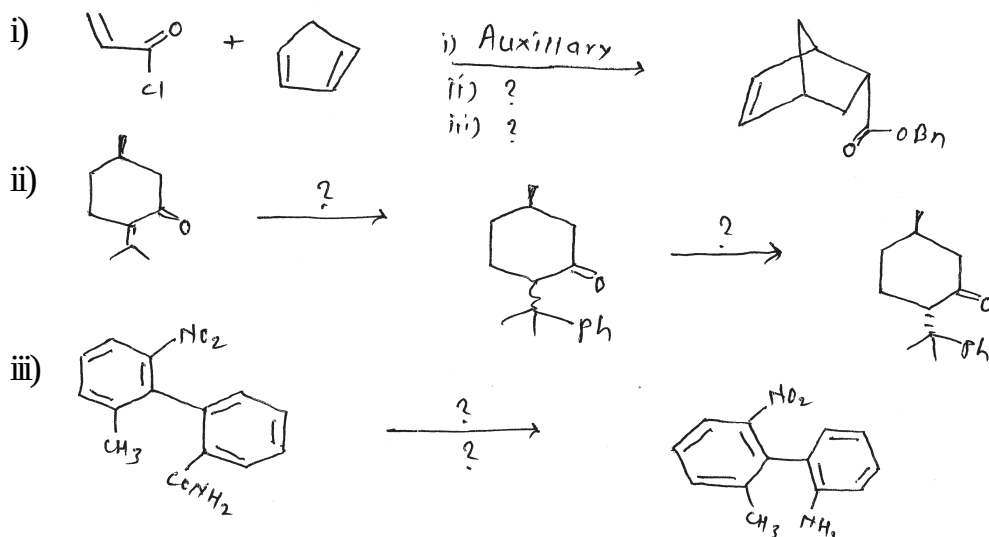
- i)  $\xrightarrow[\text{ii) H}_3\text{O}^+]{\text{i) peroxoacid}}$?
- ii)  $\xrightarrow[\text{Ti(OiPr)}_4, (-)\text{-DET}]{\text{t-BuOOH}}$?
- iii)  $\xrightarrow[\text{RuCl}_2]{\text{H}_2}$?
[(R)-BINAP]

b) Attempt the following. (any two) [6]

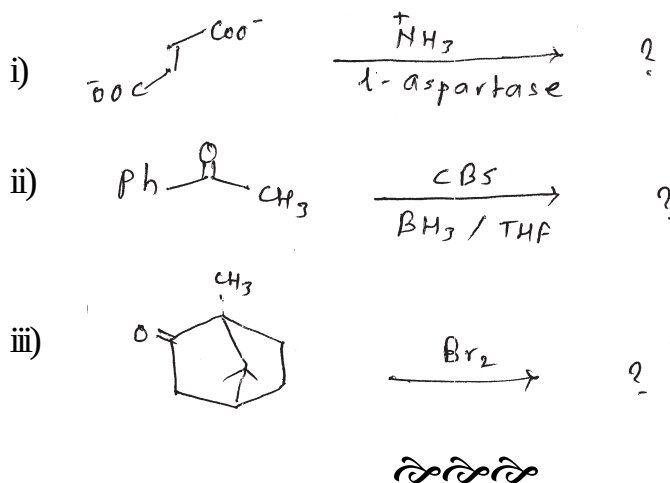
- Write a note on Asymmetric Aldol condensation.
- Describe the role of chiral solvating reagents in resolution.
- Explain the term optical purify. Calculate enantiomeric excess in following reactions.



Q6) a) Suggest the reagent and write mechanism of the following reactions. (any two) [6]



b) Predict the product and write stereochemistry of the following reaction. (any two) [6]



Total No. of Questions : 6]

SEAT No. :

PE-5333

[Total No. of Pages : 5

[6512]-304

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-363(A) : Chemistry of Heterocycles and Biologically
Active Molecules

(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

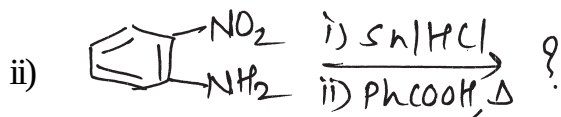
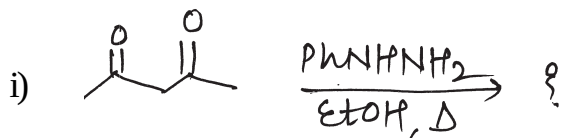
- 1) All questions are compulsory.
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- 3) Answers to the two sections should be written in separate answer books.

SECTION - I

Q1) a) Explain the following: [8]

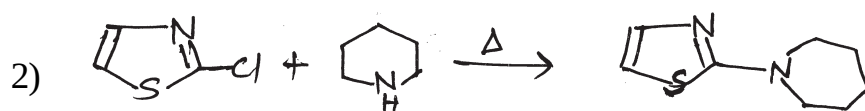
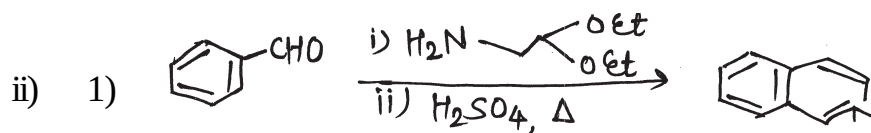
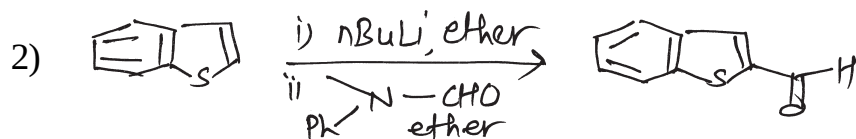
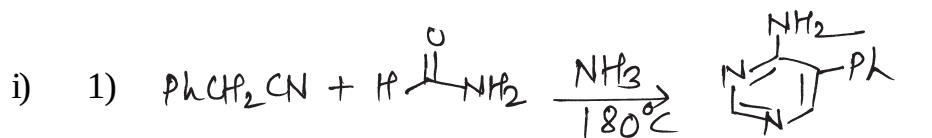
- i) 4-Chloropyridine easily undergoes hydrolysis in warm water.
- ii) Coumarin is easily attacked by electrophilic as well as nucleophilic reagents.
- iii) Indole has better selectivity for electrophilic substitution than benzofuran.
- iv) Imidazole has high boiling point than 1, 3-oxazole.

b) Predict the products in the following: [3]



P.T.O.

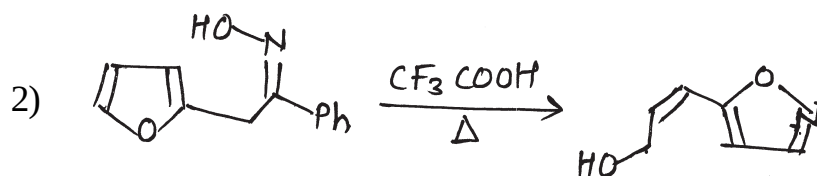
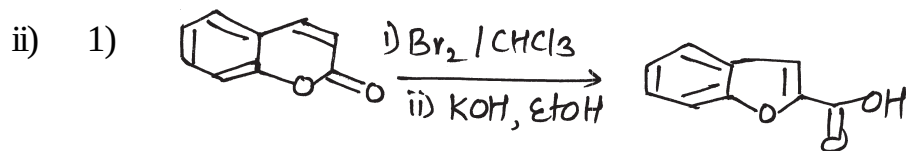
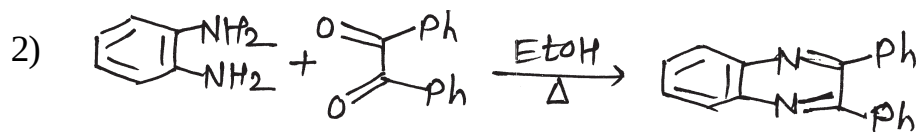
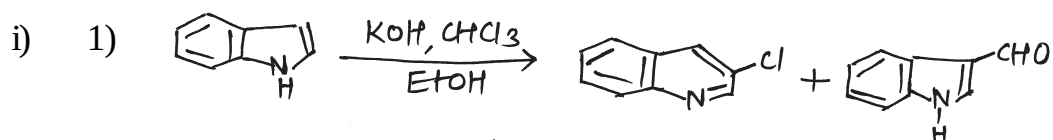
Q2) a) Suggest the suitable mechanism for any one of the following. **[6]**



b) Write notes on any two of the following.

- i) Fischer Indole Synthesis
- ii) Pechmann coumarin synthesis
- iii) Skraup quinoline synthesis

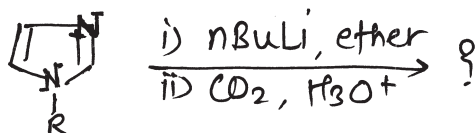
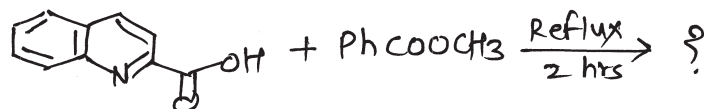
Q3) a) Suggest the suitable mechanism for any one of the following: **[6]**



b) Answer any two of the following:

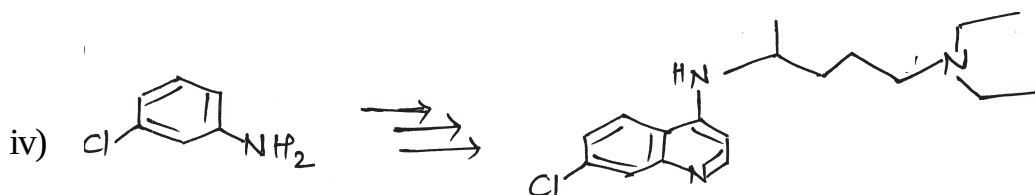
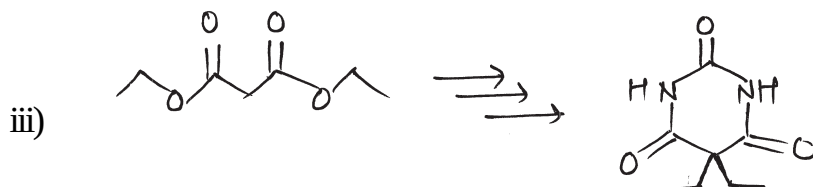
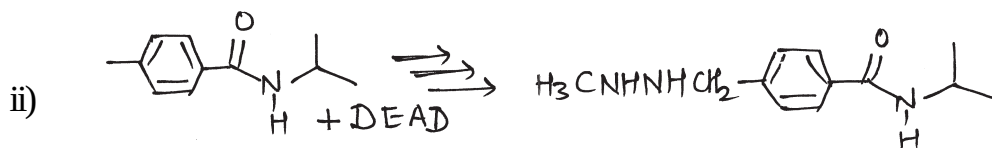
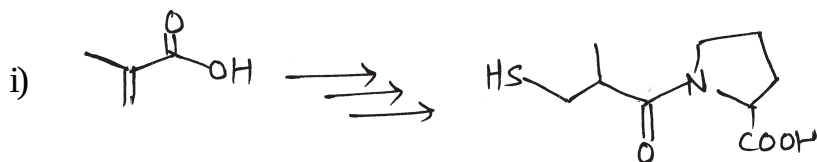
[6]

- Write short note on Madelung indole synthesis.
- Pyridine is weaker base than imidazole. Explain.
- Predict the products in the following.

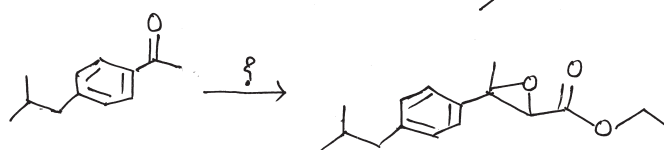
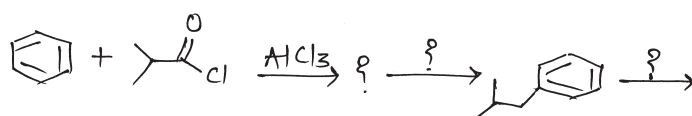


SECTION - II

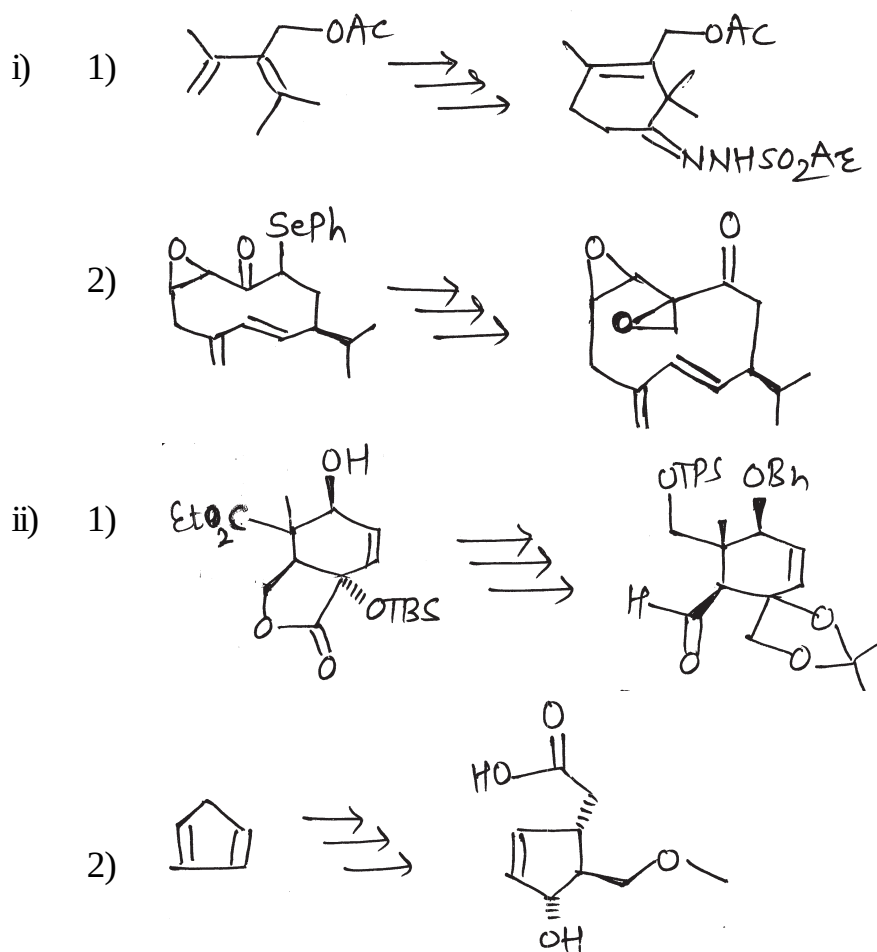
Q4) a) Describe the steps involved in the synthesis of following drug molecules. Explain the mechanism involved. [8]



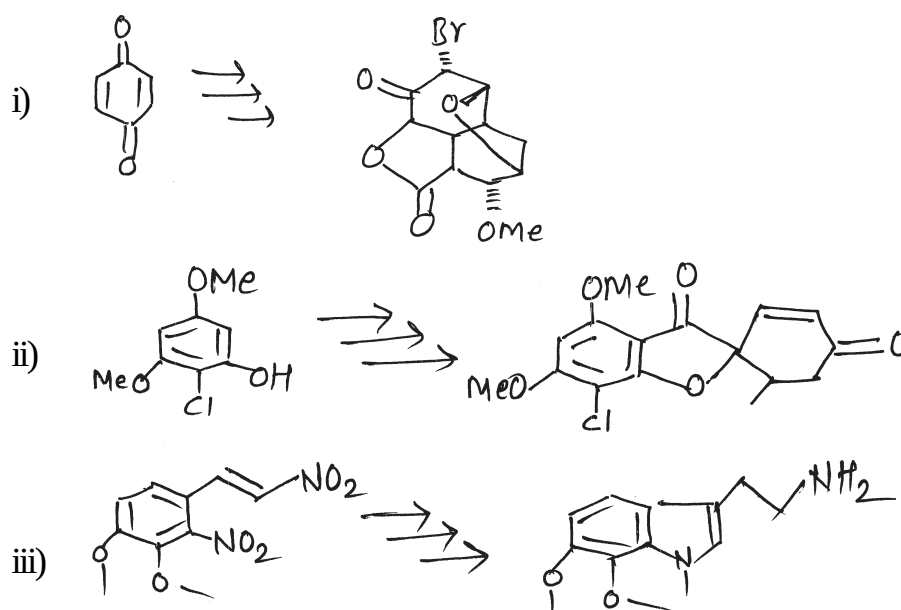
b) Insert the missing reagents in the following sequence of reactions. Explain the steps with mechanism. [3]



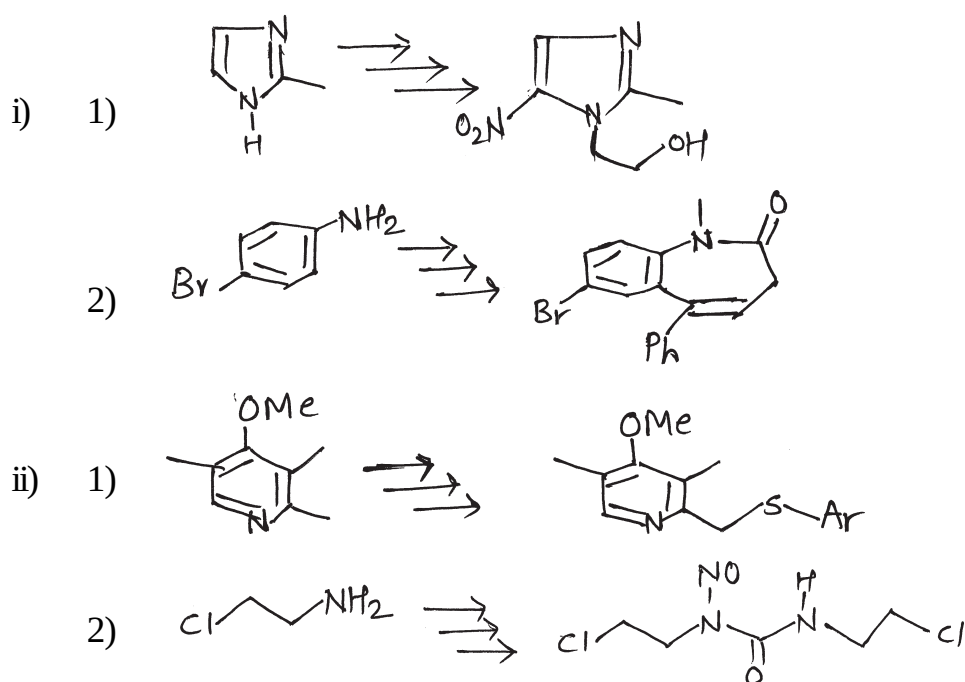
Q5) a) Describe the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved in all steps (any one). **[6]**



b) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved (any two) **[6]**



Q6) a) Explain the steps involved in the synthesis of following drug molecules.
Explain the mechanism involved (any one) **[6]**



b) Write short notes on (any two)

[6]

- i) Shapiro reaction
- ii) Michael addition reaction
- iii) Wittig reaction



Total No. of Questions : 9]

SEAT No. :

PE-5334

[Total No. of Pages : 3

[6512]-305

S.Y. M.Sc.

DRUG CHEMISTRY

**CHD-363(B): Immunology and Microbiology/
Bioinformatics, Biostatistics in drug discovery/
Entrepreneurship Development
(2019 Pattern) (Semester - III)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Attempt any two of I , II and III Sections.*
- 2) *Each section is for 35 marks.*
- 3) *All questions are compulsory.*
- 4) *Figures to the right indicates full marks.*

SECTION - I

[Immunology and Microbiology]

Q1) a) Answer the following: [6]

- i) Discuss in brief cell mediated and antibody mediated immunity.
- ii) Explain the morphological characters of bacteria.

b) Write a short note on: [5]

- i) Designing fermentation media.
- ii) The role of cytokines in immune response.

Q2) Answer any four of the following: [12]

- a) Describe a typical bacterial growth curve.
- b) What are the principles of bacterial strain improvement?
- c) Explain the principles of microbial effluent treatment processes.
- d) What is the role of B cells and T cells in immune response?
- e) Explain:
 - i) Radio immuno assay
 - ii) Immuno electrophoresis

P.T.O.

Q3) Answer any four of the following questions: [12]

- a) Explain ELISA technique.
- b) What are monoclonal antibodies? Explain its production.
- c) Describe primary and secondary immune response.
- d) Describe the different parts of industrial scale fermenter.
- e) Discuss the need for treatment of an effluent from drug manufacturing industry.

SECTION - II

[Bioinformatics, Biostatics in drug discovery]

Q4) a) Answer the following: [6]

- i) Write a short note on applications of Genomics.
- ii) Describe the types of biological databases.

b) Attempt the following: [5]

- i) Describe metabolomics.
- ii) Explain the terms: Negative correlation and chi-square test with their significance.

Q5) Answer any four of the following: [12]

- a) Give the use and significance of canonical representations in chemoinformatics.
- b) Briefly explain significance of reaction database.
- c) Discuss structure based drug discovery in brief.
- d) Explain Gene prediction programs.
- e) Chembioinformatics can be used in drug design. Justify with examples.

Q6) Answer any three of the following: [12]

- a) Define:
 - i) Coefficient of variation
 - ii) Frequency of class
 - iii) Standard deviation
 - iv) Correlation
- b) Calculate the mean and standard deviation and median for the following data. Weight of the eight eggs laid by a hen is recovered as 60, 56, 61, 68, 58, 69, 51, 54.

- c) The weights of coffee in 70 jars is as follows.

Weight (gms)	200-201	201-202	202-203	203-204	204-205	205-206
Frequency	13	27	18	10	1	1

- d) Compute correlation for import of raw materials and export of finished products.

Export	10	11	14	20	22	16	12
Import	12	14	15	16	21	26	21

SECTION - III

[Entrepreneurship Development]

- Q7) a)** Answer the following: [6]

- i) Explain Leibenstein's X-efficiency theory.
- ii) Explain the process of entrepreneurship development.

- b)** Write a short note on the following: [5]

- i) Conducting feasibility studies
- ii) Women Entrepreneur

- Q8)** Answer any three of the following: [12]

- a) Explain market analysis.
- b) Discuss the theory of high achievements.
- c) Entrepreneurship can be considered as style of management. Explain.
- d) Give a brief idea about innovation theory.

- Q9)** Answer any four of the following questions: [12]

- a) Explain the opportunities for small entrepreneurs in India.
- b) What are common errors made in writing a business plan that make it failure?
- c) Explain the problems faced by women entrepreneur.
- d) Write a note on innovation theory of entrepreneurship by schumpeter.
- e) Write a note on: Types of entrepreneur.



Total No. of Questions : 6]

SEAT No.:

PE-5335

[Total No. of Pages : 3

[6512]-401

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-460 : Advanced Medicinal Chemistry

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Answer to the two sections should be written in separate answer books.*

SECTION - I

Q1) a) Discuss the uses and side effects of the following drugs. **[6]**

- i) Indomethacin
- ii) Taxol
- iii) Aspirin

b) Write short notes on: **[5]**

- i) Enzyme inhibitors as drug molecules
- ii) Classification of antibiotics

Q2) Answer any four of the following: **[12]**

- a) What are common fungal diseases? Explain the role of fluconazole as an antifungal agent.
- b) Give a brief account of development of semi-synthetic penicillins. Explain the benefits in each case.
- c) Explain the treatment of leprosy.
- d) Discuss in brief the mode of action of fluoroquinolones.
- e) Discuss the selective toxicity of :
 - i) Cephalosporins
 - ii) Sulphonamides to bacteria

P.T.O.

Q3) Answer any three of the following: [12]

- a) Give a brief overview of cancer. Explain the role of plant products and nitrogen mustards in treatment of cancer.
- b) Explain the life cycle of plasmodium. Discuss the various strategies to control and treat malaria.
- c) What are common viral infections? Explain how acyclovir and saquinavir exert their antiviral effect.
- d) What are different steps in protein synthesis. How tetracyclines and aminoglycosides exert their antibiotic effect.

SECTION - II

Q4) a) Give one example of the drug from each of the following classes with their mode of action. [6]

- i) Opioid analgesics
- ii) Disease modifying agents
- iii) B-Blockers

b) Write short notes on: [5]

- i) Emesis
- ii) Pain

Q5) Answer any four of the following: [12]

- a) Discuss hyperacidity in brief. Explain the role of proton pump inhibitors in management of hyperacidity.
- b) What is the difference between IDDM and NIDDM. Discuss the management of NIDDM.
- c) Discuss the biochemical basis of inflammation. How do non-steroidal anti-inflammatory drugs exhibit their effect.
- d) Give a brief overview of congestive heart failure. Give at least one drug to treat it with its mode of action.
- e) Discuss benzodiazepines and barbiturates giving their anticonvulsant mechanism.

Q6) Answer any three of the following:

[12]

- a) Discuss the management of :
 - i) Cardiac arrhythmia
 - ii) Hypertension
- b) Explain the role of endocrine system in maintaining homeostasis. What are the functions of thyroid hormones? Discuss hypo and hyperthyroidism.
- c) What is interneuronal signal transmission. How it is affected in depression? Explain the strategies to rectify it.
- d) Explain the following in short.
 - i) Management of angina
 - ii) Role of hormones of adrenal gland.



Total No. of Questions : 8]

SEAT No. :

PE-5336

[Total No. of Pages : 2

[6512]-402

S.Y. M.Sc.

DRUG CHEMISTRY

CHD-461 : Drug Design

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Answer to the two sections should be written in separate answer books.
- 3) Figures to the right indicate full marks.

SECTION - I

Q1) a) Define the following: [8]

- i) Full agonist
- ii) Agonist
- iii) Antagonist
- iv) Partial agonist

b) Discuss the types of receptors. [3]

Q2) a) Answer any one of the following. [6]

- i) Give a comment on case studies of Artemisinin and related antimalarial drugs.
- ii) Explain the structure of tyrosine-kinase receptor. Describe the signal transduction mechanism of Tyrosine-kinase receptor.

b) Explain any two of the following: [6]

- i) Pharmacophore identification
- ii) Craig plot
- iii) Design of Antagonists

Q3) a) Answer any one of the following. [6]

- i) Make a comment of following used in QSAR.
 - 1) Steric factors
 - 2) Hydrophobicity
 - 3) Electronic factors
- ii) What is need for pro-drug design? Explain with suitable examples the benefits of prodrugs over routine drugs.

P.T.O.

- b) Explain any two of the following: [6]
- i) Design of Agonist
 - ii) Intracellular receptors
 - iii) Applications of pro-drug

SECTION - II

- Q4)** a) Define the following: [8]

- i) Drug target
- ii) CADD
- iii) Gene
- iv) Receptor

- b) What is Docking? Explain it's types. [3]

- Q5)** a) Any one of the following: [6]

- i) What is DNA Microarrays? How DNA microarrays could be used to diagnose a disease? Explain in detail.
- ii) Explain mix and split method used in combinatorial chemistry in detail.

- b) Discuss any two of the following: [6]

- i) 3D QSAR
- ii) Genetic engineering
- iii) Molecular dynamics

- Q6)** a) Answer any one of the following: [6]

- i) Explain any two methods used in search of conformational analysis.
- ii) What is human gene therapy? Explain it's types? How it can be used in cancer treatment?

- b) Write a short note on (any two): [6]

- i) Topliss scheme
- ii) High through put screening
- iii) Solid phase synthesis



Total No. of Questions : 6]

SEAT No. :

PE-5337

[Total No. of Pages : 4

[6512]-403

S.Y. M.Sc.

DRUG CHEMISTRY

**CHD-462-A : Advanced Synthetic Methods in Chemistry
(2019 Pattern) (Semester - IV)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figure to the right indicate full marks.*
- 3) *Answers to the two sections should be written in separate answer books.*

SECTION - I

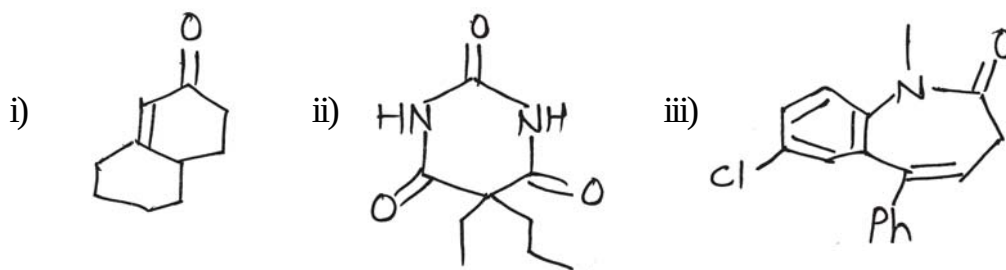
Q1) a) Explain the following: **[8]**

- i) 2, 2-Dibenzyl cyclohexanone cannot be synthesized in high yield from cyclohexanone using enamine approach.
- ii) Tetrahydropyranyl (THP) protection is preferred over methoxyl in the protection of hydroxyl group.
- iii) 1, 4 - Dicarbonyl compounds can be synthesized using umpolung strategy.
- iv) Tert-butoxy carbonyl protection is commonly used for the protection of amino group in peptide synthesis.

b) Explain the use of reagents in organic synthesis. **[3]**

- i) TBDMSCI
- ii) Na/liq. NH₃

Q2) a) Using retrosynthetic analysis, suggest a suitable method to synthesize the following (any two): **[6]**



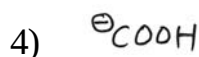
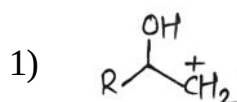
b) Answer the following questions (any two). **[6]**

- i) Explain the divergent synthesis with example.
- ii) Two methods for synthesis of 1, 2 - dicarbonyl compound
- iii) Explain the role of protection in organic synthesis.

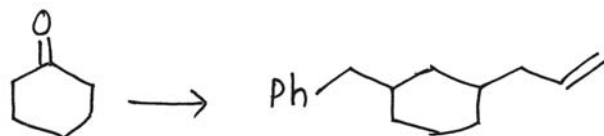
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Q3) a) Answer any two of the following. **[6]**

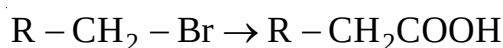
i) Give one reaction with a reagent for each synthon given below



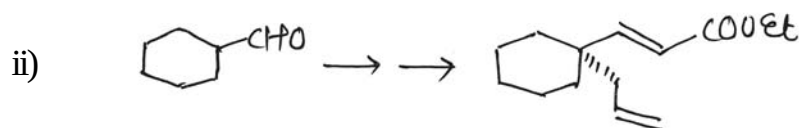
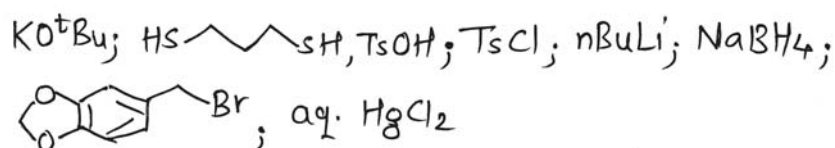
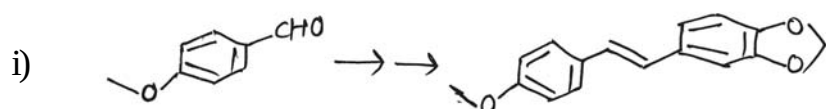
ii) Carry out the following transformation by enamine approach.



iii) Synthesize the following compound by using umpolung method.



b) Arrange the reagents in proper order and write structures of the intermediate (any two): **[6]**

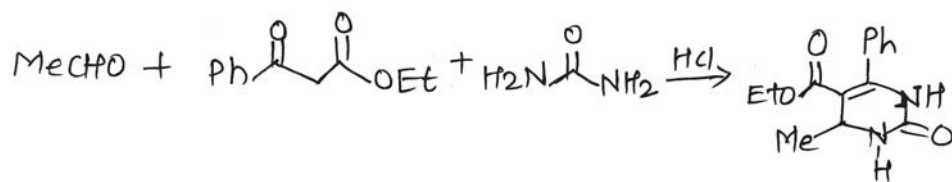


SECTION - II

Q4) a) Explain the following: **[8]**

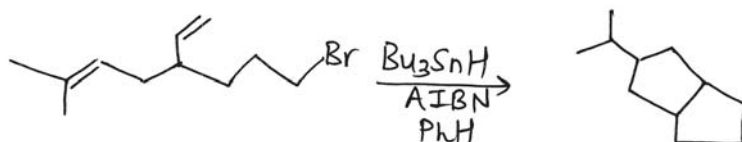
- i) Thexyl borane is used in synthesis of cycloketone.
- ii) Enlist the component of Passerini reaction.
- iii) 2-substituted 1,3-dimethoxybenzene derivatives can be conveniently synthesized from 1,3-dimethoxybenzene using organolithium reagent.
- iv) How will you prepare aryl alkynes from aryl halide?

- b) Write the mechanism for the formation of product given below. [3]

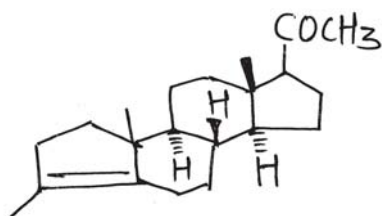


- Q5) a) Answer any two of the following. [6]

- i) What is Domino reaction? Explain the steps involved in the following reaction.

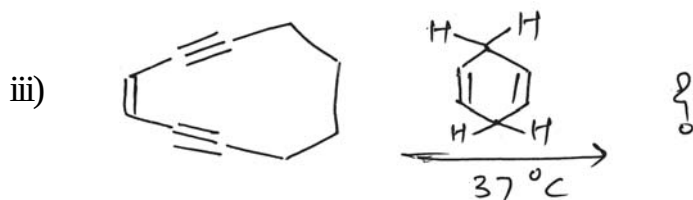
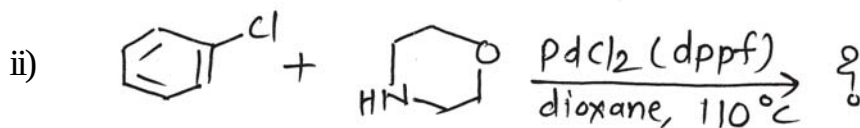
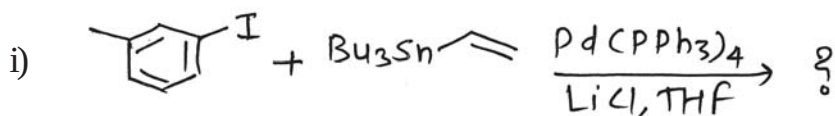


- ii) Explain the biomimetic approach used to obtain following compound.

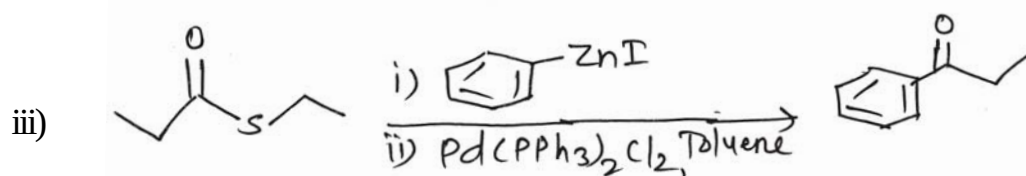
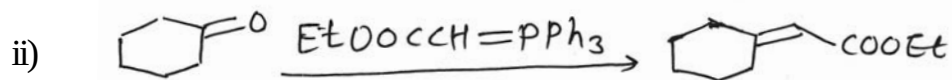
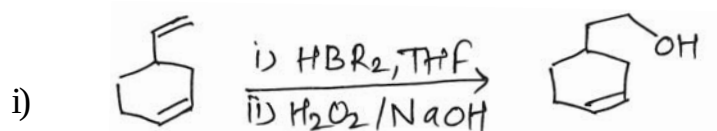


- iii) Write notes on Click Chemistry.

- b) Predict the product of any three of the following: [6]



Q6) a) Suggest the mechanism of any two of the following: **[6]**



b) Write short notes on (any two): **[6]**

- i) Negishi coupling reaction
- ii) Suzuki coupling reaction
- iii) Pauson Khand cyclization

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Total No. of Questions : 6]

SEAT No. :

PE-5338

[Total No. of Pages : 2

[6512]-404

S.Y. M.Sc.

**DRUG CHEMISTRY**

**CHD-462B : Supramolecular, Green chemistry & Forensic Chemistry**

**(2019 Pattern) (Semester - IV)**

*Time : 3 Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Figure to the right indicate full marks.*
- 3) *Answer to the two sections should be written in separate answer books.*

**SECTION - I**

**Q1) a) Answer the following: [6]**

- i) Discuss in brief the importance of various intermolecular forces in supramolecular designs.
- ii) Explain the concept of supramolecular analysis.

**b) Write short notes on: [5]**

- i) Ultra sound assisted substitution and addition reactions.
- ii) Solvent free reactions.

**Q2) Answer any four of the following. [12]**

- i) Discuss solid phase Michel addition reaction with example.
- ii) Give brief overview of use of ultra-sound technique in organic synthesis.
- iii) Discuss the applications of biocatalysts in organic synthesis.
- iv) Write a note on molecular devices.
- v) Explain the design principles of molecular receptors.

**Q3) Answer any four of the following. [12]**

- i) Give the suitable example of oxidation and reduction reactions which are assisted by ultrasound energy.
- ii) What is atom economy? Give atleast two examples of atom economical reactions.
- iii) Explain how catalytic processes are controlled by supramolecular reactivity?

**P.T.O.**

- iv) Discuss the aqueous phase reaction giving atleast two examples.
- v) Explain the transport processes through molecular channels.

## **SECTION - II**

**Q4) a) Answer the following: [6]**

- i) Give a brief overview of Clandestine laboratory investigation.
- ii) What are designer drugs? Give the classification of designer drugs with suitable examples.
- b) i) Discuss the different type of Narcotic and other drugs with suitable examples.
- ii) Discuss in brief the classification of finger prints.

**[5]**

**Q5) Answer any four of the following. [12]**

- i) Discuss detection of drugs on the basis of their metabolism with suitable example.
- ii) Write a short note on importance of fingerprints in forensic science.
- iii) Write a short note on Illicit drugs.
- iv) Discuss the method for isolation and characterization of barbiturates from biological samples.
- v) Explain in brief how fingerprints can be preserved and identified.

**Q6) Answer any four of the following. [12]**

- i) Discuss the use of spot tests in forensic analysis with suitable reagents and inference.
- ii) Discuss the classification of palm prints. How development and lifting of the palm prints is done?
- iii) What are the different analytical techniques used in identification of drugs.
- iv) How benzodiazepines can be analyzed from biological samples?
- v) Give a brief account of Poroscopy.

