Total No. of Questions: 6]

SEAT No. : ____

P2482

[Total No. of Pages : 5

[6065]-311
S.Y. M.Sc.
DRUG CHEMISTRY
CCTP-7 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 indicate full marks.***
3) ***Answers to the two sections should be written separately.***

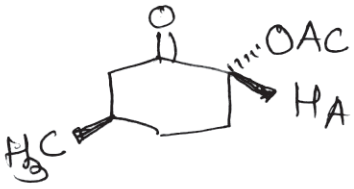
SECTION-I

Q1) A) Answer the following. **[8]**

a) Lanthanide shift reagents can be used to simplity the NMR spectra.

b) Cyclohexane shows two signals in its PMR spectrum at low temperature Explain.

c) Explain the observed data for following pair of compounds.



HA - triplet J=2.5Hz

HA=dd J=5 & 10 Hz

d) Discuss the concept of 'isotopic clusters' in balogen containing compounds.

B) A compound with MF : $C_3H_5C1F_2$ in its PMR shows two triplets one at 1.75 PPM and other at 3.63 PPM corresponding to three and two protons with J=7Hz Assign the structure of the compound. **[3]**

P.T.O.

Q2) Attempt any four of the following.

Deduce the structure using Following spectral data. **[12]**

a) MF-$C_5H_8O_2$

PMR- 4.1(s,4H), 1.5 (s,6H)

CMR-25(q), strong, 68(t) Strong, 95 (s)

b) MF.-$C_{15}H_{14}O$

IR-1680 cm^{-1}

PMR-2.4 (6H,s), 7.2 (4H, d, J = 8Hz) 7.7 (4H, d, J = 8Hz)

CMR- 21, 129, 133, 136, 141, 190

c) MF- $C_4H_6O_2$

IR-1818 cm^{-1}

CMR-20.6 (q), 44.3 (t), 68.0(d), 168.2(s)

PMR- 1.58 (d, J = 7.2 Hz, 3H)

3.06 (dd, J=7.6 Hz, 16.2 Hz, 1H)

3.58 (dd, J=6.5 Hz, 16.2 Hz, 1H)

4.7 (m, 1H)

d) M.F. $CgH_{14}O$

Mass (m/z): 138, 95 (100%), 81,79

IR : 3290, 2115, 1710

PMR : 1.12 (s,6H), 2.02(t, J=3Hz, 1H)

2.15 (s, 3H), 2.20 (d, J = 3Hz, 2H)

2.50 (s, 2H)

e) MF : $C_{11}\ H_{10}O_4$

PMR : 3.96 (s, 12mm) 6.08 (s, 8mm)

6.48 (d, J = 8Hz, 4mm), 6.68 (d, J = 8Hz, 4mm)

6.70 (dd, J = 16 & 8 Hz, 4mm),

7.38 (d, J = 16 Hz, 4mm),

9.73 (d, J = 8 Hz, 4mm)

Q3) A) Write short notes on any two of the following. **[6]**

a) Factors affecting vicinal coupling in PMR

b) DEPT Technique

c) Nuclear overhausereffect

B) Attempt any two of the following. **[6]**

a) Deduce the structure

M.F. - C_8H_9NO

CMR- 161 (d), 142(s), 125 (d,str.)
129 (d,str.), 121(d), 41(q)

b) Two isomers of $C_5H_8O_2$ show IR band at 1780 cm^{-1} Propose their structures and comment on their spliting pattern with peak areas (ratio)

c) Deduce the structure

M.F. - C_8H_8O

CMR- 50·8 (t), 52·1(d)
125·4 (st.d), 128·0(d)
128·4 (st;d), 137 (weak, s)

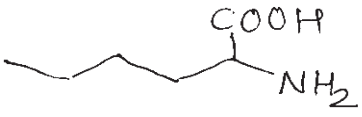
SECTION-II

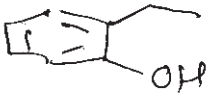
Q4) A) Suggest the genesis of the ions for any four of the following. **[8]**

a)  121, 105, 77

b)  218, 141, 113, 72, 71

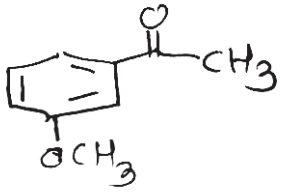
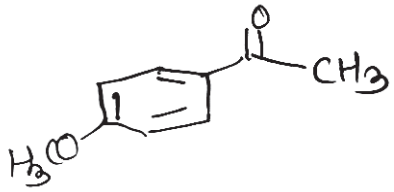
c)  130, 115, 100, 73, 43

d)  8 6, 74, 30

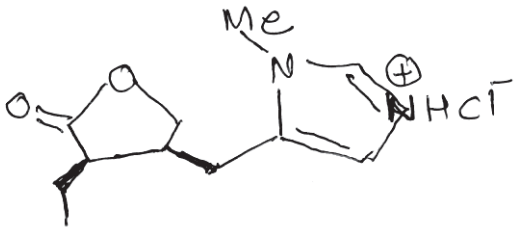
e)  122, 107, 121, 104, 77

B) Distinguish the following pairs by spectral method indicated. **[3]**

a)  and  (Mass)

b)  and  (CMR)

Q5) A) Assign the signals to the different carbons Explain your answer **[4]**



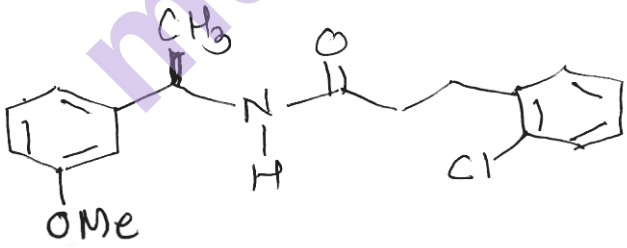
12.2 (q), 18.6 (t), 25·1(t)

34·1 (q), 36·8(d), 45·0(d)

71·8 (t), 132·2(s), 182·2(s)

117·6(d), 136·1(d)

B) Assign the following signals to different protons in the compound given below Explain NOE and decouplng experiment Justify your answer **[8]**



1.4 (d, 6·9Hz, 3H), 2·49 (t, 7·6 Hz, 2H), 3·08 (t, 7·6 Hz, 2H), 3·79 (S, 3H)

5·07 (quin, 7·1Hz, 1H), 5·56 (bd, 7·1 Hz, 1H)

6·78 (dd, 2 and 1·1 Hz, 1H), 6·8 - 6·82 (m, 2H),

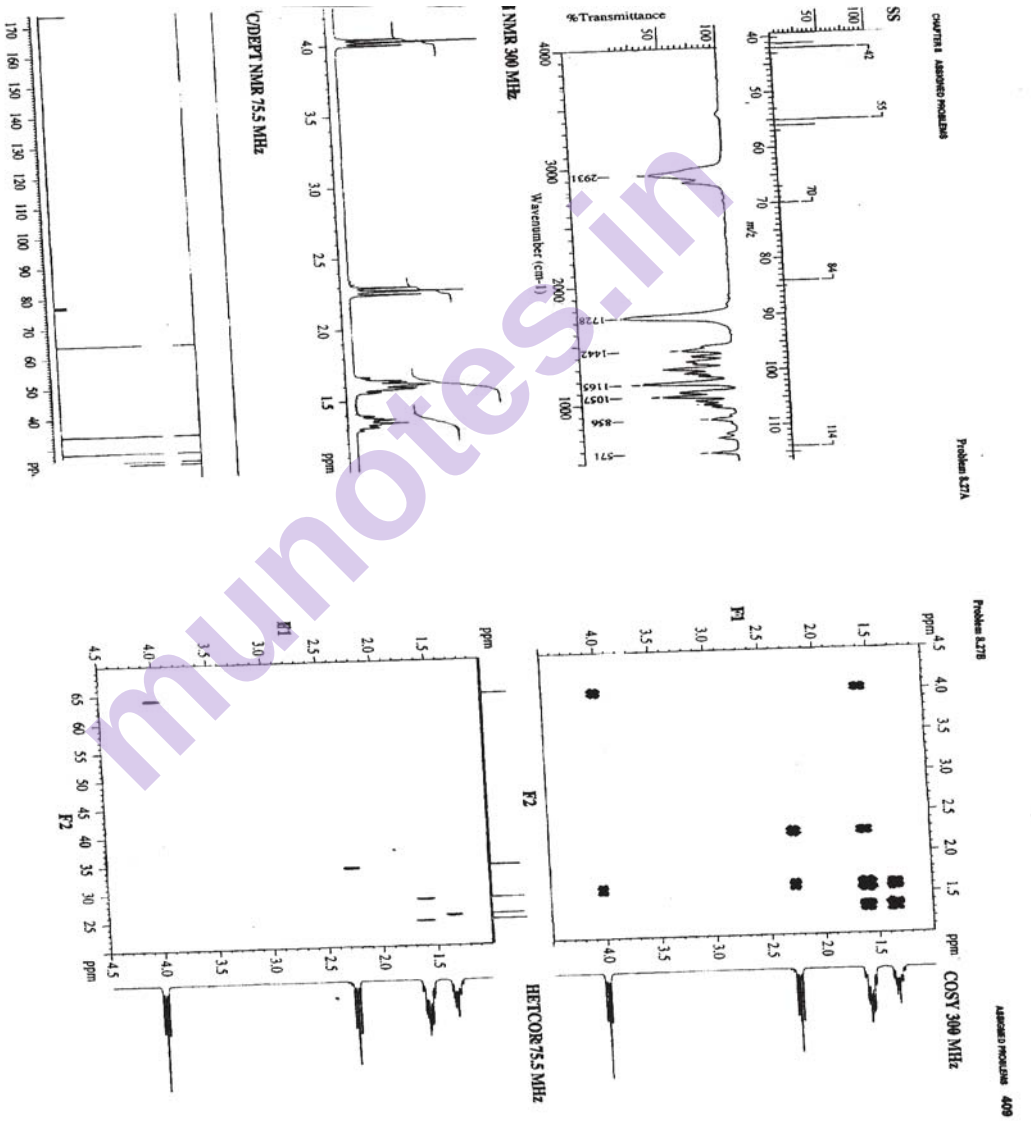
7·13-7·15 (m, 3H), 7·27 (td, 8 and 2·1 Hz, 1H)

7·3 (dd, 7·8 and 2·1 Hz, 1H)

NOE and Decoupling Experiment

Irradiation at	Change at
3.79	15%at 6·78
6·78	6·8-6·82 (dd, J = 8 & 2Hz
7·30	7·27 → t, 8Hz
	7·13–7·15 simplification

Q6) Determine the structure of the compound with the help of Following spectroscopic data. **[12]**



Total No. of Questions : 6]

SEAT No. :

P-2483

[Total No. of Pages : 2

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M.Sc. (Part - II)

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) Drug target ii) Therapeutic index

iii) Lead iv) LD_{50}

b) Give a commentary on how combinatorial chemistry, HTS and computers have aided the process of drug discovery. **[3]**

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

i) Explain the different types of dosage forms used in the formulation of drug dosage forms.

ii) What is Lead? Discuss the different strategies used in Lead discovery.

b) How can we screened Lead compounds from the followings with examples. (any two) : **[6]**

i) Natural products ii) Medical Folklore

iii) Natural Ligands

P.T.O.

Q3) a) Answer <u>any one</u> 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) Discuss the following system of medicines

I) Allopathy II) Homeopathy

b) Write a short note on (<u>any two</u>) : **[6]**

i) Carbohydrates as a drug target

ii) Proteins as a drug target

iii) FDA

SECTION - II

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

i) Infringement ii) Patentable inventions

iii) Prior art iv) Novelty

b) What is Bioavailability? Give it's types in detail. **[3]**

Q5) a) Answer <u>any one</u> of the following : **[6]**

i) Explain all the phases involved in clinical trials?

ii) What is patent? Give it's Basic and formal requirements of patents.

b) Discuss the following (<u>any two</u>) : **[6]**

i) Genototoxicity studies ii) Sub-acute toxicity studies

iii) Dose ranging studies

Q6) a) Answer <u>any one</u> of the following : **[6]**

i) Explain different routes of drug administration with examples.

ii) Give a brief history of drug discovery. What are the characteristics expected of an Ideal drug? What are the strategies to achieve these?

b) Write a short note on (<u>any two</u>) : **[6]**

i) Role of FDA and Institutional Review board in clinical trials.

ii) Preclinical testing

iii) Pharmacoeipia.

▽▽▽▽

Total No. of Questions : 6]

SEAT No. :

P2484

[Total No. of Pages : 4

[6065]-313

M.Sc. (Part - II)

DRUG CHEMISTRY

CCTP - 9, CHD - 362 : Stereochemical Principles and Applications

(2019 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

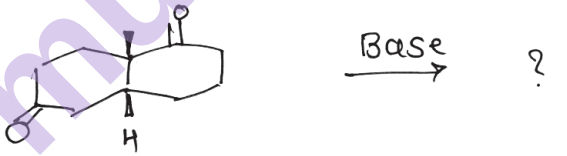
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Answers to the two sections should be written in separate answer books.***

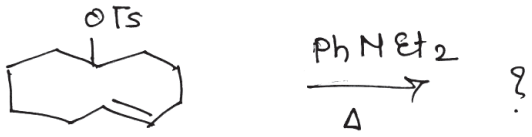
SECTION - I

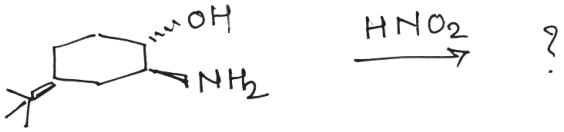
(Stereochemistry)

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

i) 

ii) 

iii) 

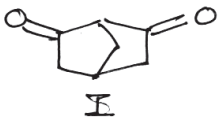
iv) 

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

P.T.O.

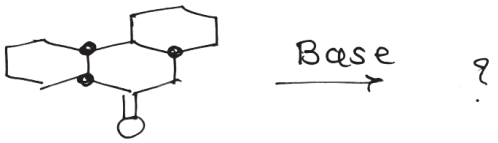
Q2) a) Answer any six of the following : **[12]**

i) Compound I do not show acidic property.



I

ii) Cis-4 hydroxy cyclohexane carboxylic acid lactonize, while the trans isomer does not.

iii) 

iv) Pyrolysis of cycloalkyl trimethyl ammonium hydroxides with 6 to 10 membered rings.

v) In 3 and 4 member rings $SP^2 \rightarrow SP^3$ is more facile process, where as in 5 member rings $SP^3 \rightarrow SP^2$ is facile. Explain.

vi) Explain 'von Auwer's - Skita' rule with exceptions.

vii) Write a note on 2-Alkyl - Ketone effect.

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

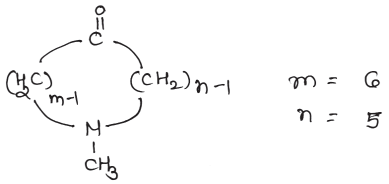
i) Write a note on thalidomide.

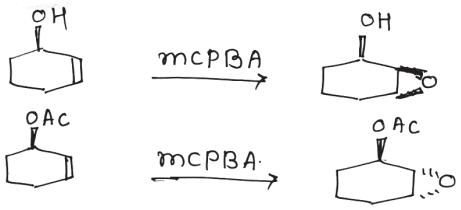
ii) Chair - boat interconversion is more facile in cyclohexanone than in cyclohexane.

iii) Which form of bicyclo [3·3·1] nonane is more stable? Why?

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

i) In the IR spectra of following aminoketone the carbonyl absorption around 1700cm^{-1} disappears on protonation.



ii) 

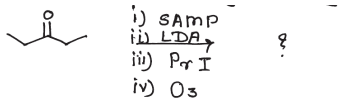
Explain the stereochemistry of the product.

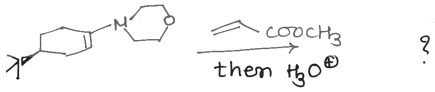
iii) Dehydrohalogenation reaction of neomenthyl chloride and menthyl chloride with base. Explain.

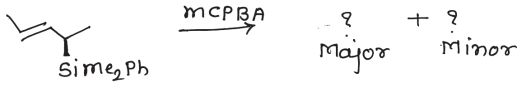
SECTION - II

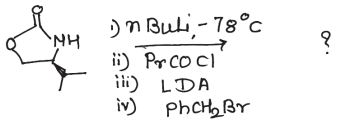
(Principles and Applications of Asymmetric synthesis)

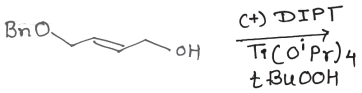
Q4) a) Predict the product/s of the following and explain stereochemical principles involved. Justify. (any four) **[8]**

i) 

ii) 

iii) 

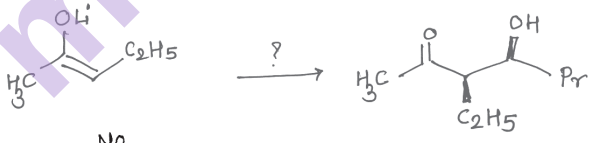
iv) 

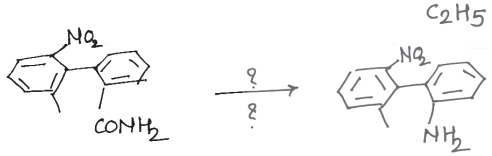
v) 

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

Q5) a) Suggest the reagent and stereochemistry of the following reactions. (any two). **[6]**

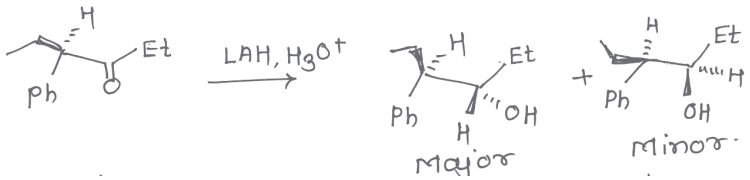
i) 

ii) 

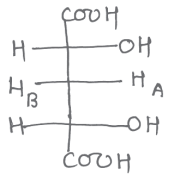
iii) 

b) Attempt the following (any three) **[6]**

i) Using Felkin rule, explain the following transformation.



ii) Identify pro R and pro S hydrogen atoms in the following compounds.

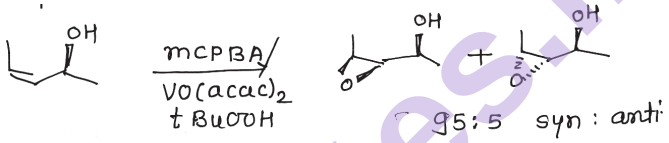


iii) Identify the following compounds as Re/Si faces.

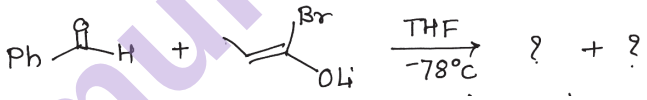
d) Explain use of chiral solvating agents.

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

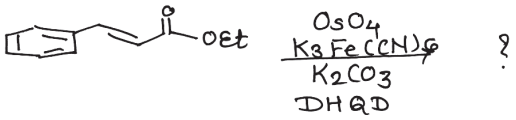
i) Explain the observation



ii) Predict the product with stereochemistry and explain the formation of major product.



iii) Predict the product of the following reaction with stereochemistry.



b) Write a short note (any two) **[6]**

i) Sharpless Asymmetric Epoxidation.

ii) Concept of Natural Pool Strategy.

iii) Cram's Chelate Model.

Total No. of Questions : 6]

SEAT No. :

P2485

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M.Sc.-II

DRUG CHEMISTRY

CBOP-3, 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.***
2) ***Figures 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]**

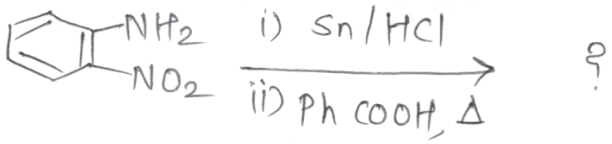
i) Explain the synthesis of benzofuran from salicyldehyde.

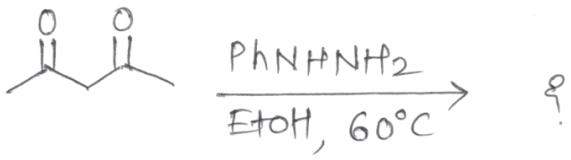
ii) Coumarin is easily attacked by electrophilic as well as nucleophilic reagents.

iii) Indole undergoes electrophilic substitution at C-3 position.

iv) 2-Quinolone can be prepared by the reaction of 2-aminoquinoline with $NaNO_2$/HC1

b) Predict the product in the following. **[3]**

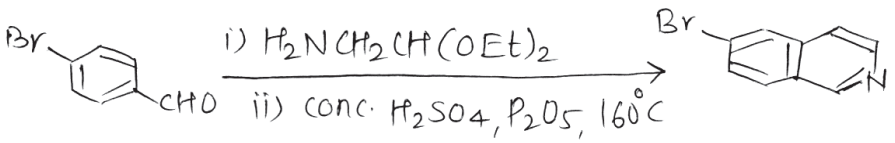
i) 

ii) 

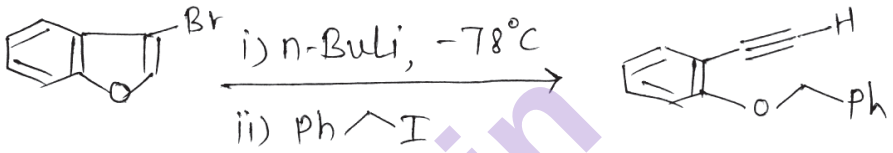
P.T.O.

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

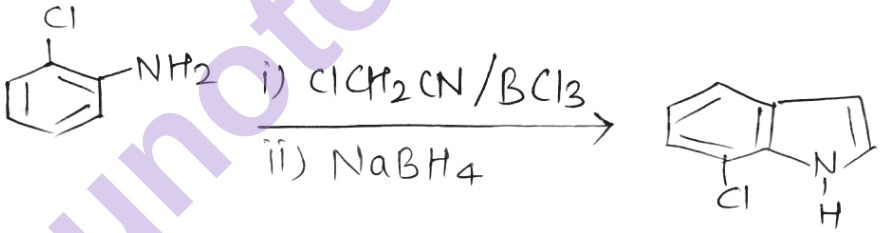
a) i)



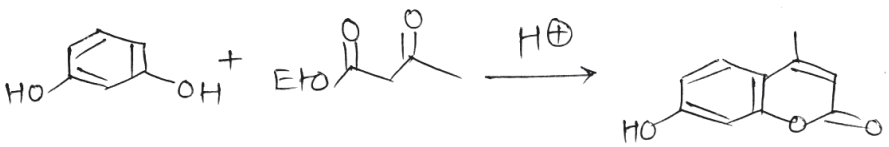
ii)



b) i)



ii)



B) Write short notes on any two of the following **[6]**

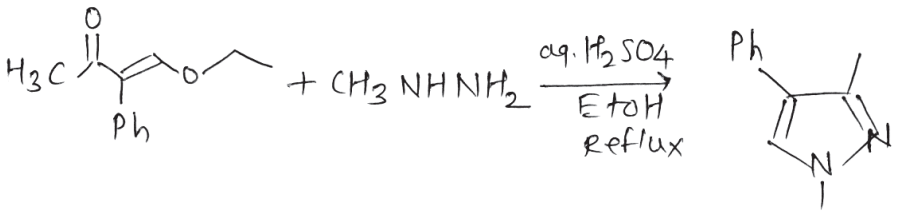
a) Skraup Quinoline synthesis

b) Madelung Indole synthesis

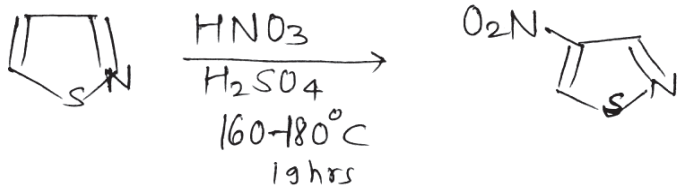
c) Pictet-Spengler Isoquinoline synthesis

Q3) A) Suggest the suitable mechanism for any one of the following. **[6]**

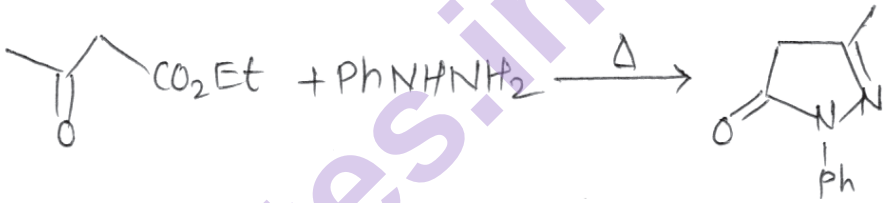
a) i)



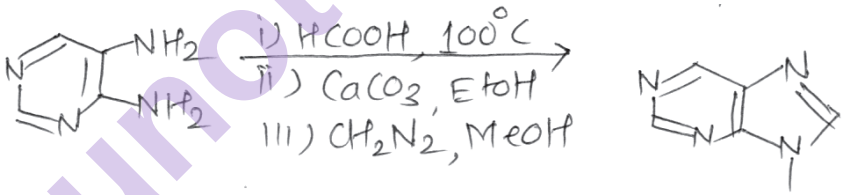
ii)



b) i)



ii)

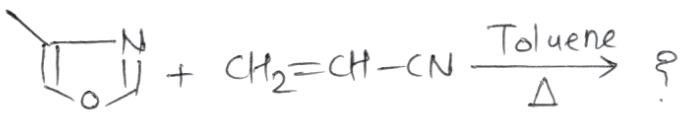


B) Answer any two of the following. **[6]**

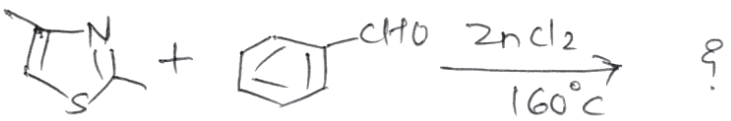
a) Imidozole can be used as an effective catalyst in ester hydrolysis. Explain.

b) Write notes on Perkin synthesis of coumarin

c) Predict the product in the following.

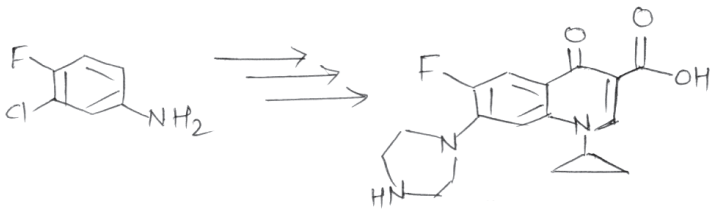


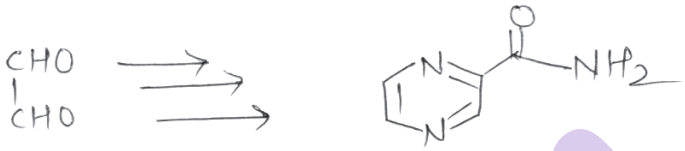
and

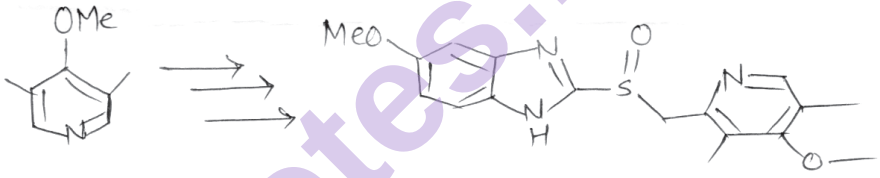


SECTION-II

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

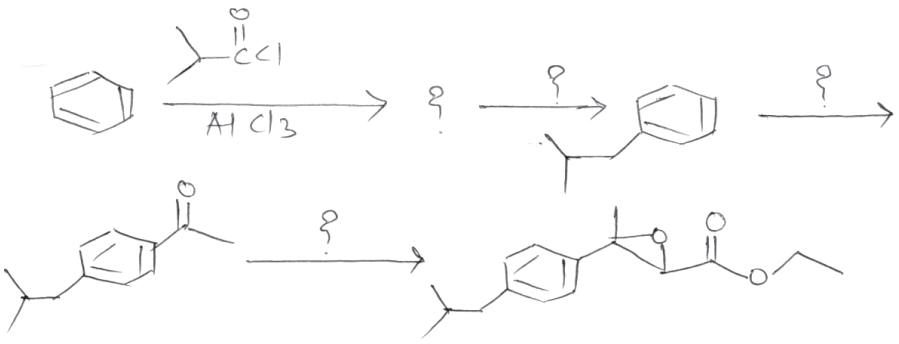
i) 

ii) 

iii) 

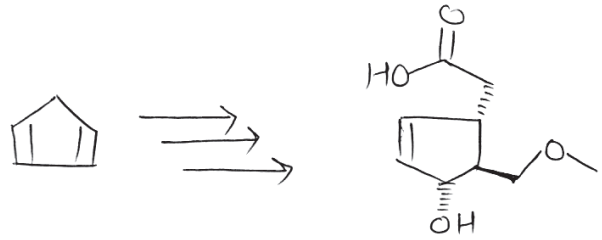
vi) 

b) Insert the missing reagents/products in the following sequences of reactions. Explain the steps with mechanism. **[3]**

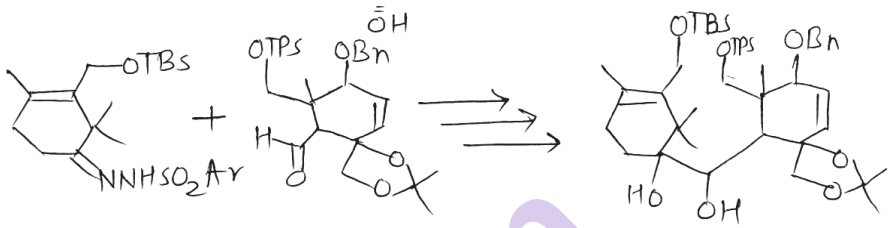


Q5) A) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved in all steps (any one) **[6]**

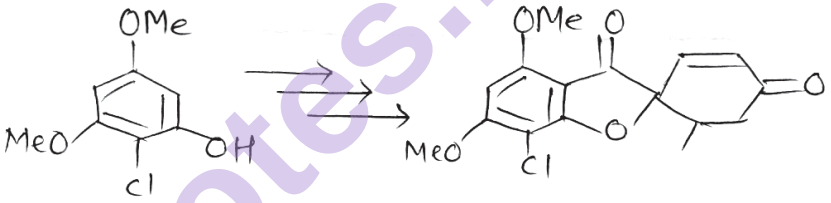
a) i)



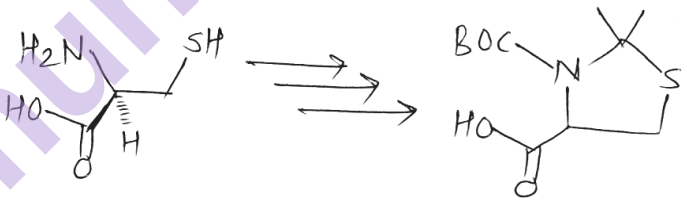
ii)



b) i)

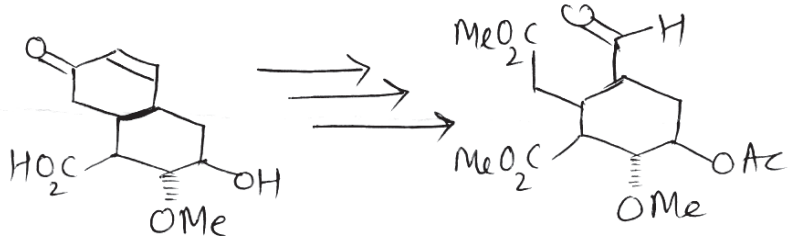


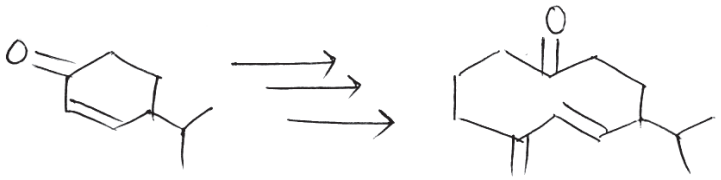
ii)

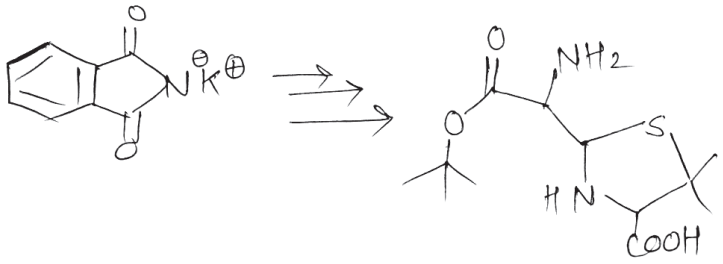


B) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved (any two) **[6]**

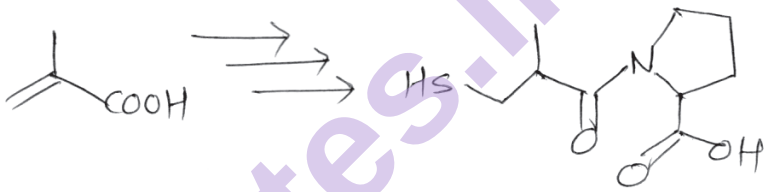
a)

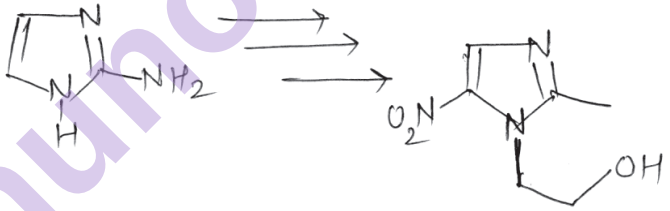


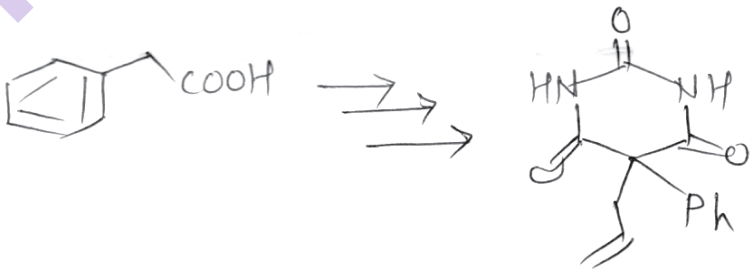
b) 

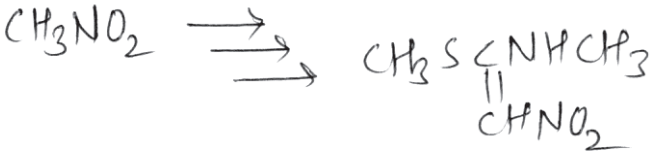
c) 

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

a) i) 

ii) 

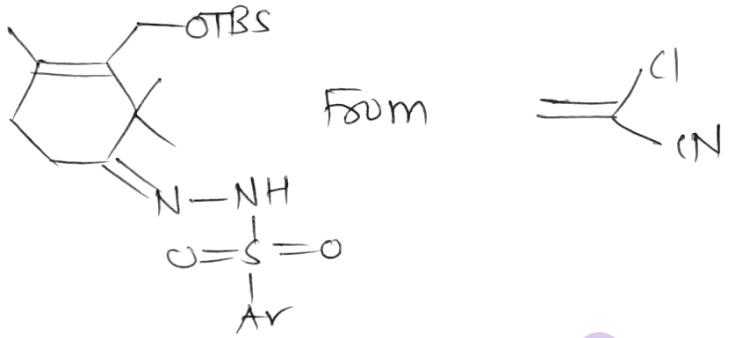
b) i) 

ii) 

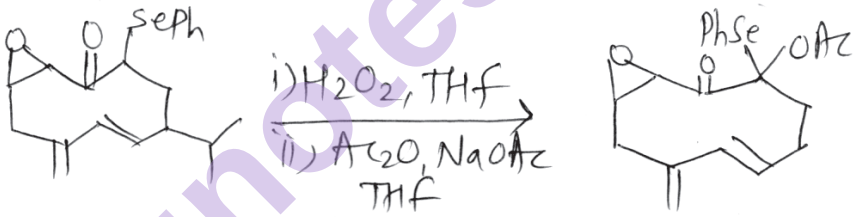
B) Answer any two of the following. **[6]**

a) Use of Wittig Horner reaction in prostaglandin synthesis.

b) Devise a synthetic pathway for the following from the starting compound shown.



c) Explain the mechanism in the following.



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Total No. of Questions : 6]

SEAT No. :

P2486

[Total No. of Pages : 4

[6065]-315

M.Sc.-II

DRUG CHEMISTRY

CBOP-3, CHD-363 (B)

(SEC-I TO SEC-III -any two)

Section I - Immunology and Microbiology

Section II - Bioinformatics, Biostatistics in Drug Discovery

Section III - Enterpreneurship 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 indicate full marks.***
5) ***Answer to the two sections should be written in separate answer books.***

SECTION-I

Immunology and Microbiology

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

i) What are the methods used for isolation of micro-organisms. Describe any one in detail.

ii) Discuss in brief cell mediated and antibody mediated immunity.

b) Write short notes on the following. **[5]**

i) T and B lymphocytes

ii) Designing fermentation media

P.T.O.

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

a) Comment on any two methods of strain improvement of bacterium used in fermentation.

b) Explain the following terms.

i) Phagocytosis

ii) Passive immunity

c) Differentiate between innate and adaptive immunities.

d) How bacteria are classified based on requirement of 'c' and energy source.

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

a) Describe primary and secondary immune response.

b) Describe the different parts of industrial scale fermenter.

c) Discuss the need for treatment of an effluent from drug manufacturing industry.

d) What are monoclonal antibodies? Explain its production.

e) Explain ELISA Technique.

SECTION-II

Bioinformatics, Biostatistics in Drug Discovery

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

i) Write a short note on-Applications of genomics.

ii) Explain in brief-Docking.

b) Explain the terms Negative correlation and chi-square test with their significance. **[5]**

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

a) Define bioinformatics and write a note on biological databases.

b) Define proteomics and explain the techniques used in proteomics.

c) Discuss the steps involved in structure based drug designing.

d) What is chemoinformatics? Explain SMILE notations.

e) Define Metabolomics. Comment on its importance over genomics and proteomics.

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

a) Define the following terms.

i) Correlation

ii) Standard deviation

iii) Frequency of class

iv) Coefficient of variation

b) 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

Determine the variane and standard deviation of the above distribution.

c) Compute correlation for import of raw material export of finished products.

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

d) Calculate the mean and standard deviation and median for the following data.

Weight of the eight eggs layed by a hen is recorded as

60, 56, 61, 68, 58, 69, 51, 54

SECTION-III

Enterpreneurship Development

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

i) Differentiate between Intrapreneur and Enterpreneur.

ii) Explain Leibenstein's X-efficiency theory.

b) Write short nots on the following. **[5]**

i) Conducting feasibility studies

ii) Danhof's classification of Enterpreneurship

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

a) What are the steps involved in business plan process. Explain in brief.

b) Discuss about enterpreneurial search and identification.

c) Discuss factors affecting enterprenurial growth.

d) Enterpreneurship does not emerge spontaneously Explain.

Q6) Explain the following (any four) **[12]**

a) What are common errors made in writing a business plan that make it failure.

b) Explain the problems faced by women enterpreneur.

c) Write a note on Innovation theory of Enterpreneurship by schumpeter.

d) Write a note on-Types of enterpreneur.

e) Explain the apportunities for small enterpreneurs in India.

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Total No. of Questions : 6]

SEAT No. :

P2487

[Total No. of Pages : 3

[6065]- 411
S.Y. M.Sc.
DRUG CHEMISTRY
CCTP-10 : 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) ***Answers to the two sections should be written in separate answer sheets.***

SECTION - I

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

i) Discuss in brief the tuberculosis and its treatment.

ii) Discuss the uses and mode of action of gentamicin and clavulanic acid.

b) Discuss in brief the following classes of drug molecules. **[5]**

i) Antimetabolites

ii) Plant products

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

a) Discuss the development of cephalothic, cefalexin, and cefotaxim from cephalosporin-C. What are the benifits achieved in each case.

b) Explain various steps involved in protein synthesis. Discuss the uses and mechanism of action of tetracyclines and aminoglycosides.

c) What are the functions of cell wall and cell membrane of bacteria? How do B-lactam antibiotics and polyene antibiotics affect their functions? Explain.

d) What are antibiotics? Give the classification of antibiotics with suitable examples. Discuss the selective toxicity of antibiotics.

e) Give a brief commentory on carbapenems.

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

a) Give a brief overview of the common viral infections. Explain the HIV Life cycle and drugs used for treatment of AIDS.

P.T.O.

b) How do alkylating agents exhibit their effect? Discuss the development of aromatic mustards starting from the discovery of mustard gas.

c) Give the treatment of following disorders

i) Malaria

ii) Leprosy.

d) Write a short note on Antifungal agents.

SECTION - II

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

i) Discuss in brief hyperacidity and its treatment

ii) Give a brief account of diabetis management.

b) Write short notes on the following. **[5]**

i) Mechanism of pain and pain management

ii) Anticonvulsants.

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

a) Discuss the arachidonic acid pathway to prostaglandins and thromboxanes. How do anti-inflammatory agents exhibit their effect.

b) Explain the common disease associated with cardiovascular system. Discuss the approaches to treat angina and cardiac arrythmia. Explain the mechanism of one drug in each.

c) Discuss in brief the role of following compounds in treatment of CNS disorders.

i) Benzodiazepines

ii) Serotonin reuptake inhibitors

d) Explain how the following groups of drugs help in management of CVS disorders

i) Calcium channel blockers.

ii) Cardiac glycosides.

e) Discuss in brief the following GIT disorders and their treatment.

i) Emesis

ii) Ulcers.

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

a) Discuss in brief the organization and functioning of the Endocrine system. Explain the negative feedback mechanism with suitable example. Explain the role of hormones in feedback mechanisms.

b) Explain in brief the biological basis of depression. What are the different approaches to treat depression.

c) The following drugs are known to have CNS/CVS effect. Explain their molecular mechanism of action.

i) Imipramine

ii) Valporic acid

iii) Captopril

iv) Propranolol.

d) Discuss the following in brief.

i) Vasodilators

ii) Na^+/K^+ ATPare inhibitors Discuss their mode of action and uses.

Total No. of Questions : 6]

SEAT No. :

P2488

[Total No. of Pages : 3

[6065] - 412

M.Sc - II DRUG CHEMISTRY

CCTP - 11, 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 Maximum marks.***

SECTION-I

Q1) A) Define the following. **[8]**

a) AFFinity

b) EFFicacy

c) Potency

d) Antagonist

B) Make a comment on pharmacophore identification. **[3]**

Q2) A) Attempt any one from the following. **[6]**

a) How are the following are calculated or determined experimentally in QSAR.

i) E_s

ii) Optimum logP

iii) 6

iv) π

b) Give a comment on case studies of Artemisinin and related Antimalarial drugs.

P.T.O.

B) Explain any two of the following. **[6]**

a) Craig plot

b) Topliss scheme

c) Design of Antagonist

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

a) Discuss the various theories of drug-receptor interactions.

b) Discuss in brief.

i) Equation of Best fit

ii) COMSIA

iii) 3D QSAR

B) Explain any two of the following. **[6]**

a) Intracellular receptor.

b) Applications of prodrug

c) Design of Agonist

SECTION-II

Q4) A) Define the following. **[8]**

a) Genome

b) Scaffold

c) Pharmacophore

d) Apoptosis

B) What is combinatorial chemistry? Discuss how it is used to make Large number of compounds. **[3]**

Q5) A) Answer any one of the following. **[6]**

a) Explain De NoVo design method used in designing of molecules, When structure is unknown?

b) Explain recombinant DNA technology. Discuss various steps involved in it.

B) Discuss any two of the following. **[6]**

a) Dynamic combinatorial synthesis.

b) Genetic engineering.

c) Molecular dynamics.

Q6) A) Answer any one of the following. **[6]**

a) What is solid phase synthesis ? Discuss how is technique applied to synthesize combinatorial Libraries.

b) Explain the following recombinant DNA products:

i) Hormones

ii) Enzymes

iii) Vaccines

B) Write a short Note on (any two): **[6]**

a) On bead and Off bead screening

b) Genetic illness

c) Haughton's teabag procedure

Total No. of Questions : 6]

SEAT No. :

P-2489

[Total No. of Pages : 8

[6065]-413
S.Y. M.Sc.
CHEMISTRY
Drug Chemistry
CBOP-4 : CHD-462(A) : Advanced Synthetic Methods in Chemistry
(2019 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 70*

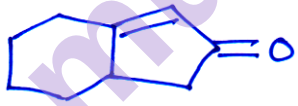
Instructions to the candidates:

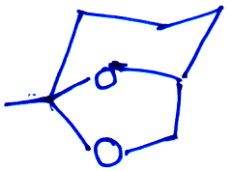
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Answers to the two sections should be written in separate answer books.***

SECTION - I

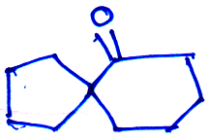
Designing of Organic Synthesis

Q1) A) Using retrosynthetic analysis, suggest a suitable method to synthesize the following compounds. **[8]**

i) 

ii) 

iii) 

iv) 

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

i) DCC

ii) Ethyl ethylthiomethyl Sulfoxide

P.T.O.

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

i) a) Give the synthetic equivalent of the following synthon with example.

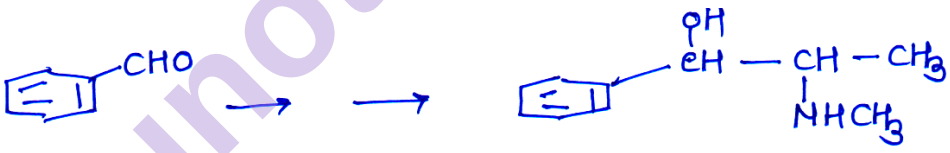
I)  II)  III) 

b) Complete the following conversion by using suitable reagents.

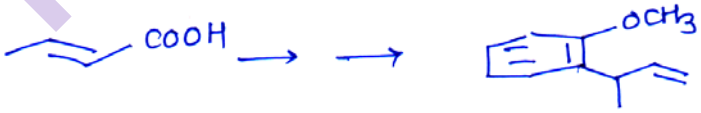
ii) a) Benzyloxycarbonyl group is preferred protection than benzyle group for amino protection during peptide synthesis. Explain.

b) Explain that umpolung method is employed to obtain 1, 2 dicarbonyl compounds.

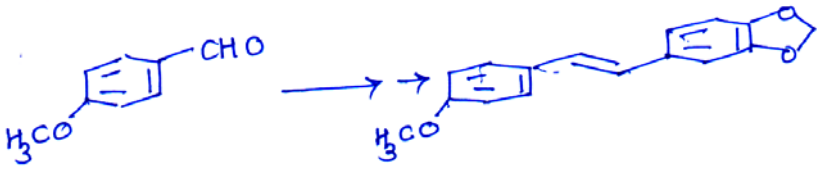
B) Arrange the reagents in proper order write mechanism and structures of the intermediate. (Any Two). **[6]**

i) 

Sn/HCl ; $CH_3-CH_2-NO_2/K_2CO_3$; 1 eq. CH_3I

ii) 

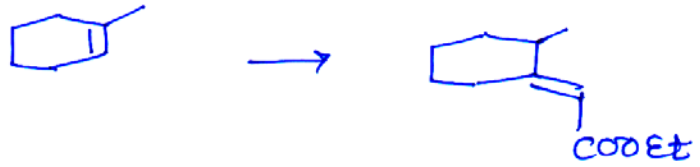
DMS/K_2CO_3 ; PBr_3 ; LAH ; $\Delta, 200^\circ C$; PhOH ; K_2CO_3

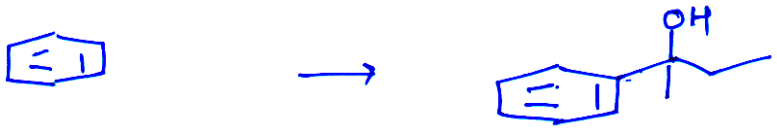
iii) 

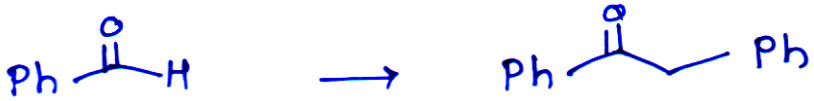
KO^tBu ;  TsOH ; TsCl ; n BuLi ; $NaBH_4$;

 ; aq. $HgCl_2$.

Q3) A) Complete the following conversions by using suitable reagents [Any Three] : **[6]**

i) 

ii) 

iii) 

iv) 

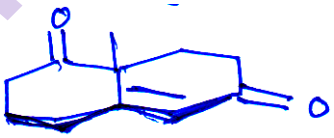
B) Answer <u>any Two</u> of the following. **[6]**

i) Explain the role of following reagents in organic synthesis.

I) TBDMSCI II) 1, 3 dithiane

ii) Write two methods for the synthesis of 1,2 dicarbonyl compounds.

iii) Explain the retrosynthetic route for the following and suggest the synthesis.



SECTION - II

Q4) A) Answer any four of the following : **[8]**

i) Ortho substituted 1, 3 dimethoxy benzene derivatives can be synthesized from 1,3 dimethoxy benzene using organolithium compound.

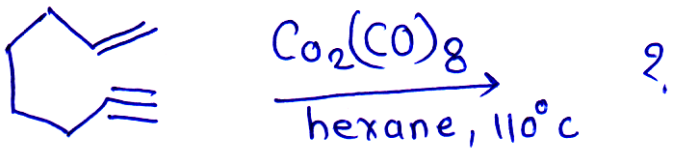
ii) Diisopino camphenyl borane show higher enantioselectivity for cis alkene.

iii) 3° amine does not show Mannich reaction.

iv) Enlist the component of an UGI Reaction

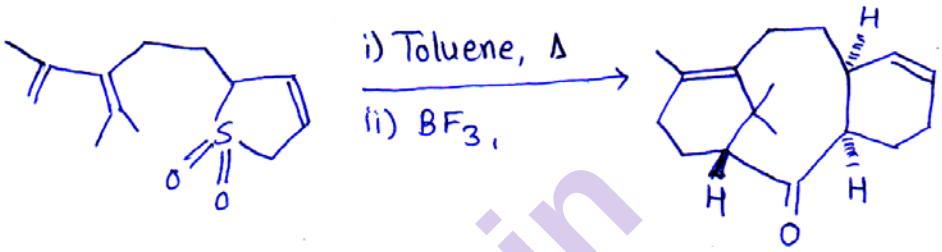
v) Explain the carbonation in Reppe reaction.

B) Write the product and suggest the mechanism. **[3]**

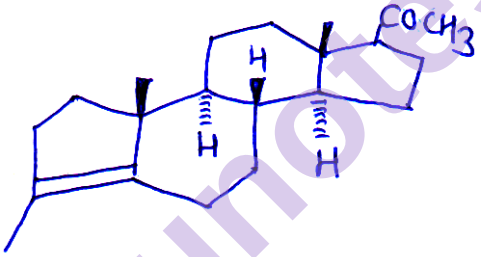


Q5) A) Answer any two of the following. **[6]**

i) What is Domino reaction? Explain the step involved in following conversion.



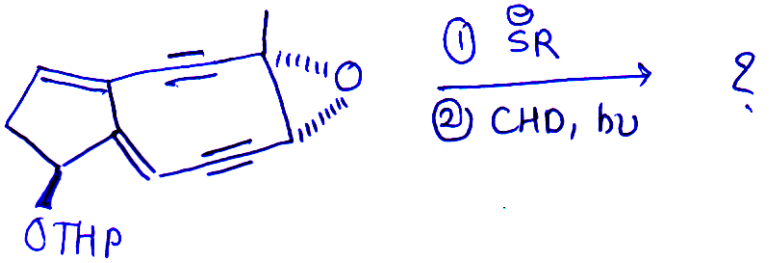
ii) Explain the biomimetic approach to retrosyntheis to obtain the following compound.

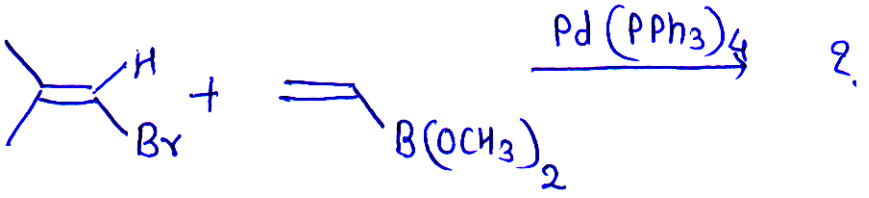


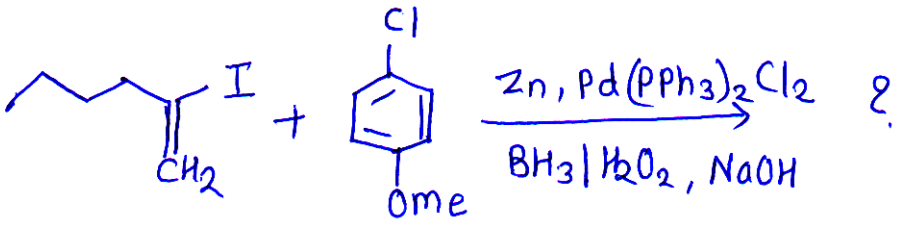
iii) Carry out the following transformation using Boron transition metal chemistry

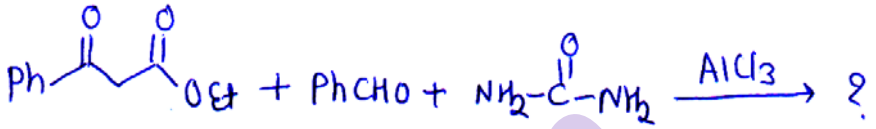
B) Predict the production of any three of the following : **[6]**

i)



ii) 

iii) 

iv) 

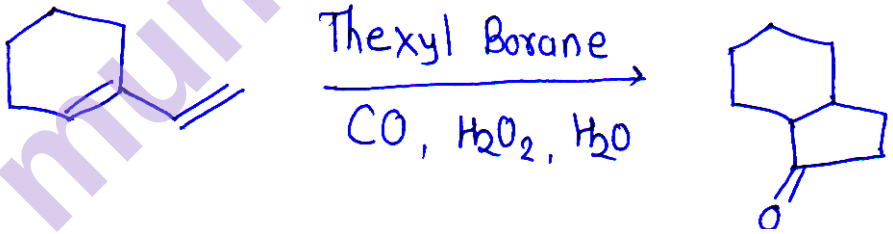
Q6) A) Write Short Notes on any two of the following. **[6]**

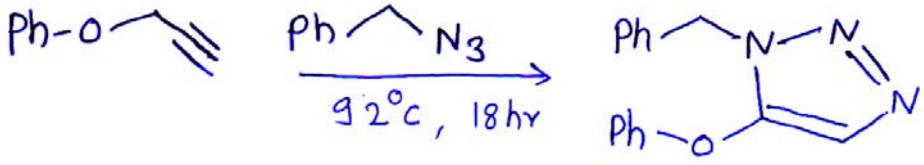
i) Applications of organo phosphorous

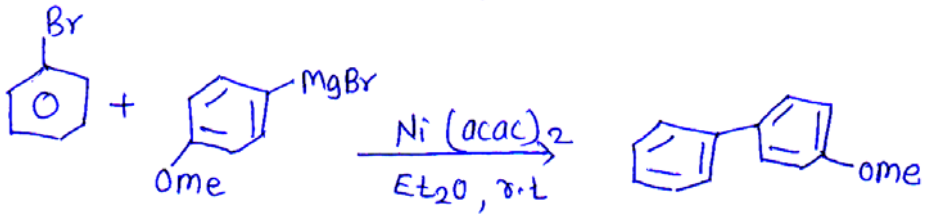
ii) Oxo process

iii) UG Reaction

B) Suggest the mechanism of any two of the following. **[6]**

i) 

ii) 

iii) 

Total No. of Questions : 6]

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[6065]-413
S.Y. M.Sc.
CHEMISTRY
Drug Chemistry
CBOP-4 : CHD-462(B) : 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) ***Figures to the right indicate maximum marks.***
3) ***Answers to the two sections should be written in separate answer books.***

SECTION - I

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

i) Discuss various properties of covalent bonds with their significance in supramolecular chemistry.

ii) What are the different intermolecular Forces? How do they assist molecular recognition processes?

b) Attempt the following. **[5]**

i) Write a short note on principles of green chemistry.

ii) Discuss in brief the use of 'Ionic Liquids' in organic synthesis.

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

a) Explain the use of H-bonding in self-Assembly of organic supramolecular structures.

b) Discuss the design principles of molecular receptors.

c) Explain tetrahedral recognition by macrocyclic cryptands

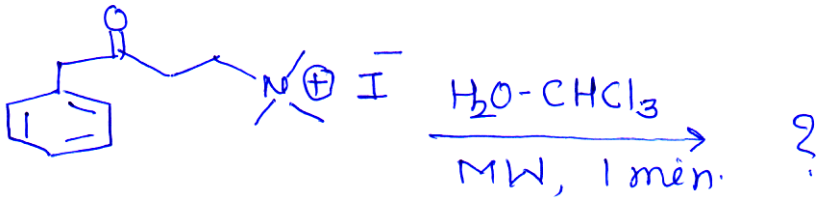
d) Discuss Heck reaction in aqueous phase for the synthesis of substituted cinnamic acids.

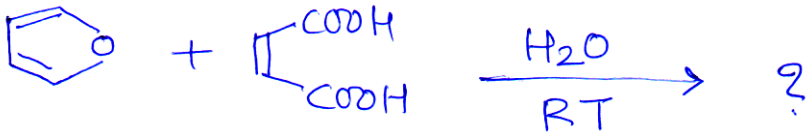
e) Write a short note on solvent free reactions.

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

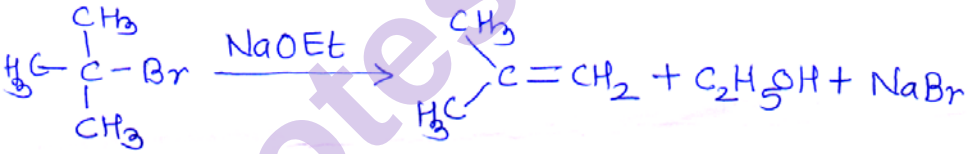
a) Explain solid phase synthesis in brief. Discuss solid phase Michael addition reaction.

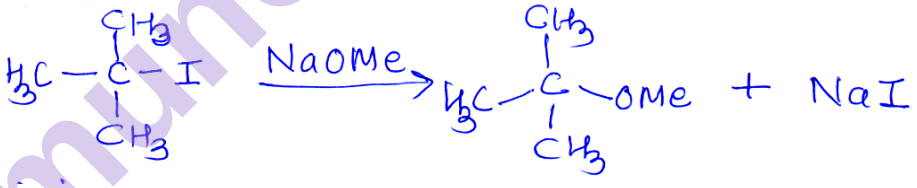
b) Identify the products in Following reactions.

i) 

ii) 

c) Calculate atom economy of the following reactions

i) 

ii) 

d) Explain the transport processes with the help of cation carriers.

e) Discuss the use of cyclodextrins in supramolecular synthesis.

SECTION - II

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

i) Discuss different instrumental techniques in Forensic analysis.

ii) Write a short note on detection of drugs on the basis of their metabolic studies.

b) Explain the following. **[5]**

i) Spot tests and microcrystal tests

ii) Drug abuse

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

a) Discuss designer drugs with reference to forensic investigation

b) What are different types of fingerprints. Explain powder method of fingermark development.

c) How is heroin isolated from sample?

d) How are barbiturates isolated from biological samples.

e) Write a short note on preservation and identification of finger prints.

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

a) Give a brief explanation on development, evaluation and analysis of footprints.

b) Explain how analysis of NDPS in antemortem and postmortem blood is done?

c) Explain urine analysis of narcotic and psychotropic substances. What are the advantages and limitations of urine analysis.

d) Discuss the classification of drugs.

e) Discuss the following :

i) Illict trafficking

ii) Collection of Drugs as Forensic Evidences