Total No. of Questions : 6]

SEAT No. :

PD-3254

[Total No. of Pages : 2

[6478]-301

M.Sc. - II

DRUG CHEMISTRY

CHD-601 MJ : Drug Discovery and Development

(2023 Pattern) (Semester - III) (4 Credits)

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 book.***
3) ***Figures to the right indicate full marks.***
4) ***Draw the neat labelled diagram wherever necessary.***

SECTION - I

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

i) Give in brief classification of drug.

ii) Define

I) Pharmacodynamics

II) Pharmacokinetics

iii) Write a note on Therapeutic index.

iv) Define lead compound.

b) Make a comment on Ayurveda system of medicine. **[3]**

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

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

ii) Explain different routes of drug administration.

b) Discuss how the active ingradients are isolated from the following sources with examples (any two) : **[6]**

i) Microbial ii) Natural products

iii) Me too drugs

P.T.O.

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

i) Explain the following system of medicine

I) Allopathy II) Homeopathy

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

b) Write a short note on following drug targets (any two) : **[6]**

i) Carbohydrates ii) Lipids

iii) Proteins

SECTION - II

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

i) Placebo ii) Drug

iii) Pilot plant iv) Drug target

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

Q5) a) Answer any one of the following : **[6]**

i) What is patent? Give it's basic and formal requirements of patents.

ii) What is Bioassays? Explain need of Bioassays. Give in detail the type of Bioassays.

b) Discuss the following (any two) : **[6]**

i) Genotoxicity studies ii) Sub-acute toxicity studies

iii) Dose ranging studies

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

i) Give a brief account of the clinical trails.

ii) Give a brief account of the function performed by the following in a pharma industry.

I) Documentation II) QA and QC

III) R and D

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

i) FDA

ii) Pre-clinical testing

iii) GMP

Total No. of Questions : 6]

SEAT No. :

PD-3255

[Total No. of Pages : 6

[6478]-302

M.Sc. - II

DRUG CHEMISTRY

CHD-602 MJ : Spectroscopic Methods in Structure Determination

(2023 Pattern) (Semester - III) (4 Credits)

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

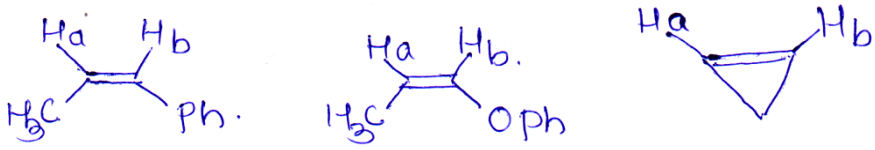
Instructions to the candidates :

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) Answer the following (any four) : **[8]**

i) Arrange the following compounds with increasing order of coupling constant between H_a and H_b protons. Justify your answer.



ii) A compound with molecular formula C_3H_7NO shows signals at 14.3(q), 21.5(t), 155.2(s) in its CMR spectrum. Deduce the structure.

iii) In the mass spectrum of O-dichlorobenzene, three peaks are observed at m/e 96, 98, 100 in the intensity ratio of 9 : 6 : 1. Explain.

iv) A proton shows signal at 4.5 ppm on 60 MHz instrument. What will be the line position in Hertz on 300 MHz instrument?

v) Distinguish following compounds by PMR spectroscopy.

P.T.O.

b) A basic compound with molecular formula $C_{10}H_8N_2$ shows the following signals in its CMR spectrum. Deduce the structure of the compound CMR : 124.7 (d), 128.2 (d), 141.6 (d), 154.0 (d), 160.6 (s). **[3]**

Q2) **Deduce the structure (any four) :** **[12]**

a) A compound shows following spectral data

IR : 3500-2500 broad, 1680 cm^{-1}

CMR : Four peaks in the region 125-145 ppm

Mass : 136(M^+), 119, 92, 91 (100%), 65, 39

b) MF : $C_9H_{16}O_4$

IR : 1750, 1735 cm^{-1}

CMR : 10 (q), 12 (q, str), 20 (t), 48 (d), 58 (t, str), 158 (s)

PMR : 0.9 (t, 7Hz, 3H), 1.9 (q, 7Hz, 2H), 3.2 (t, 7Hz, 1H), 1.3 (t, 6.5Hz, 6H), 4.3 (q, 6.5Hz, 4H)

c) MF : $C_8H_8O_2Cl_2$

PMR : 1.45(1H, d, 12Hz), 1.60(3H, s), 2.29(1H, d, 12Hz), 3.77(3H, s)

CMR : 18, 31, 35, 53, 63, 170

DEPT 90 : No Peak

DEPT 135 : 18, 53 up; 31 down

d) MF : $C_8H_{12}O$

IR : 2740, 1685, 1618 cm^{-1}

CMR : 188.2(d), 153.4(s), 152.7(d), 43.6(s), 40.8(t) 30.3(t), 29.5(q)

PMR : 1.25(s, 6H), 1.83(t, 7Hz, 2H), 2.5(dt, 7 & 2.6Hz, 2H) 6.78(t, 2.6Hz, 1H), 9.82(s, 1H).

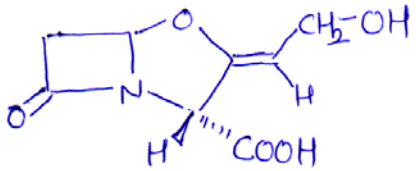
e) MF : $C_{12}H_{14}O$

IR : 2240 cm^{-1}

Mass : 174, 156, 141, 102, 43

CMR : 132 d (str), 128.5 (d, str), 128 (d), 122 (s, w), 92 (s, w), 82 (s, w), 68 (s, w), 36 (t), 28 (q), 8 (q).

Q3) a) Assign the chemical shifts to the different protons of the following compound. Justify your answer. **[6]**



3.05 (d, 18Hz, 1H), 3.60(dd, 18 & 2.5Hz, 1H) 4.75(d, 7.5Hz, 2H), 4.95(bs, exch. 1H), 5.66(s, 1H), 5.78(t, 7.5Hz, 1H), 6.0(d, 2.5Hz, 1H), 11.3(s, 1H).

Decoupling Experiment :

Irradiation of 6.0 changes 3.6 to a doublet J = 18 Hz.

In NOE experiment 30% increase in intensity of 5.78 on irradiation of 4.75.

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

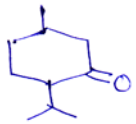
i) Lanthanide shift reagents

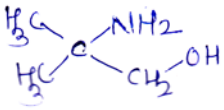
ii) Mc Lafferty Rearrangement

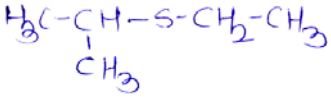
iii) Soft Ionization Techniques

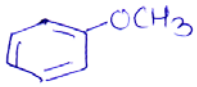
SECTION - II

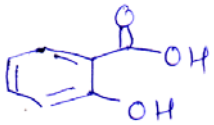
Q4) a) Write the genesis of fragment ions (any four) **[8]**

i)  112, 84, 69

ii)  74, 58, 31

iii)  104, 89, 61, 47

iv)  108, 93, 78, 77

v)  138, 120, 92, 64

b) Deduce the structure of a compound whose elemental analysis shows C = 64.3% and H = 8.8% **[3]**

IR : 1195, 1670, 1720 cm^{-1}

Mass : 114, 99, 86, 69, 41

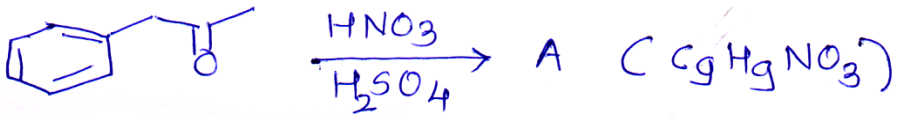
PMR : 1.3 (t, 7Hz, 3H), 2.0 (d, 7Hz, 3H), 4.2(q, 7Hz, 2H), 5.8 (d, 16Hz, 1H), 6.9(dq, 16 & 7Hz, 1H)

Q5) a) Answer the following (any two) : **[6]**

i) A carboxylic acid having molecular formula $C_{10}H_{12}O_2$ exhibits ions at 164(M^+), 149(100%) 119, 105, 91, 79, 77. Deduce the structure.

ii) A trisubstituted benzene having one bromine and two methoxy groups, exhibits three aromatic signals at 6.40, 6.46 and 7.41. Write the possible structure and explain.

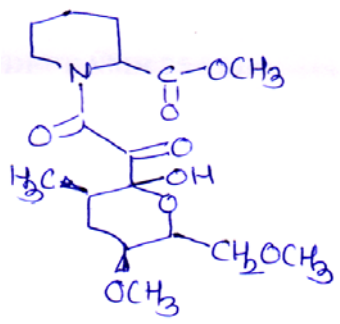
iii) Predict the product for following reaction whose spectral data is given below.



PMR : 2.30 (s, 3H), 4.13 (s, 2H),
7.27 (dd, 1.2 & 7.5 Hz, 1H)
7.43 (dt, 1.2 & 7.5Hz, 1H)
7.58 (dt, 1.2 & 7.5Hz, 1H)
8.08 (dd, 1.2 & 7.5Hz, 1H)

CMR : 29.8 (q), 48.3 (t), 124.9 (d), 128.2 (d), 130.2 (d), 133.4 (d), 133.5 (s), 203.5 (s), 148.4 (s).

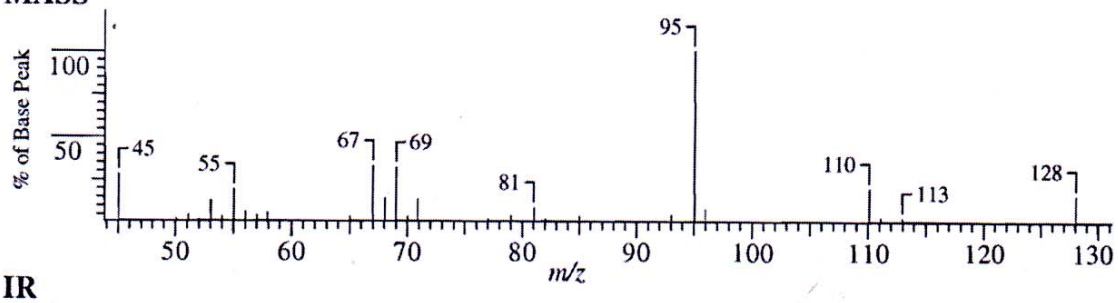
b) Assign the signals to the different carbon atoms of the following molecule. Explain **[6]**



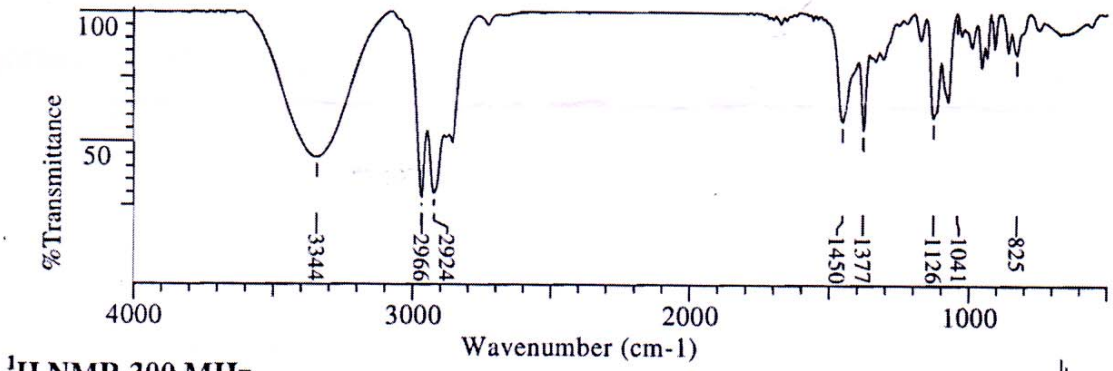
195.4 (s), 170.4 (s), 165.6 (s),
98.0 (s), 74.5 (d), 72.8 (d),
72.2 (t), 58.4 (q), 56.3 (q),
52.4 (q), 51.5 (d), 39.1 (t),
34.2 (d), 31.7 (t), 26.5 (t),
24.4 (t), 21.2 (t), 15.5 (q)

Q6) You are provided with the spectra of a compound. Analyze these spectra and deduce the structure of a compound and justify. **[12]**

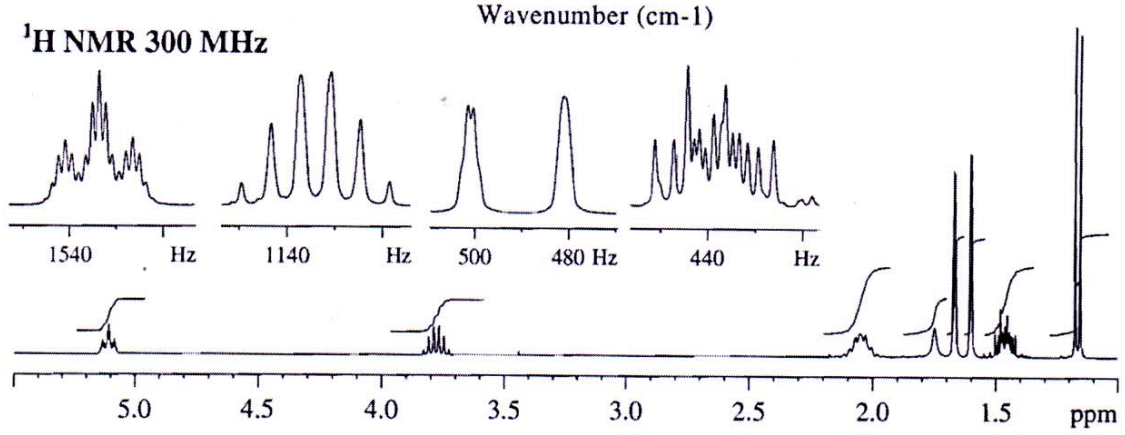
MASS



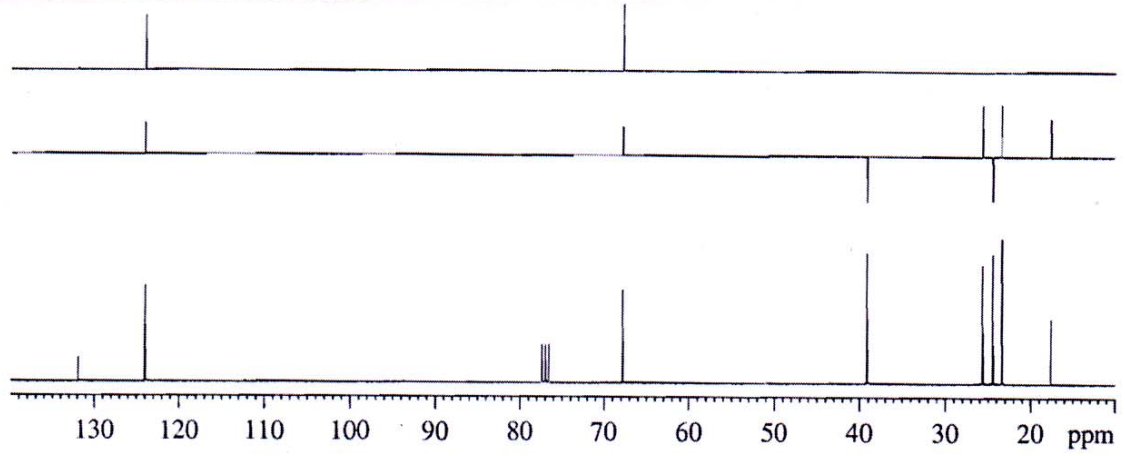
IR

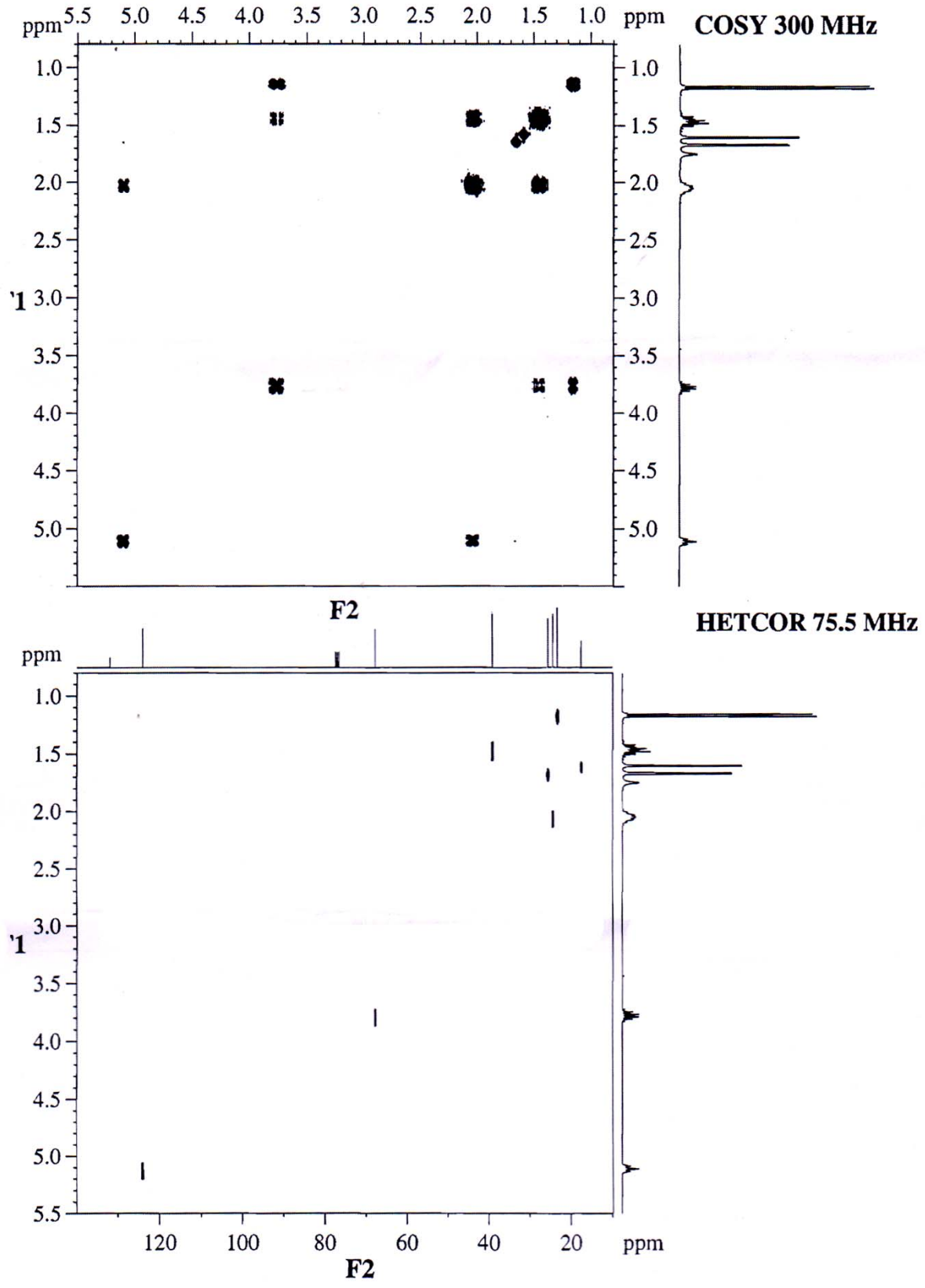


^{1}H NMR 300 MHz



^{13}C/DEPT NMR 75.5 MHz




COSY 300 MHz
ppm
5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 ppm
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
F1
F2
HETCOR 75.5 MHz
ppm
120 100 80 60 40 20 ppm

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Total No. of Questions : 3]

SEAT No. :

PD-3256

[Total No. of Pages : 3

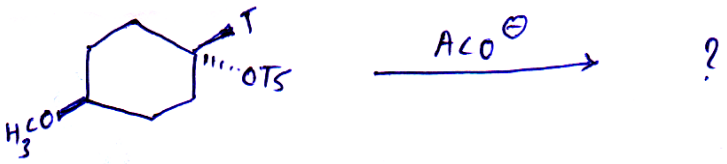
[6478]-303
M.Sc. - II
DRUG CHEMISTRY
CHD - 603 - MJ : Stereochemistry
(2023 Pattern) (Semester - III) (2 Credits)

Time : 2 Hours] *[Max. Marks : 35*

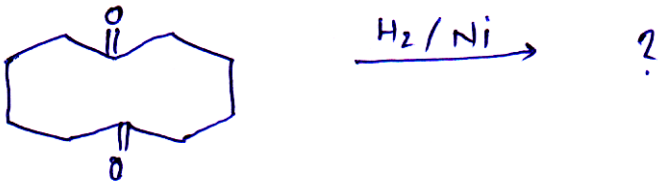
Instructions to the candidates :

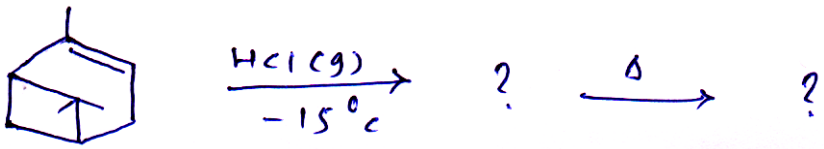
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw the neat label diagram wherever necessary.***

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

i) 

ii) 

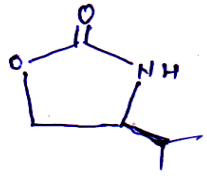
iii) 

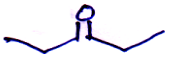
iv) 

b) Draw cis-anti-trans and cis-anti-cis isomers of perhydro phenanthrene and compare their stability. Also comment on their optical activity. **[3]**

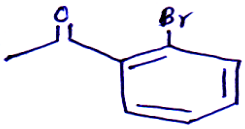
P.T.O.

Q2) a) Predict the product of the following and explain stereochemical principles involved (any three) **[6]**

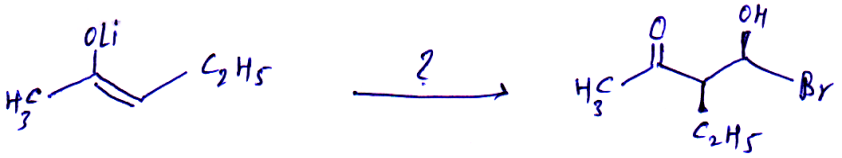
i) 

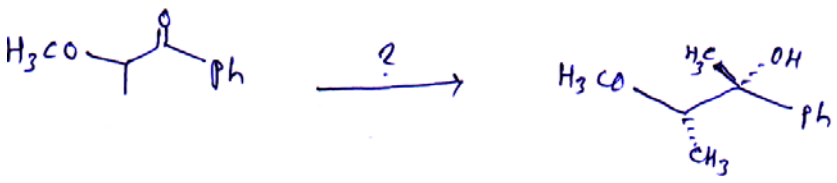
ii) 

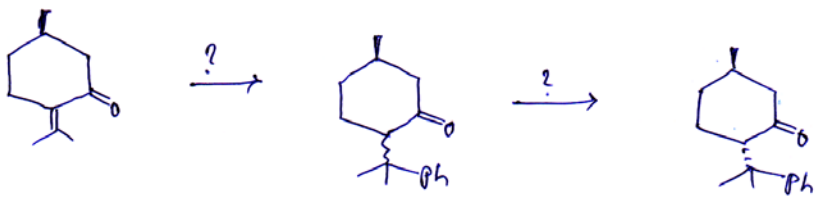
iii) 

iv) 

b) Suggest the reagents and stereochemistry of the following reactions. (any two) **[6]**

i) 

ii) 

iii) 

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

a) Cis - 4 - hydroxy cyclohexane Carboxylic acid lactonize, while the trans isomer does not. Explain.

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

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

d) Describe - Sharpless Asymmetric epoxidation.

e) Explain - Concept of Natural pool strategy.

♦ ♦ ♦

Total No. of Questions : 3]

SEAT No. :

PD-3257

[Total No. of Pages : 3

[6478]-304

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD - 610 - MJ (A) : Advanced Heterocyclic Chemistry

(2023 Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

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

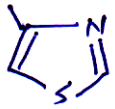
i) Pyrazole has higher boiling point than isoxazole.

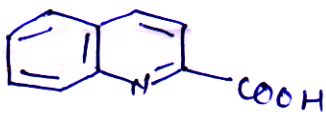
ii) Indole shows better selectivity for electro philic substitution than benzofuran.

iii) 2 - Aminoquinoline on diazotization give 2-quinolone.

iv) 4 - chloropyridine easily undergoes hydrolysis in warm water.

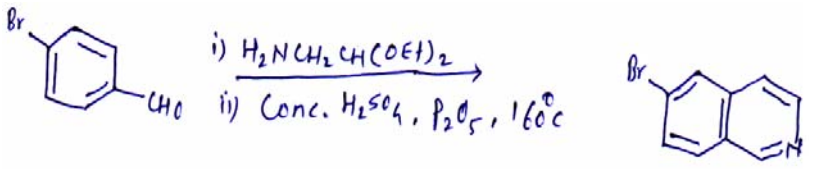
b) Predict the products in the following. **[3]**

i)  i) n-BuLi, Dry ether ii) CH_3CHO ?

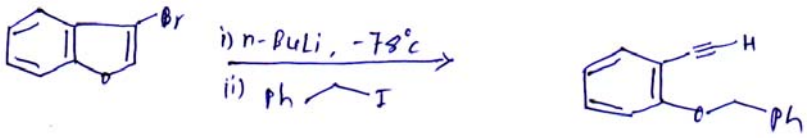
ii)  + $PhCOOCH_3$ $\xrightarrow[2\ hrs]{\Delta}$?

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

i) I)

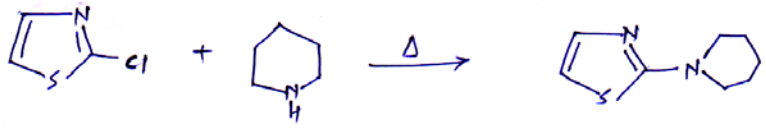


II)

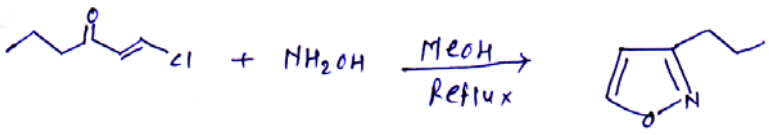


OR

ii) I)



II)

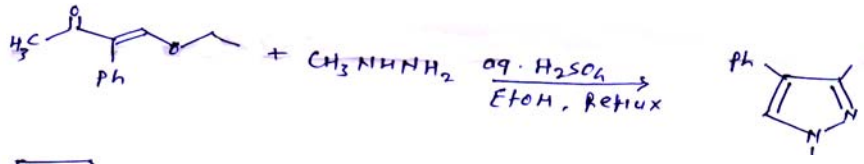


b) Write short notes on any two of the following. **[6]**

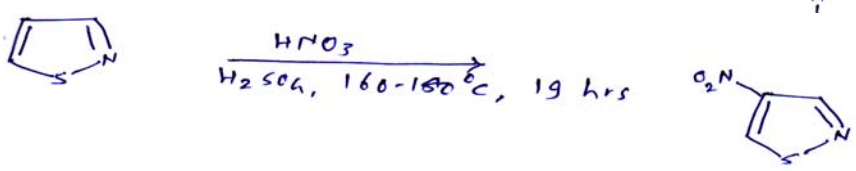
i) Reissert indole synthesis
ii) Pomeraz fritsch Isoquinoline synthesis
iii) Pechmann coumarin synthesis

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

i) I)

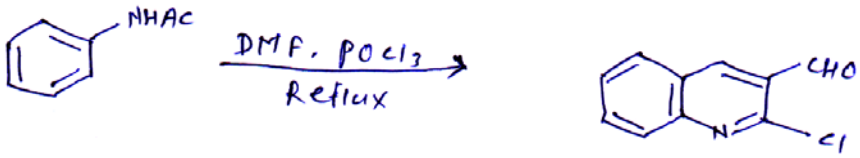


II)

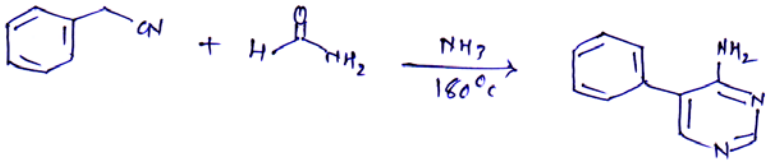


OR

ii) I)



II)

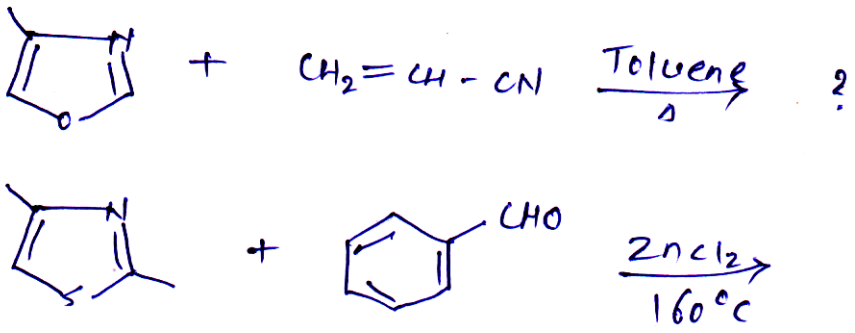


b) Answer any two of the following. **[6]**

i) Imidazole can be used as an effective catalyst in ester hydrolysis. Explain.

ii) Write a short note on skraup quinoline synthesis

iii) Predict the product in the following.



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Total No. of Questions : 3]

SEAT No. :

PD-3913

[Total No. of Pages : 4

[6478]-305
M.Sc. (Part - II)
DRUG CHEMISTRY
CHD-610(B) MJ : Synthesis of Biologically Active Molecules
(2023 Pattern) (Semester - III)

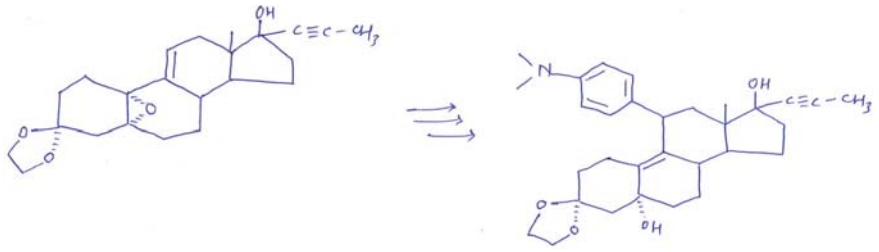
Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

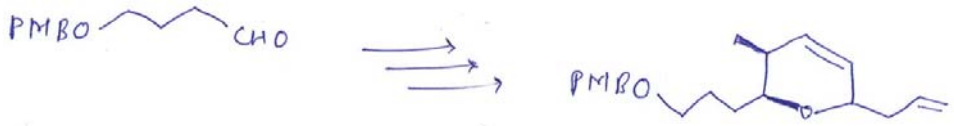
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) Describe the steps involved in the synthesis of following drug molecules. Explain the mechanism involved. **[8]**

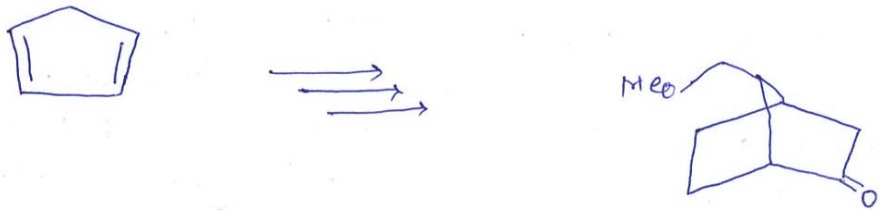
i)



ii)



iii)



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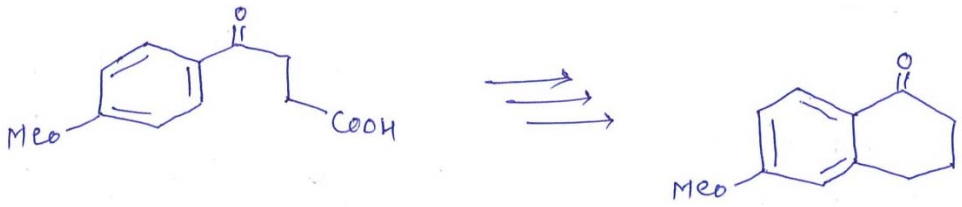
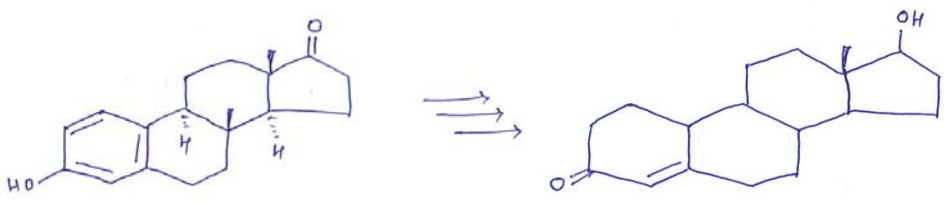


P.T.O.

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

i)



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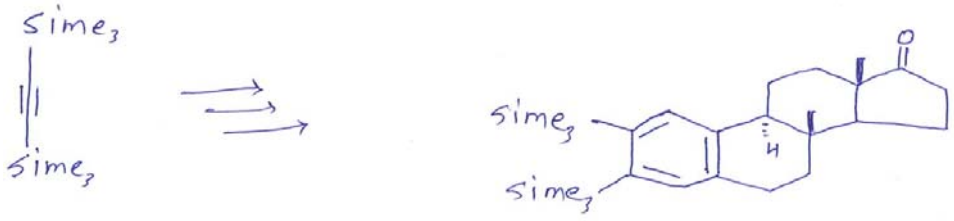
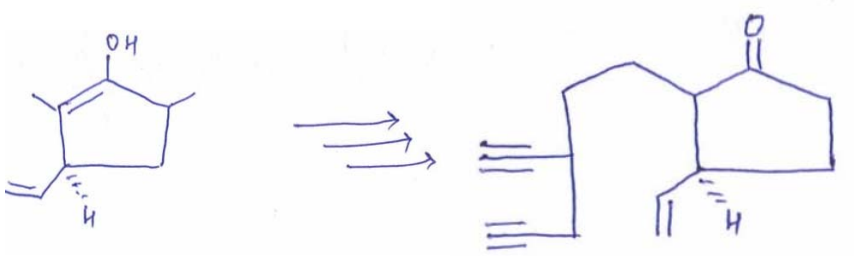


Q2) a) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry & mechanism involved. (any one) **[6]**

i) I)



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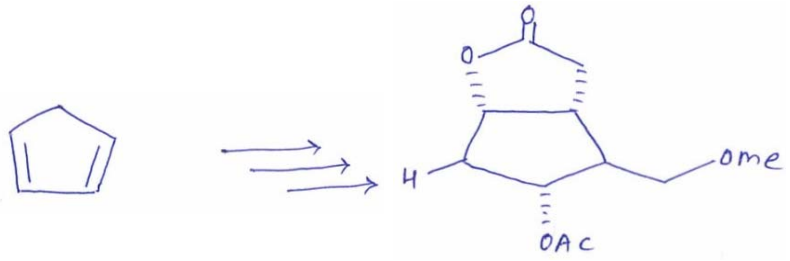
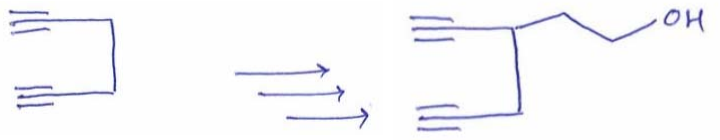


ii) I)



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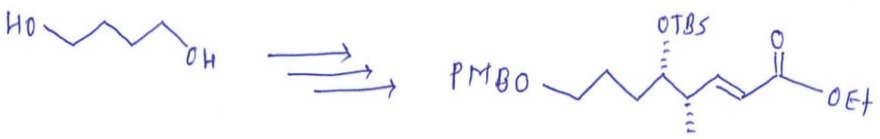
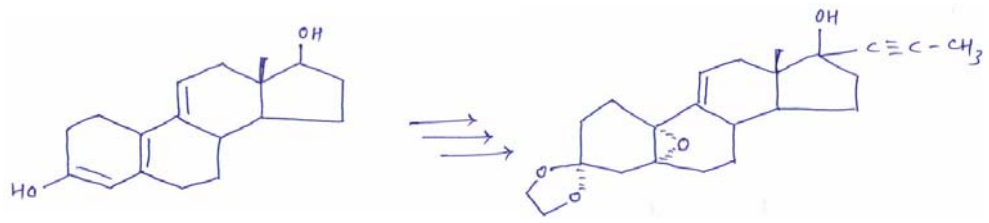
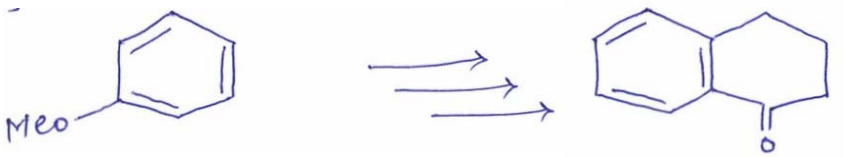
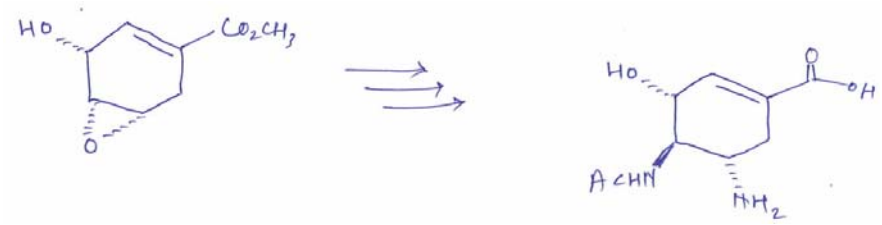


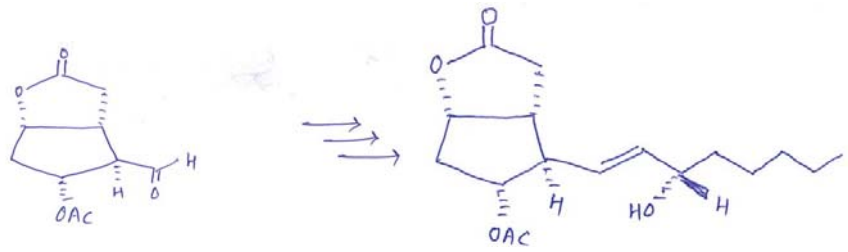
b) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved. (any two) **[6]**

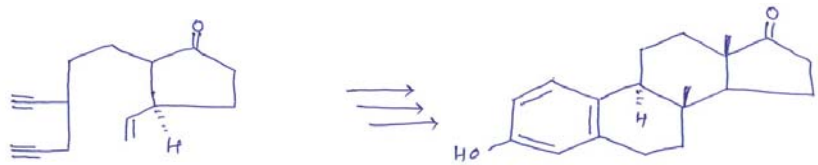
i) 

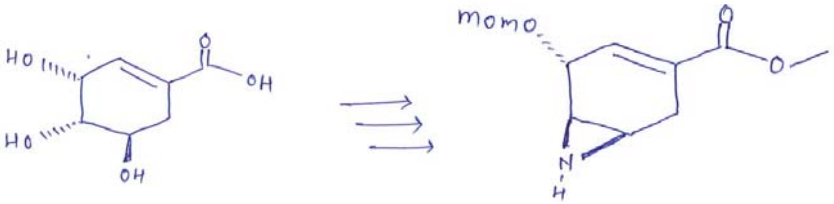
ii) 

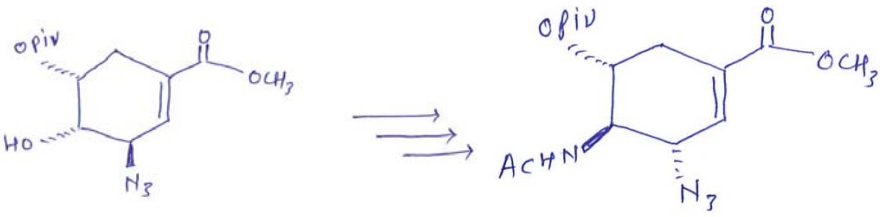
iii) 

Q3) a) Describe the steps involved in the synthesis of following drug molecules. Explain the mechanism involved. (any one) **[6]**

i) I) 

II) 

ii) I) 

II) 

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

i) Merits and Demerits of Divergent Synthesis

ii) Mc-Murray pinacol coupling with example.

iii) MCR based synthesis of Atorvastatin

Total No. of Questions : 6]

SEAT No. : ____

PD-3258

[Total No. of Pages : 3

[6478]-401

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD - 651 - MJ : Drug Design

(2023 Credit Pattern) (Semester - IV) (4 - Credits)

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) Affinity

ii) Efficacy

iii) Receptor

iv) Antagonist

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

Q2) a) Attempt any one from the following : **[6]**

i) Discuss the steps involved in signal transduction mechanism of GPCR.

ii) Give a comment on case studies of Artemisinin and related antimalarial drugs.

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

i) Craig Plot

ii) Equation of best fit

iii) Topliss scheme

P.T.O.

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

i) Discuss in brief

I) Ligand - gated ion channel receptor

II) COMSIA

III) 3D QSAR

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

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

i) Design of Agonist

ii) Intracellular receptors

iii) Applications of prodrugs

SECTION - II

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

i) Pharmacophore

ii) Genome

iii) Linker

iv) Proteomics

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]**

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

ii) Explain De Novo design method used in designing of molecules, when structure is unknown.

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

i) Antisense technology

ii) Monoclonal antibodies

iii) Virtual screening

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

i) Explain the following recombinant DNA products.

I) Hormones

II) Enzymes

III) Vaccines

ii) What is solid phase synthesis? Discuss how is technique applied to synthesize combinational libraries.

b) Write a short note on (Any two) : **[6]**

i) Conformational analysis

ii) High throughput screening

iii) Docking

▽▽▽▽

Total No. of Questions : 6]

SEAT No. :

PD-3259

[Total No. of Pages : 3

[6478]-402

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD-652 MJ : Advanced Medicinal Chemistry

(2023 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) Give the uses and side effects of the following drug molecules. **[6]**

i) Cephalosporin c

ii) Streptomycin

iii) Cis-platin

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

i) Antisense Therapy.

ii) Enzyme Inhibitors as Drug molecules.

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

a) Explain the mechanism of action of fluoroquinolones and their uses.

b) Explain SAR of tetracyclines giving their mode of action.

c) Discuss the mode of action and selective toxicity of sulphonamides.

d) Explain how protease inhibitors and DNA polymerase in hibitors exert their antiviral activity.

e) What are common Fungal diseases? Explain the mode of action of fluconazole and flucytosine.

P.T.O.

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

a) Discuss the biochemical basis of cancer. What are different classes of anti cancer agents. Explain how DNA- alkylators exert their anticancer effect.

b) Discuss the mechanism of action of penicillins and explain the selective toxicity associated with them.

c) Discuss the life cycle of malarial parasite and explain the use of mefloquin and artemesinins as an antimalarial agents.

d) Explain the use of any two of the following classes of drugs in disease management.

i) Aminoglycosides

ii) Macrolides

iii) Peptides

SECTION - II

Q4) a) Discuss the role of following drugs in disease management. **[6]**

i) Propranolol

ii) Domperidone

iii) Glyceryl ritrate

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

i) Hyperacidity

ii) Analgesics

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

a) What is diabetis? Discuss NIDDM in brief. Explain how oral glycemic agents control the blood sugar.

b) Explain the mechanism of inflammation. Discuss how indomethacin and celecoxib exhibit their effect.

c) Give a brief overview of antidepressants.

d) Explain in brief angina pectoris and its tretment.

e) Discuss the use of following group of compounds in treatment of diseases.

i) Anticoagulants

ii) Thrombolytics

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

a) Explain in brief the organization of endocrine system. Discuss the role of thyroid hormones in maintaining homeostasis of the body.

b) Explain intra and interneuronal signal transmission. How this process is affected in convulsions Explain any one class of drugs to treat convulsions.

c) Explain in brief following CVS disorders and atleast one class of drugs used to treat them.

   i) Congestive Heart Failure

   ii) Myocardia Infarction

d) Explain the treatment of following disorders in brief.

   i) Ulcers

   ii) Stroke

Total No. of Questions : 3]

SEAT No. :

PD-3260

[Total No. of Pages : 3

[6478]-403

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD-660 (A) MJ : Advanced Synthetic Methods in Chemistry

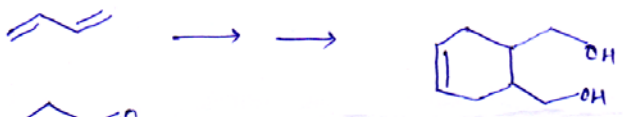
(2023 Credit Pattern) (Semester - IV) (2 Credits)

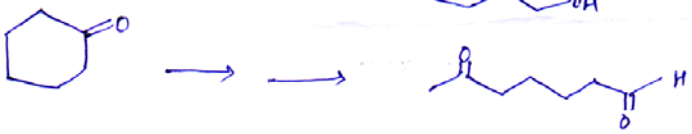
Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) How will you bring about the following transformations : **[8]**

i) 

ii) 

iii) 

iv) 

b) Explain reconnection approach is preferred over disconnection approach in 1.6-dicarbonyl compound synthesis. **[3]**

P.T.O.

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

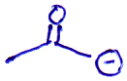
a) Explain the convergent synthesis with example.

b) Trityl chloride can be used for selective protection.

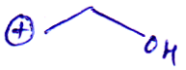
c) 1.2 and 1.4 - dicarbonyl compounds can be synthesized using Umpolung strategy.

d) The substituted ylides may be converted to trans - alkene in Wittig - Hornes reaction.

e) Give the synthetic equivalents of the following and illustrate your answer with one example.

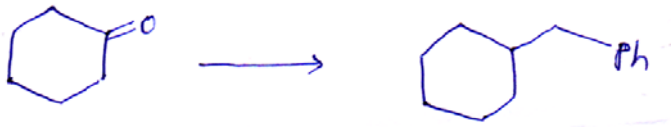
i) 

ii) $CH_3–\overset{\ominus}{C}H–NH_2$

iii) 

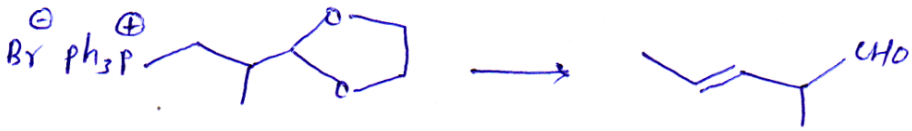
Q3) a) Answer any two of the following : **[6]**

i) Carry out the following transformation by enamine approach.



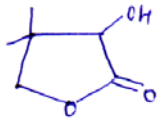
ii) Synthesize the following using umpolung method.

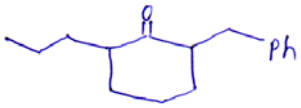
iii) Arrange the given reagents in proper order to accomplish the following conversion, write the structure of the intermediate

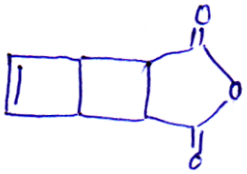


ACOH, H_2O : H_3CCHO ; MCOH ; TSOH ; KO^+BCl

b) Using retrosynthetic analysis suggest a suitable method for the synthesis of any two of the following. **[6]**

i) 

ii) 

iii) 

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Total No. of Questions : 3]

SEAT No. :

PD-3261

[Total No. of Pages : 2

[6478]-404

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD-660(B)MJ : Organometallic Reagents in Organic Synthesis

(2023 Pattern) (Semester - IV) (2 Credits)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

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

i) How will you prepare aryl alkynes from aryl halide.

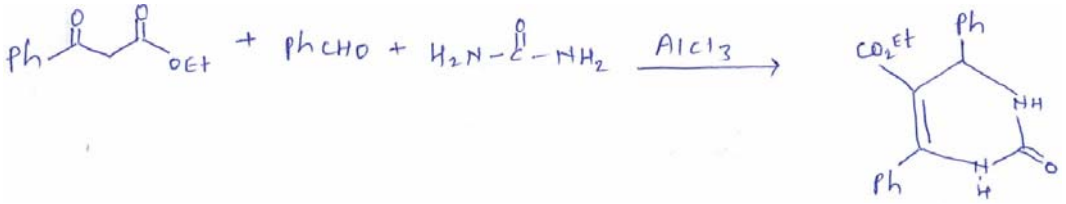
ii) Thexyl boranes is used in the synthesis of cycloketone. Explain.

iii) Reactions of organolithiums are carried out in an atmosphere of dry nitrogen or Argon.

iv) Stable phosphorous ylides give E-oletins.

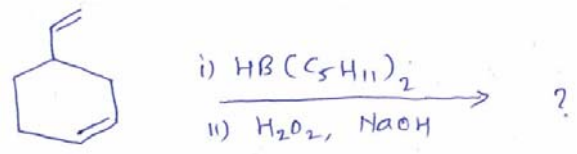
v) Secondary amine preferrentially used in the Mannich reaction.

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



Q2) Predict the product with mechanism (Any four) : **[12]**

a)



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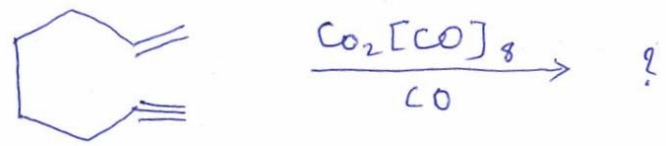
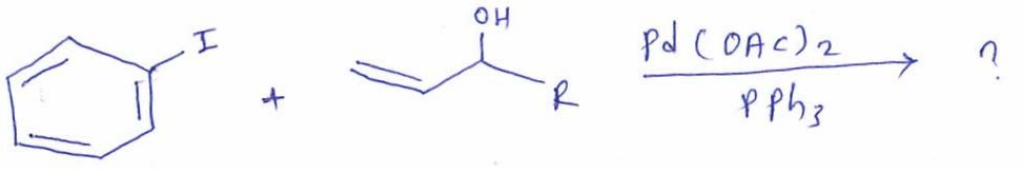
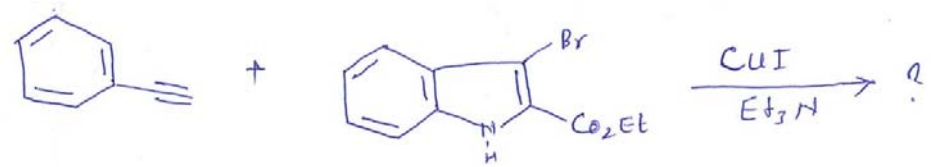
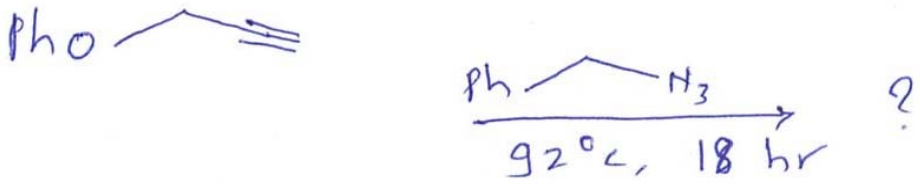
b) 

c) 

d) 

e) 

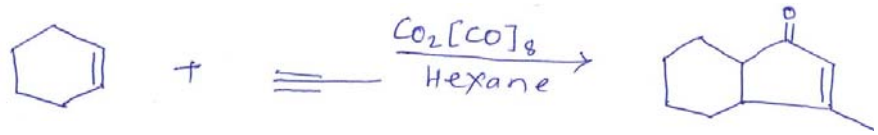
Q3) a) Write short note on the following. (Any two) **[6]**

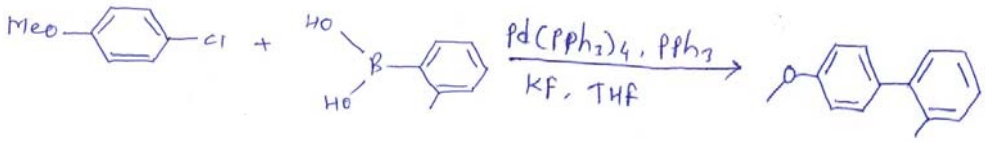
i) Suzuki Coupling

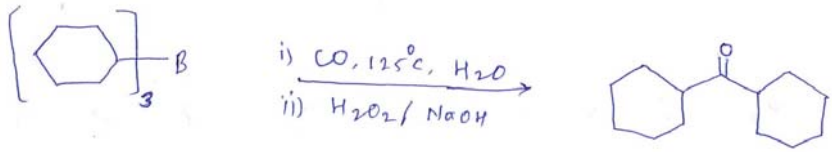
ii) Reppe oxidation

iii) Click Chemistry

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

i) 

ii) 

iii) 

Total No. of Questions : 3]

SEAT No. :

PD-3262

[Total No. of Pages : 2

[6478]-405

M.Sc. (Part - II)

DRUG CHEMISTRY

CHD - 660 (C) - MJ : Forensic Chemistry

(2023 Credit Pattern) (Semester - IV) (2 Credits)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates :

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

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

i) Discuss the different types of Narcotic and other drugs with suitable example.

ii) Discuss in brief the classification of finger prints.

b) Answer the following : **[5]**

i) Give a brief overview of clandestine laboratory investigation.

ii) What are designer drugs? Give the classification of designer drugs with suitable examples.

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

a) Discuss detection of drugs on the basis of their metabolism with suitable example.

b) Describe types and importance of finger prints in forensic science.

c) Write a short note on Illict drugs.

d) Discuss the method for isolation and characterization of barbiturates from biological samples.

e) Explain in brief how finger prints can be preserved & identified.

P.T.O.

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

a) Give a brief account of poroscopy.

b) How benzodiazepines can be analyzed from biological samples.

c) What are the different analytical techniques used in identification of drugs?

d) Discuss the classification of palm prints. How development and lifting of the palm prints is done.

e) Discuss the use of spot tests in forensic analysis with suitable reagents and inference.