Total No. of Questions :6]

SEAT No. :

P2879

[Total No. of Pages : 6

[5532]-3002

M. Sc.

DRUG CHEMISTRY

CHD-362 : Advanced Analytical Methods

(2013-Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

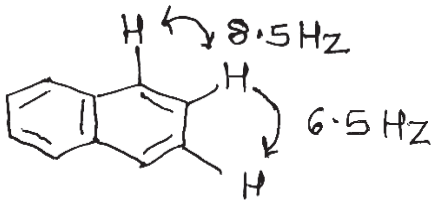
SECTION - I

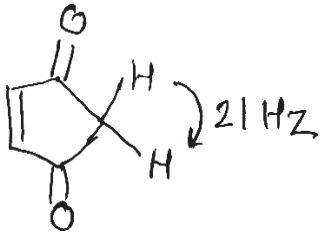
Q1) a) Answer the following. (any three) **[6]**

i) MALDI is used for biomolecules and high molecular weight compounds to record MS.

ii) Axial-equatorial coupling constant is smaller than axial-axial coupling in cyclohexane in PMR. Explain.

iii) Explain the observed coupling constant values in the following compounds.

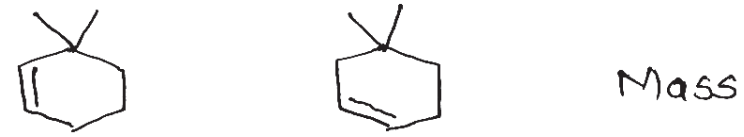


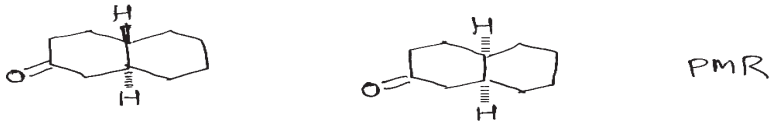


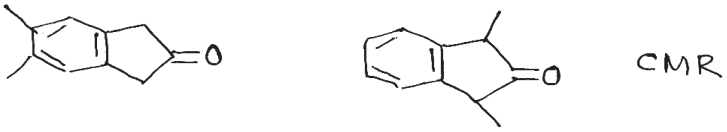
iv) Mono substituted epoxide shows twelve lines for epoxide protons in ^{1}H NMR.

P.T.O.

b) Distinguish between the following pairs using the indicated spectral methods. (any two) **[3]**

i) 

ii) 

iii) 

Q2) Using the given spectral information, deduce the structure of the following. (any four) **[10]**

a) M.F. : $C_8H_9NO_3S$
IR : 1675, 1515, 1360 cm^{-1}
PMR : 1.4(d, J=7 Hz, 6H), 3.4(Septet, J=7 Hz, 1H), 7.6(d, J=5Hz,1H), 7.9 (d, J = 5 Hz, 1H).
CMR : 196(s), 156(s), 146(s), 125(d), 124(d), 36(d), 20 (q, str)

b) M.F. : $C_{10}H_{16}O_4$
IR : 1725 cm^{-1}
PMR : 1.3 (t, J=7 Hz, 6H), 2.0 (s, 6H), 4.3 (q, J=7 Hz, 4H)
CMR : 165(s,w), 155(s,w), 125(s,w), 60 (t, str), 20(q, str), 12 (q,str)

c) M.F. : $C_5H_6O_2$
IR : 1796 cm
CMR : 178 (s), 153 (s), 98 (d), 34 (t), 12 (q)

d) M.F. : $C_7H_{16}O_4$
IR : 1110 cm^{-1}
PMR : 1.8 (t, J=7Hz, 2H), 3.3 (s, 12H), 4.5 (t, J=7Hz, 2H)
CMR : 35, 51 (str), 100
DEPT 135: 35 down, 51 and 100 up

e) M.F. : $C_8H_{12}O$
IR : 2740, 1685, 1618 cm^{-1}
PMR : 1.25 (s, 6H), 1.83 (t, J=7Hz, 2H), 2.5 (dt, J=7&2.6 Hz,2H), 6.78 (t, J=2.6 Hz, 1H), 9.82 (s, 1H)
CMR : 188.2 (d), 153.4 (s), 152.7 (d), 43.6 (s), 40.8 (t), 30.3 (t), 29.5 (q).

Q3) Write notes on the following. (any three) **[6]**

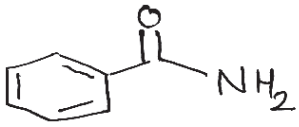
a) Time of flight analyzer in Ms

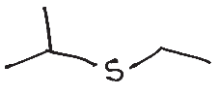
b) Factors affecting 13_C chemical shifts.

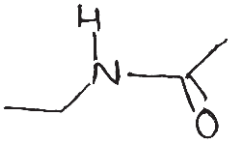
c) Applications of NOE

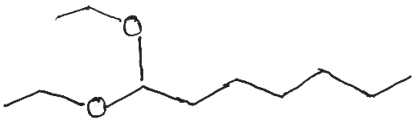
SECTION - II

Q4) a) Write the genesis of the indicated ion for any three of the following. **[6]**

i)  77, 105, 121

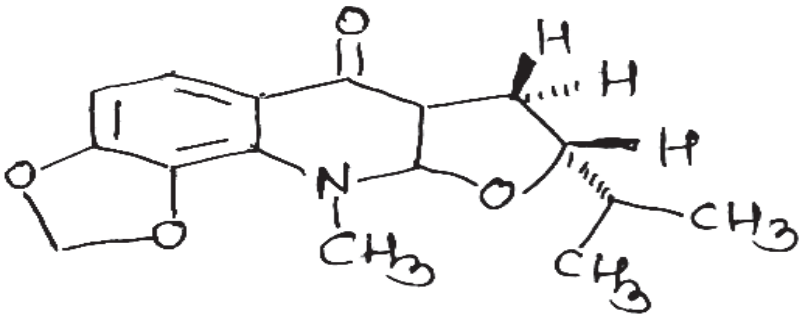
ii)  47, 61, 89, 104

iii)  30, 43, 72, 87

iv)  47, 75, 103

b) What is hyperfine splitting in ESR? How many lines are seen in the ESR spectrum of radical anion of benzene? What will be the intensities of these lines? **[2]**

Q5) a) Assign the chemical shifts to various protons in the given structure. Comment on the observed coupling constants and double resonance experiments. **[5]**

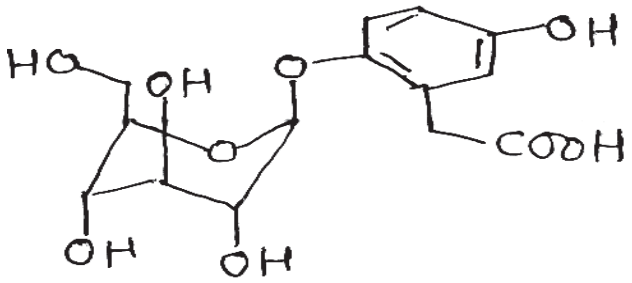


0.97 (d, J=7Hz, 3H), 1.03 (d, J=7Hz, 3H), 2.01 (eight lines, J=7Hz, 1H), 2.25 (dd, J=15.3 & 8.7 Hz, 1H), 2.95 (dd, J=15.3 & 9.9 Hz, 1H), 3.80 (s, 3H), 4.76 (eight lines, ddd, J=9.9, 8.7 & 7.0Hz, 1H), 6.02 (s, 2H), 7.93 (d, J=8.5 Hz, 1H), 8.0 (d, J=8.5 Hz, 1H)

Spin - decoupling EXPT.

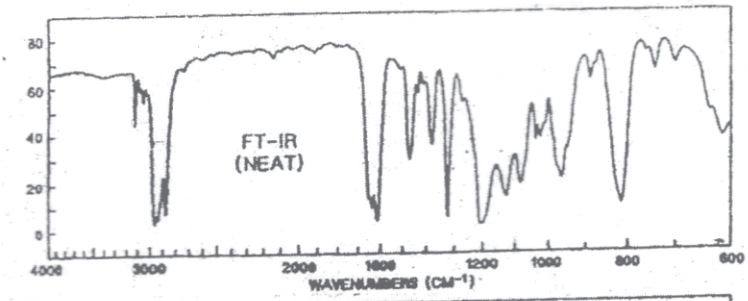
i)	Irradiation at 2.01	Changes δ 1.03 → S
		δ 4.76 → dd, 9.9 & 8.7 Hz
ii)	Irradiation at δ 2.25	δ 2.95 → d, 9.9 Hz
		δ 4.76 → dd, 9.9 & 7.0 Hz

b) Assign the chemical shift to various carbon atoms. **[3]**



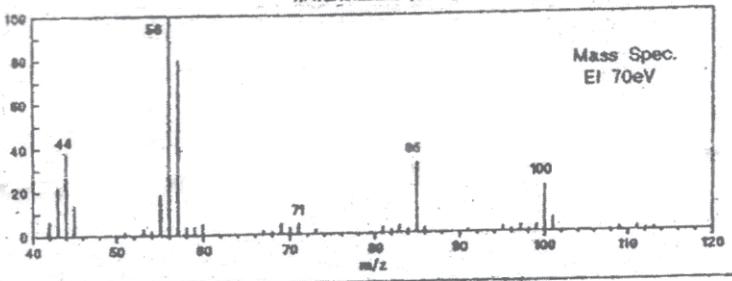
172. 9 (s), 152.1 (s), 148.6 (s), 126.1 (d), 117.7 (d), 117.1 (d), 114.1 (s), 103.0 (s), 76.9 (d), 76.6 (d), 73. 5 (d), 69.9 (d), 61.0 (t), 35.0 (t).

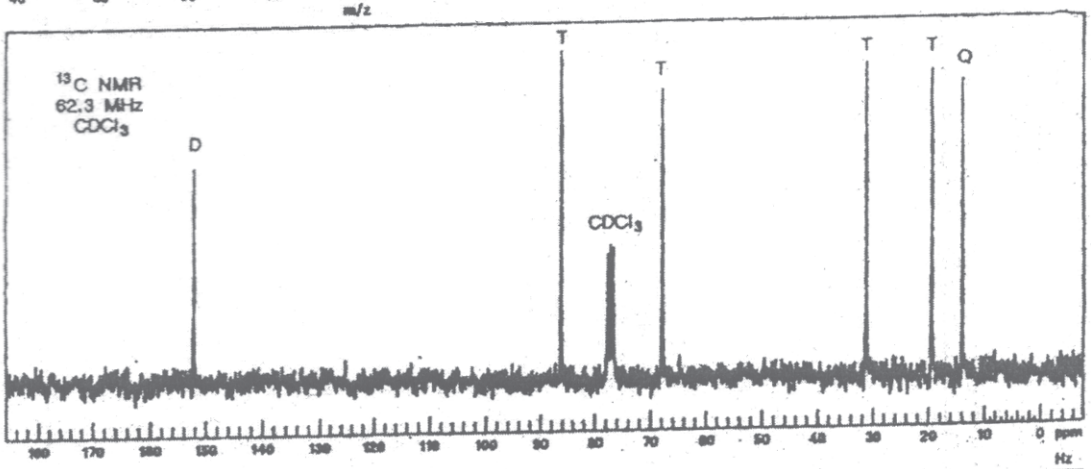
Q6) Deduce the structure of the compound whose spectral information is given on the next page. **[9]**

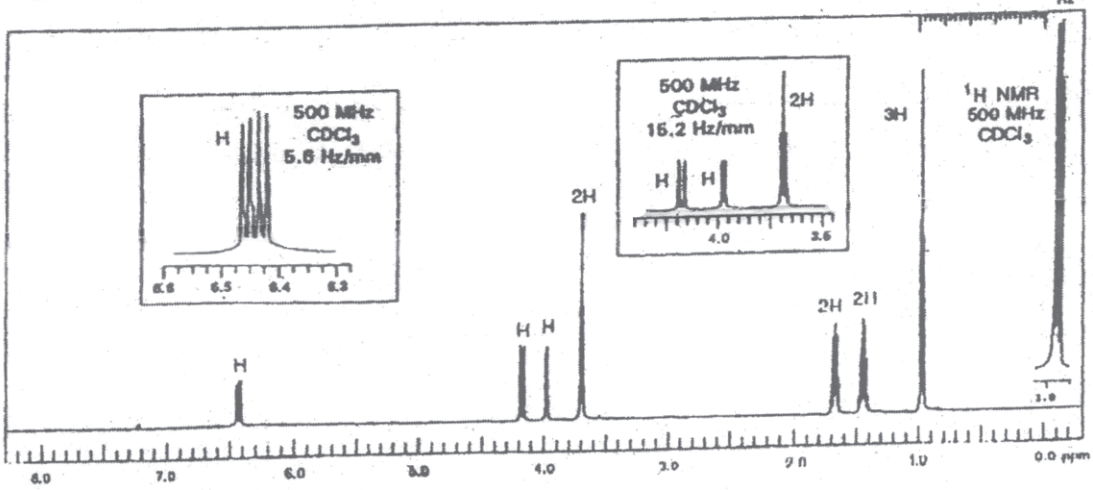


Exact M.S. (EI) = 100.0888

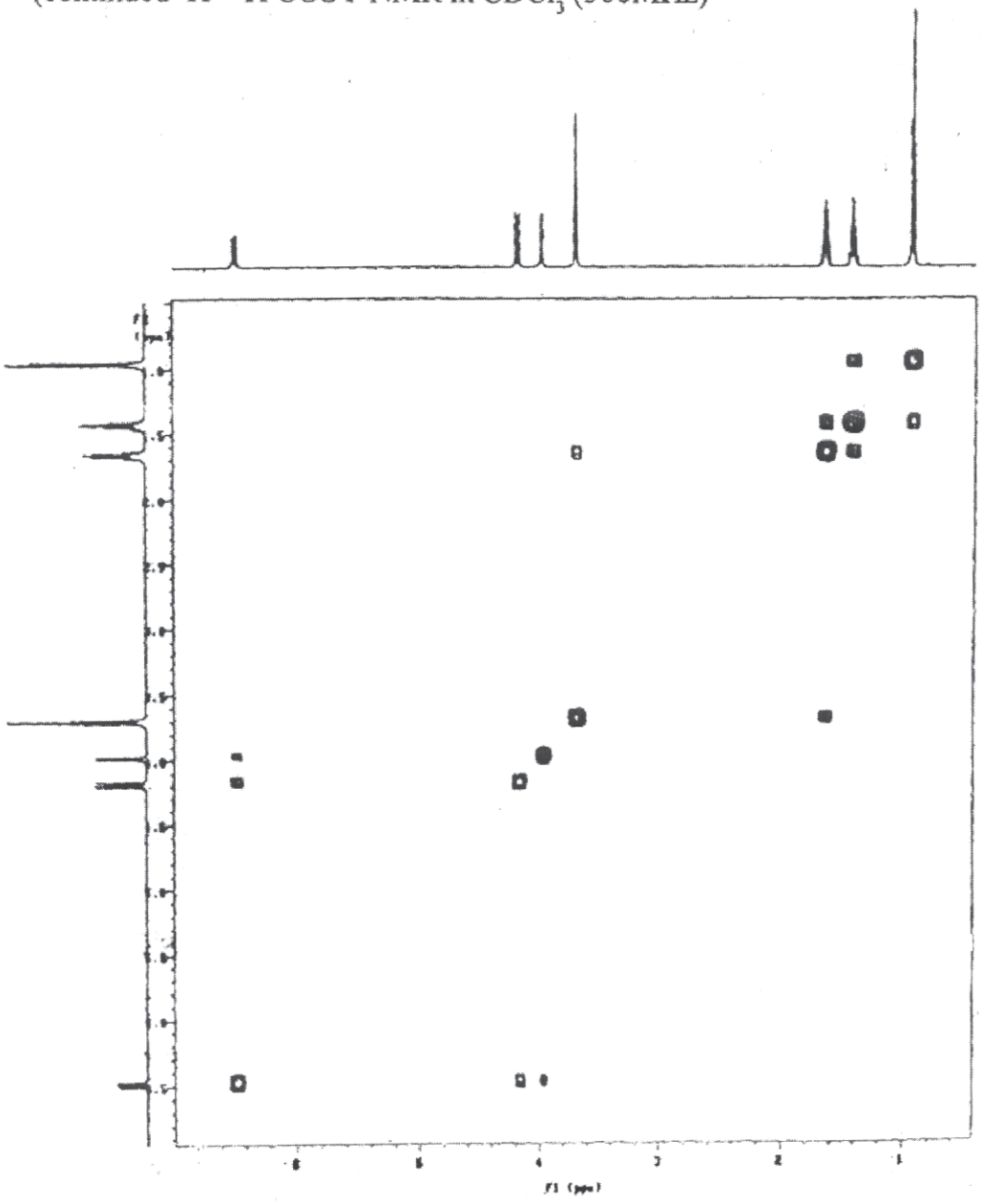
UVλ_{max} = BLANK







(continued $^{1}H - ^{1}H$ COSY NMR in $CDCl_3$ (500MHz)



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Total No. of Questions : 6]

SEAT No. :

P2880

[Total No. of Pages : 3

[5532]-3003

M.Sc.

DRUG CHEMISTRY

CHD-363 : Microbiology, Immunology & Drug Discovery and Development

(2013 Pattern) (Semester - III) (Credit System)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

SECTION-I

Q1) Attempt any three of the following: **[12]**

a) Give brief classification of microbes.

b) Describe any one method of isolating micro-organisms.

c) Describe any one method of screening microbes for industrial purposes.

d) Short note on any one method used in Downstream process.

e) Briefly explain microbial method of effluent treatment.

Q2) Attempt any three of the following: **[9]**

a) Describe the types of Adaptive immunity.

b) State the types of Hypersensitivities. Describe any one in brief.

c) Write a short note on ELISA or RIA.

d) Briefly explain barriers of Innate immunity.

e) What is Auto-immunity. State any one disease caused due to it & its symptoms.

P.T.O.

Q3) Explain <u>any four</u> of the following: **[4]**

a) Antigen.

b) Interferon.

c) Lead.

d) Pharmacophore.

e) Agonist.

f) Antibiotics.

SECTION-II

Q4) Answer <u>any three</u> of the following: **[12]**

a) Explain the strategies employed in lead development with proper examples.

b) What is the Role of FDA and Institutional Review Board in clinical trials?

c) Make a comment on the different system of Medicines.

d) Explain in brief the different Routes of drug administration.

e) Explain how the screening of Lead compounds has been carried out from the following.

i) Medical folklore.

ii) Synthetic libraries.

Q5) Answer <u>any two</u> of the following: **[8]**

a) What is Patent? Explain it's formal requirements for filing a patent application.

b) Give a brief account of strategies adopted for Lead discovery.

c) Discuss the parameters used for Toxicological evaluation of new drugs.

Q6) Answer <u>any two</u> of the following: **[5]**

a) Microbial sources of drugs.

b) Intellectual property rights.

c) Soild dosage forms.

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Total No. of Questions : 6]

SEAT No. :

P2881

[Total No. of Pages : 5

[5532]-3004

M.Sc.

DRUG CHEMISTRY

CHD-364 : Stereochemistry, Asymmetric Synthesis and Pericycle Reactions

(2013 Pattern) (Semester-III)

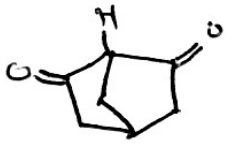
Time : 3 Hours] *[Max. Marks : 50*

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) Answer any four of the following (Any 4): **[8]**

a)  compound (I) do not show acidic property.

(I)

b) Explain why $SP^2 \rightarrow SP^3$ process is facile in 3 & 4 membered ring, while $SP^3 \rightarrow SP^2$ process is facile in 5 & 6 membere ring.

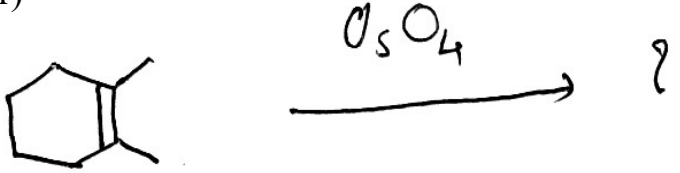
c) Trans-4-t-butyl cyclohexanol is more strongly adsorbed on alumina than cis isomer. Explain.

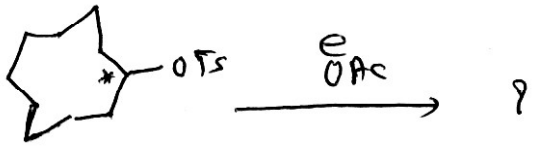
d) Explain why bridge ring compounds showed only Half number of enantiomers.

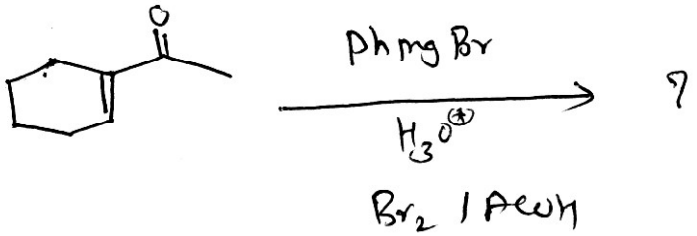
e) Draw the stereo structures of perhydroanthracene and explain their stability.

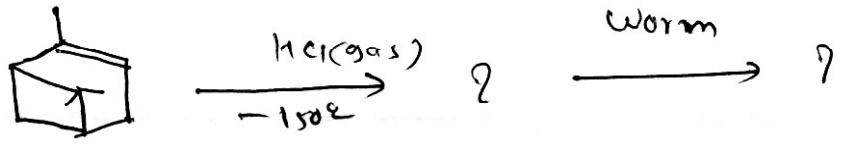
P.T.O.

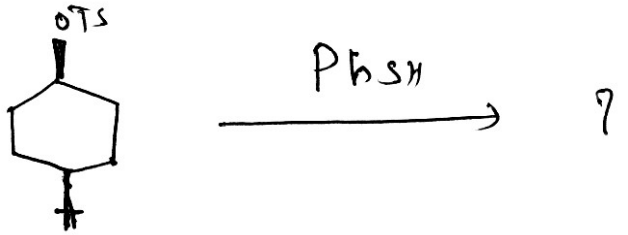
Q2) Predict the product & explain machinery, stereochemical principles involved. (Any Four) **[8]**

a) 

b) 

c) 

d) 

e) 

Q3) a) Write short note on (Any 3) **[6]**

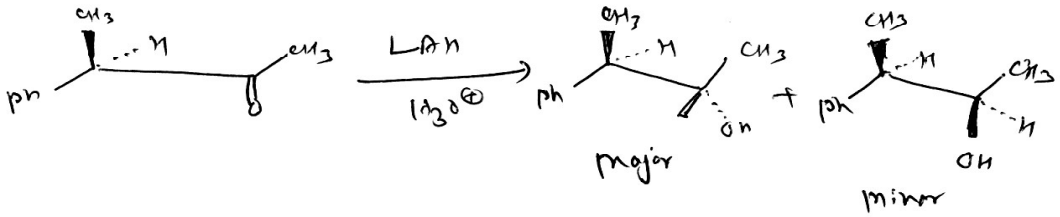
i) CBS reduction.

ii) Stereochemistry of NGP reactions.

iii) Ene reaction.

iv) Chirol Auxillary

b) Using Felkin Anh rule explain the following transformation. **[3]**

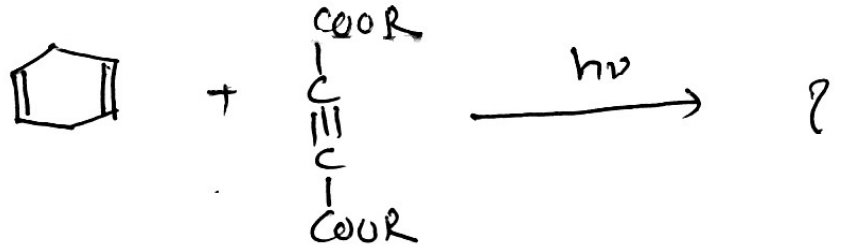


SECTION-II

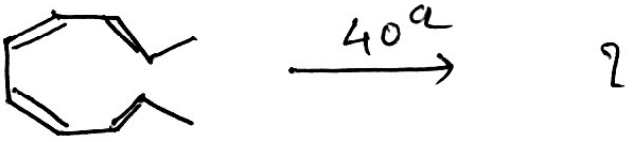
Q4) a) Construct the cerrelation diagram for the following transformation. **[3]**

b) Predict the product/s and suggest the mechanism. (Any four) **[8]**

i)



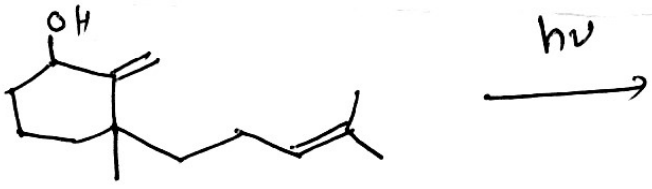
ii)



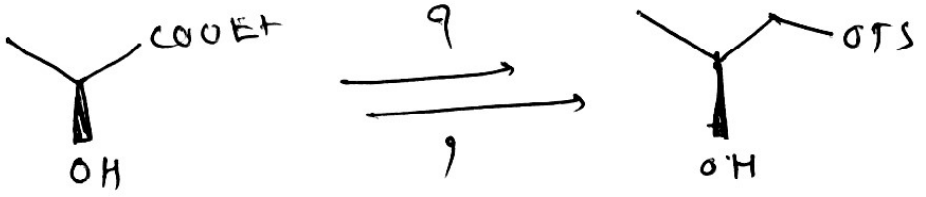
iii)

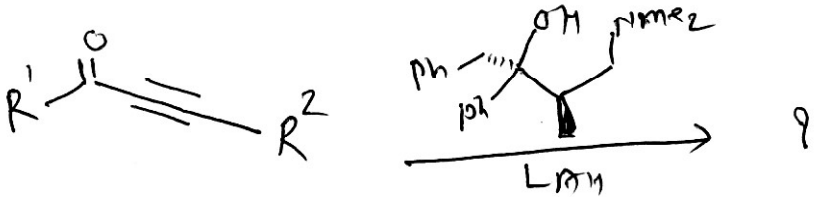
iv)

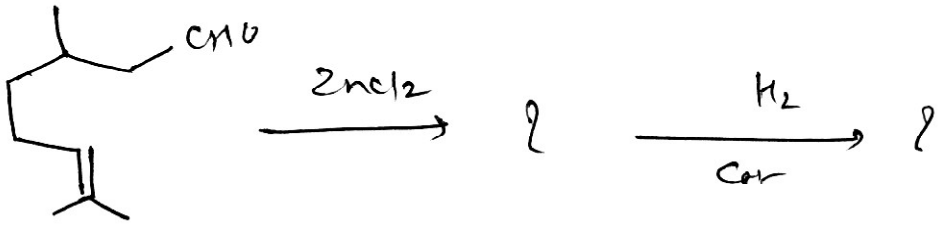
v)

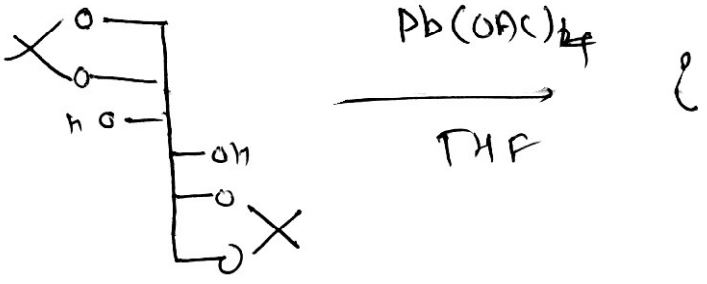


Q5) Complete the following reactions and explain the mechanism (Any 4): **[10]**

a) 

b) 

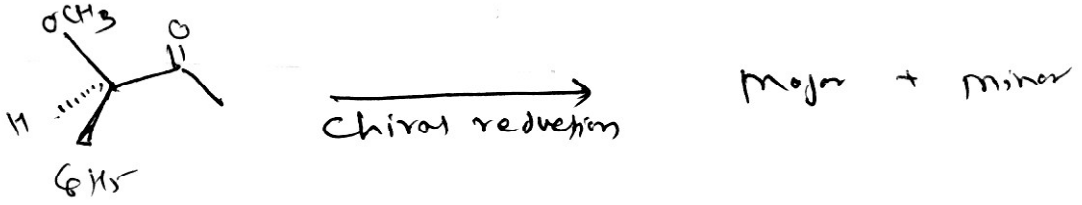
c) 

d) 

e) 

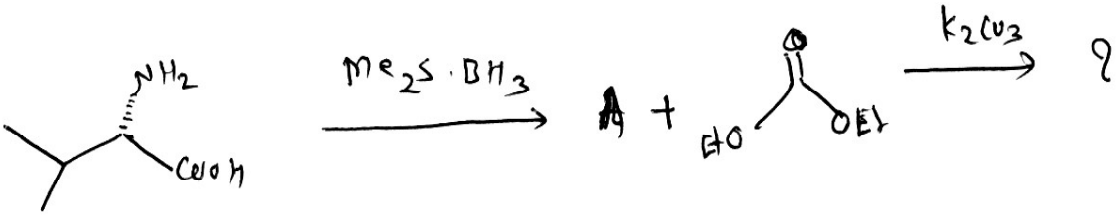
Q6) Answer the following (Any four): **[5]**

a) Calculate the percentage of major & minor product in the following reaction; it ee = 97%



b) Give the applications of pericyclic reactions.

c) Complete the following reaction.



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Total No. of Questions :6]

SEAT No. :

P2871

[Total No. of Pages :5

[5532]-31
M.Sc.
DRUG CHEMISTRY
CH-361 Chemistry of Heterocycles and Biologically Active Compounds
(2008 Pattern) (Semester - III)

Time : 3Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

SECTION-I

Q1) Explain any four of the following. **[12]**

a) Oxazole is less basic than imidazole.

b) Pyridine N-oxide undergoes nitration at C_4-position. Explain.

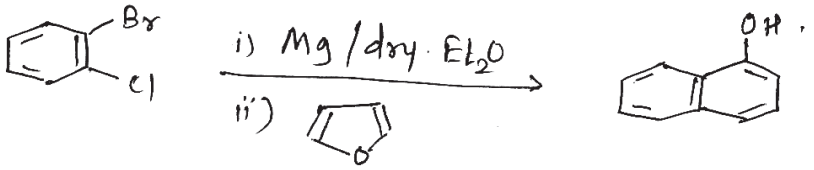
c) Explain the cycloaddition reaction of furan with maleic anhydride.

d) Quinoline undergo reduction more easily than naphthalene Explain.

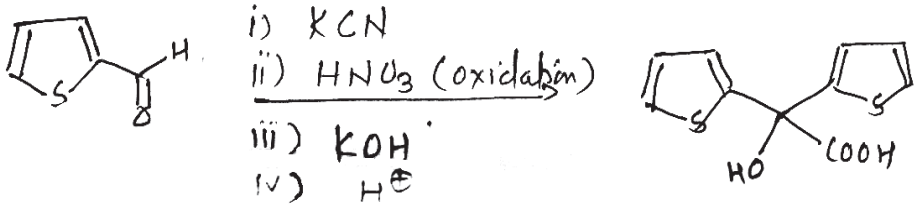
e) Explain the nitration of thiophene and benzothionphene.

Q2) Suggest the suitable mechanism for any four of the following conversions. **[12]**

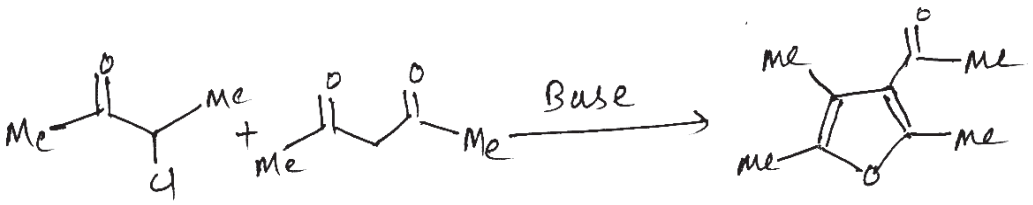
a)

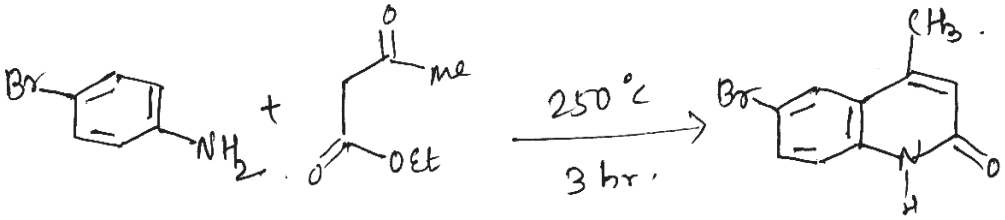


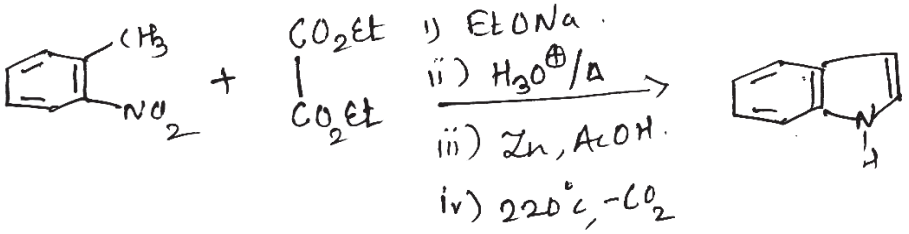
b)



P.T.O.

c) 

d) 

e) 

Q3) a) Write short notes on any three of the following. **[9]**

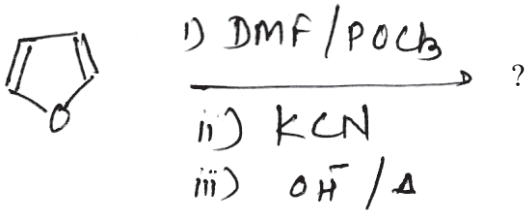
i) Gabriel thiazole synthesis.

ii) Medlung indole synthesis.

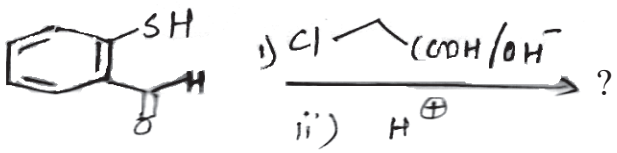
iii) Hantzch pyrrole synthesis.

iv) Reissert synthesis.

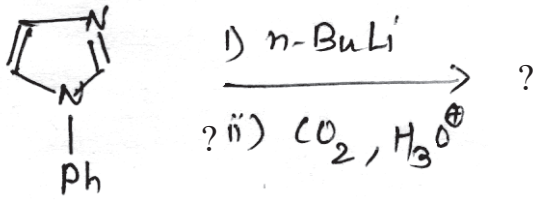
b) Predict the products with mechanism for any two of the following. **[7]**

i) 

ii)



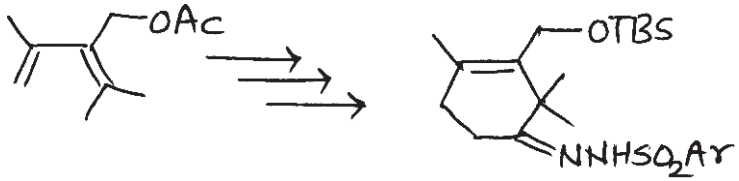
iii)



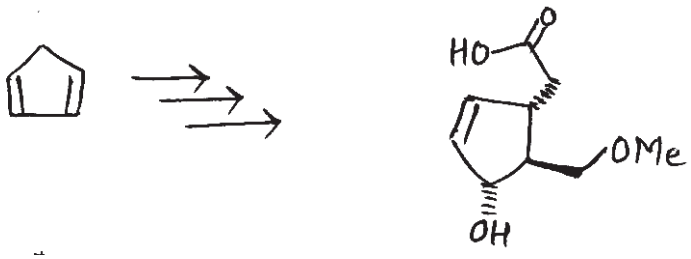
SECTION-II

Q4) Discuss the steps involved in the following transformations, comment on steps indicating mechanism and reagents used (any three) . **[15]**

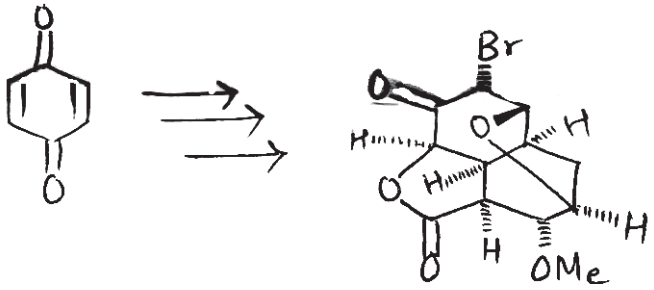
a)



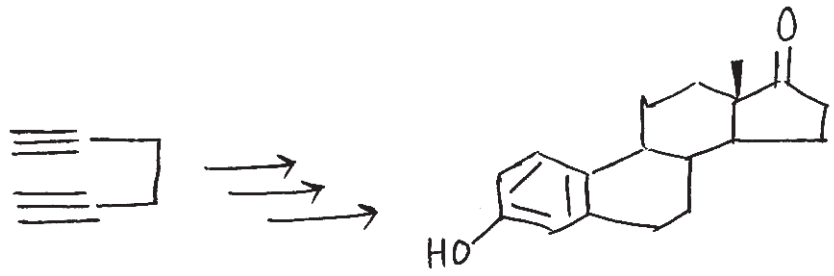
b)



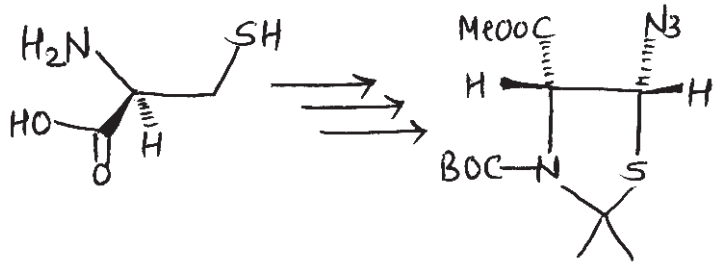
c)



d)

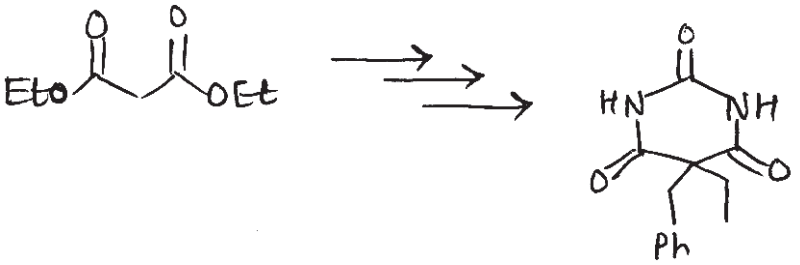


e)

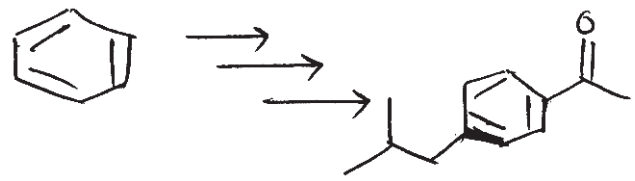


Q5) Discuss the steps involved in the synthesis of following drug molecules. Explain the mechanism involved (any four) **[16]**

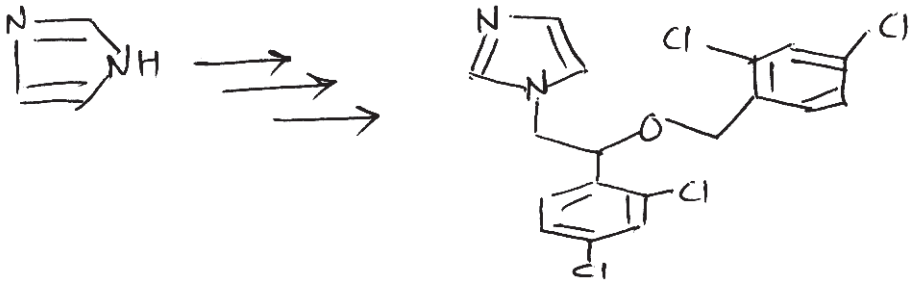
a)



b)



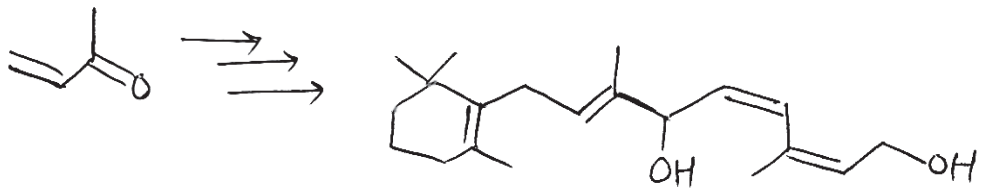
c)



d)

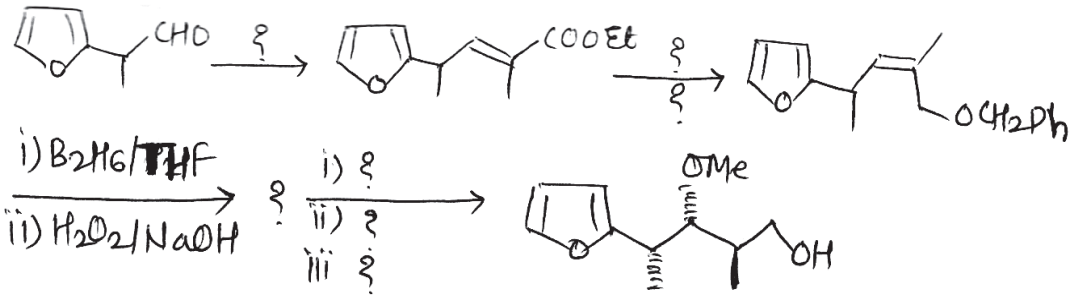
$H_3C-NO_2 \longrightarrow \longrightarrow (CH_3CH_2CH(CH_2OH)NHCH_2)_2$

e)



Q6) Answer any two of the following. **[9]**

a) Put the missing reagents/intermediates in the following synthesis. Justify your approach.



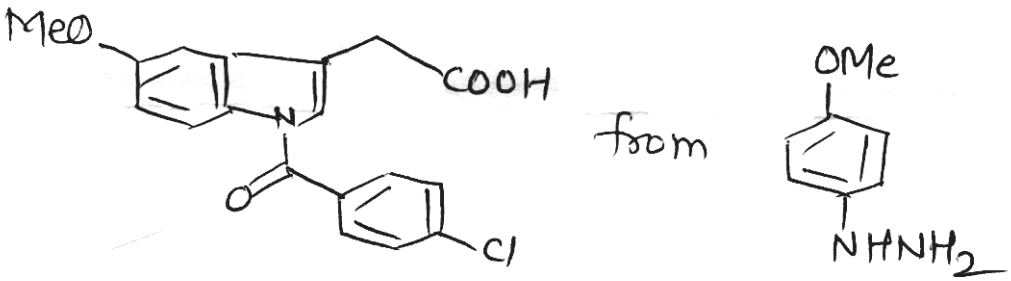
b) Explain with examples the following (any two)

i) Mc Murray pinacol coupling

ii) Shapiro reaction

iii) suzuki coupling

c) Devise a synthetic pathway for the following.



Total No. of Questions :6]

SEAT No. :

P2872

[Total No. of Pages :6

[5532]-32
M.Sc.
DRUG CHEMISTRY
CH-362: Advanced Analytical Methods
(2008 Pattern) (Semester - III)

Time : 3Hours] *[Max. Marks : 80*

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) Explain any four of the following. **[12]**

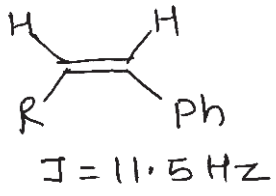
a) In CMR spectroscopy integration is not used in interpretation.

b) Cyclohexane displays itself in PMR spectrum as singlet at room temperature however at -100°c the spectrum becomes complicated.

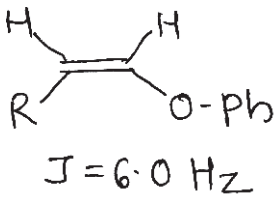
c) Lanthanide shift reagents can be used to simplify the NMR spectra.

d) The mass spectrum of n-pentanol exhibits prominent peaks at m/z 31,42 and 70.

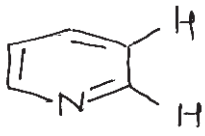
e) Observed coupling constants in some of the compounds are as.



J = 11·5 Hz



J = 6·0 Hz



J = 5·0 Hz

Q2) Deduce the structure from given spectral data (any four). **[16]**

a) MF : C_7HgN

IR : 2250 Cm^{-1}

PMR: 1.9 (m, 2H); 2.35 (m,4H); 3.1 (S,2H); 5.75 (t,J=3Hz,1H)

CMR: 19 (t), 23(t), 32(t), 34(t), 117(S), 129 (d), 132 (s)

P.T.O.

b) MF : C_8H_9FO

PMR: 1.38 d, J= 7Hz,3H

3.2 s, exchangeable, 1H

4.75 q, J=7 Hz, 1H

6.98 dd J=11 and 8 Hz, 2H

7.22 dd J=8 and 3 Hz, 2H

c) MF : $C_8H_9\ No_3$

IR : 2500-3000 (b), 3300, 1600, 1510, 1200 Cm^{-1}

PMR: 3.8 (s,3H), 6.84 (d, J=8 Hz, 1H)

7.22 (d,J=8Hz,&3Hz,1H) 7.26 (d,J=3Hz,1H)

5.0 (bs, 1H, exchangeable), 11.2 (bs,1H,exch.)

d) M.F. : $C_8H_{10}O_2$

CMR : 55 (q), 133.5(s), 64 (t, mod) 159(s),

114 (d, strong), 129 (d strong)

PMR : 2.0 (bs,exch.1H), 3.8 (s,3H)

5.0 (s,2H), 6.5 (d,J=7Hz,2H)

6.8 (d,J=7 Hz, 2H)

Mass : m/e –138, 137, 107

e) MF : $C_7H_{14}O_2$

Mass : 130, 115, 100, 73, 43

CMR : 208,(s), 75(s), 54(t), 50(q), 33(q), 25(q strong)

PMR : 1.3 (s,6H), 2.2 (s,3H), 2.5 (s,2H), 3.2 (s,3H)

Q3) Write short notes on the following. (any three) **[12]**

a) AMX spin system in PMR

b) Isotopic peaks in Mass spectrum

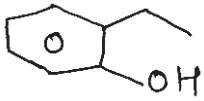
c) Off resonance spectroscopy

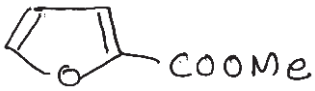
d) Factors affecting germinal coupling constants.

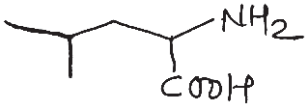
SECTION-II

Q4) a) Explain the genesis of the following ions. (any three) **[9]**

i)  m/e–29,43,44,71,72

ii)  m/e –122,107,104,77

iii)  m/e–126,96,95,67

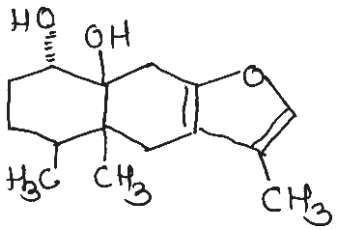
iv)  me/–131,86,74,44,30

b) Two isomers of C_6H_{14} show following mass spectral data. Assign structures to each isomers. **[3]**

x: 86(15%), 57(100%), 43(81%), 42(41%), 41(70%), 29(61%)

y: 86 (0.1%), 57(98%), 56(32%), 43(100%), 41(56%) 29(48%)

Q5) a) Assign the signals to the different carbon atoms in the following compound justify. **[4]**



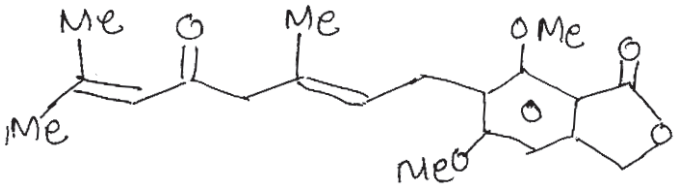
8.0(q), 17.0(q), 20.0(q), 28.0(t)

29.0 (q), 34.0(t), 35.0 (t), 49.0(s),

72.0(d), 82.0(d), 85.0(s), 125.0(s),

128.0(s), 135.0(d), 148.0(s).

b) Assign the signals to different protons in given compound. use decoupling and Noe experiment to assign the signals justify. **[6]**



1.79 d, J=1.2 Hz, 3H , 1.85 s,3H,

2.13 s, 3H, , 3.02s,2H

3.47 d, J=6.6 Hz, 2H , 3.91 s,3H

4.07 s, 3H, , 5.19s,2H

5.26 m, 1H, , 6.08 s,1H

6.65 s, 1H,

Spin Decoupling	Irradiationat	Change at
	1.79	5.26m→t J=6.6Hz
	5.26	3.47d→singlet
Noe	3.91	15% at 6.65

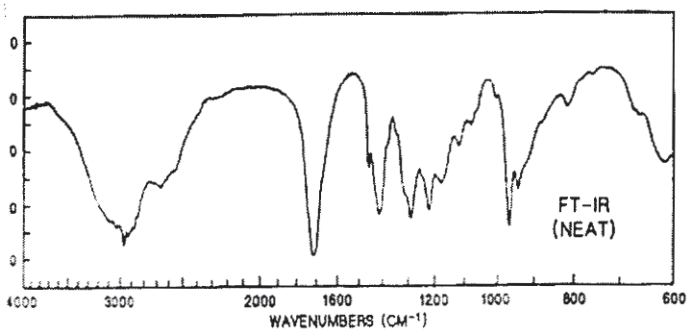
c) Answer any two of the following. **[6]**

i) Discuss the theory and instrumentation of HPTLC.

ii) Explain in brief any two detectors used in GCMS.

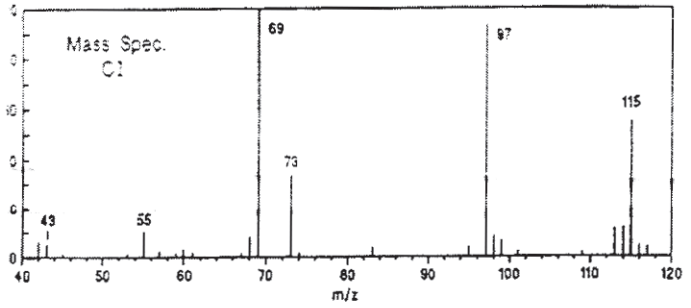
iii) Explain how corelation spectroscopy is useful in structure determination.

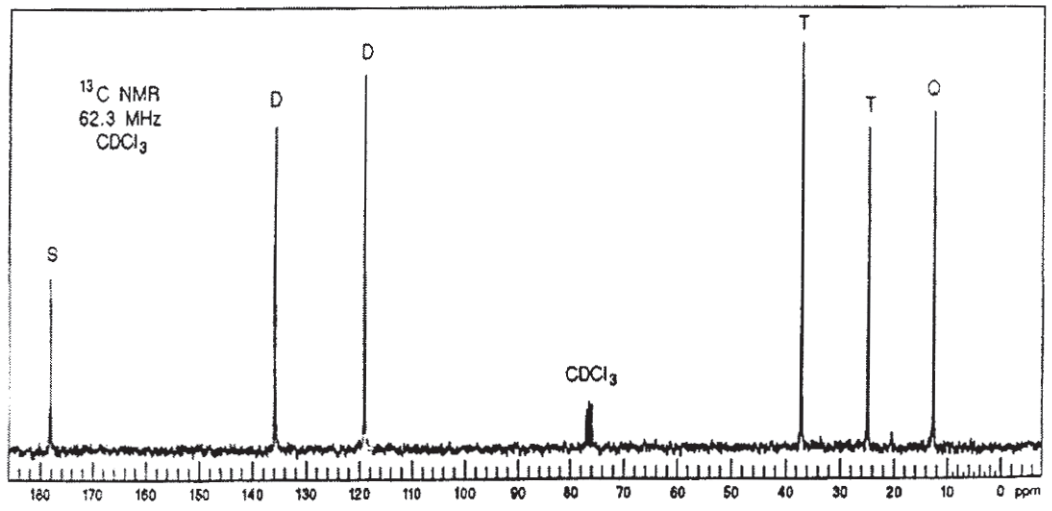
Q6) A compound exhibits the spectral properties shown on the attached sheet. Suggest the structure and explain the spectral data. **[12]**

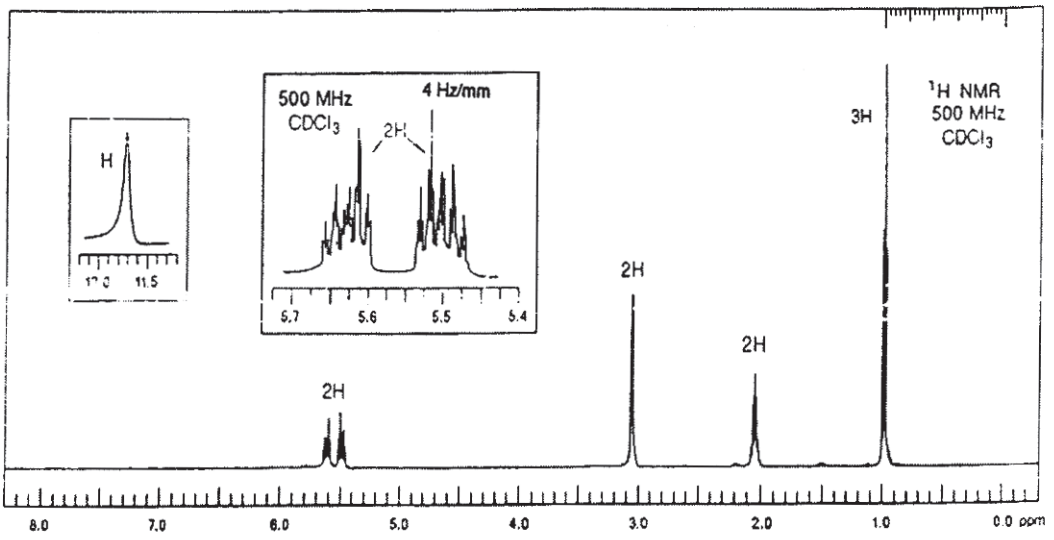


Exact M.S. (CI) = 115.0759

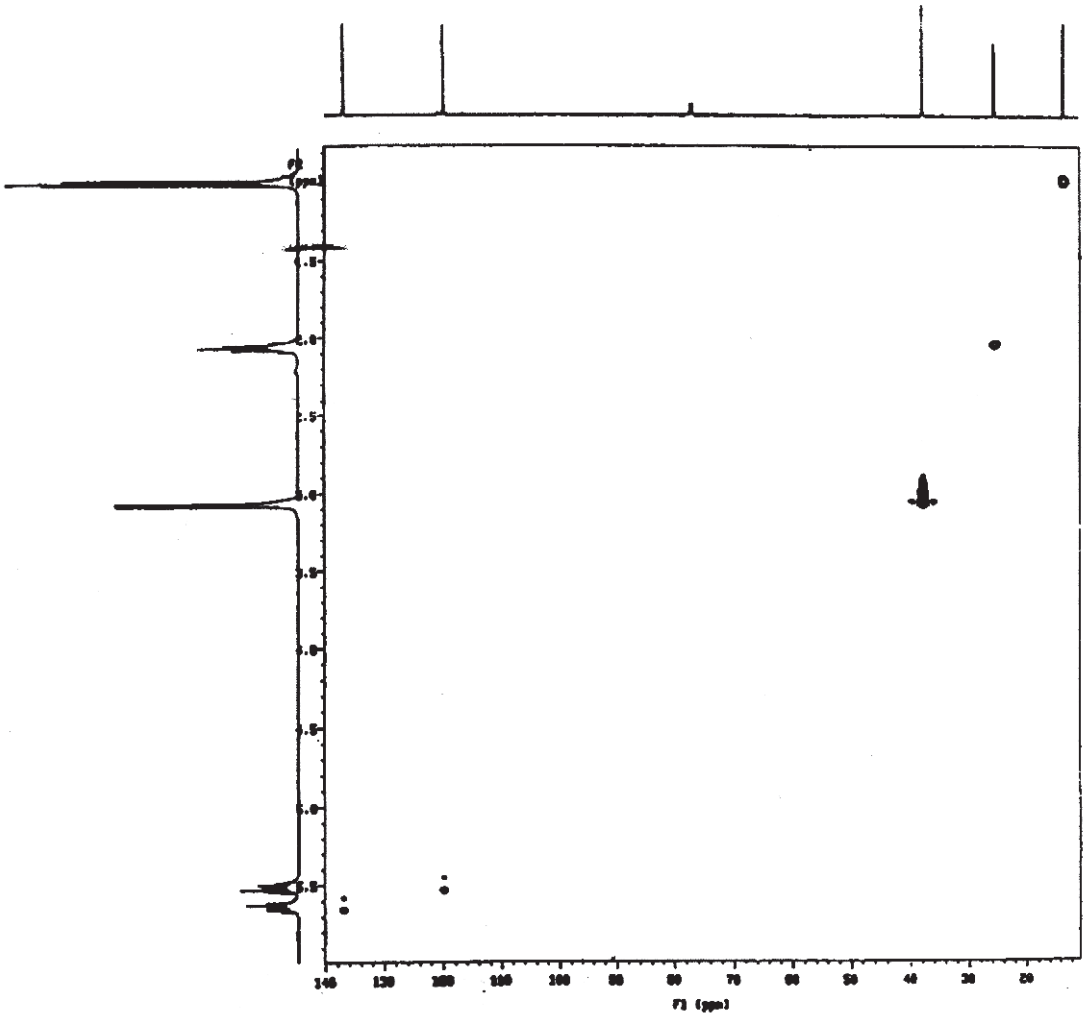
$UV\lambda_{max}$ = BLANK







HETCOR



Total No. of Questions : 6]

SEAT No. :

P2873

[Total No. of Pages : 3

[5532]-33
M.Sc.
DRUG CHEMISTRY
CH-363 : Drug Development
(Immunology and Microbiology)
(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

SECTION-I

Q1) Attempt any three of the following: **[15]**

a) What is Down Stream processing. Describe any one method used in the same.

b) Give a brief account of Microbial effluent treatment.

c) Give an outline classification of microbes.

d) Diagramatically represent a typical fermentor.

e) Describe the various phases of bacterial growth curve.

Q2) Answer any three of the following: **[15]**

a) What is Adaptive immunity. Describe its various types.

b) What are Immunosuppresants and Immunomodulators. Give examples of each.

c) Short note on: Hypersensitivity.

d) Describe the precipitation techniques used in detection of Antigen-antibody interaction.

e) Describe the structure of a typical antibody molecule.

P.T.O.

Q3) Answer any two of the following: **[10]**

a) Define the following terms:

i) Inverse Agonist

ii) Lead

iii) Drug potency

iv) Drug target

v) LD50

b) Define Bioassays. Discuss the various types of Bioassays.

c) Give a commentary on how combinatorial chemistry, HTS and computer have aided the process of drug discovery.

SECTION-II

Q4) Answer any three of the following: **[18]**

a) Give an account of all strategies involved in drug discovery.

b) Write a note on:

i) Ayurveda.

ii) Allopathy.

c) Describe basic and formal requirements of patents.

d) Explain the following:

i) Solid dosage forms.

ii) Liquid dosage forms.

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

a) Discuss the following:

i) Mutagenicity.

ii) Chronic toxicity.

b) Give the parameters used in toxicological evaluation of new drug.

c) What is pharmacokinetics? What are the factors that affect the pharmacokinetics of drug action.

Q6) Answer any two of the following: **[10]**

a) Write a short note on Routes of drug administration.

b) Make a comment on different sources of drugs.

c) Discuss the following:

i) Process development.

ii) Pharmacoepia.

✈ ✈ ✈

Total No. of Questions : 6]

SEAT No. :

P2874

[Total No. of Pages : 5

[5532]-34

M.Sc.

DRUG CHEMISTRY

CH-364 : Stereochemical Principles and Applications

(2008 Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

SECTION-I

Q1) Answer any four of the following: **[16]**

a) Explain which of the following compound form an epoxide on treatment with base.

b) Draw the conformational structures of the compound I & II. Give their nomenclature and discuss the stability.

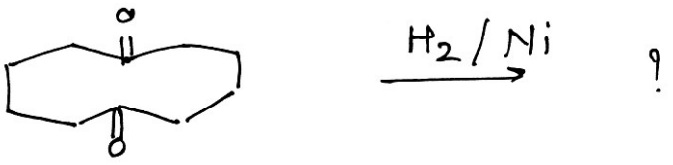
c) Cis 1, 2 dibromocyclohexane undergoes elimination to cyclohexene with KI in methanol at the rate 11 times slower than trans isomer.

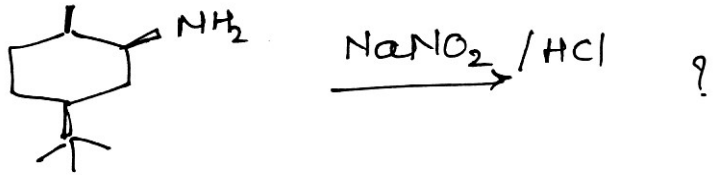
d) Reduction of camphor with LAH gives mainly isobornel. Explain with stereostructures.

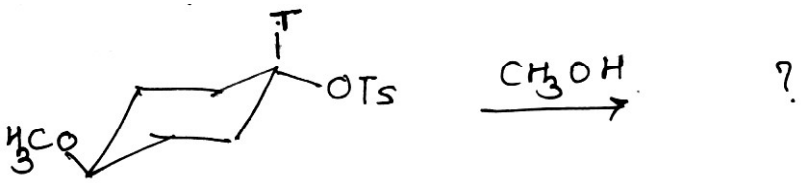
e) Cis decaline is less stable than trans decaline.

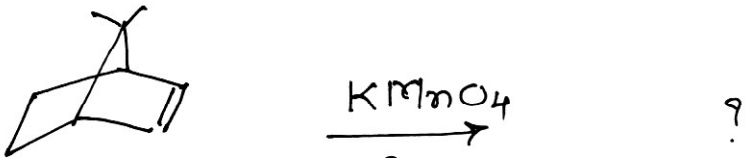
P.T.O.

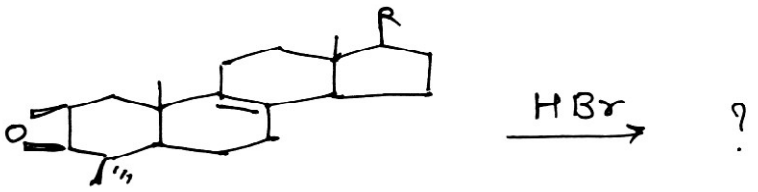
Q2) Predict the products and explain stereochemistry and mechanism of the following reactions. (<u>any four</u>) **[12]**

a) 

b) 

c) 

d) 

e) 

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

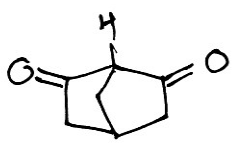
a) Write a note on 2 Alkyl keto & 3 Alkyl ketone effect.

b) Explain concept of I-strain.

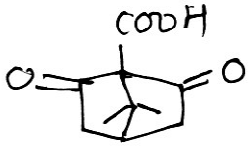
c) Explain Bredt's rule and its limitations.

d) In 3 and 4 membered rings $SP^2 \rightarrow SP^3$ is a facile process whereas in 5 membered rings $SP^3 \rightarrow SP^2$ is a facile process.

e) Compound I do not show acidic property, also compound II do not undergo decarboxylation. Explain.



I

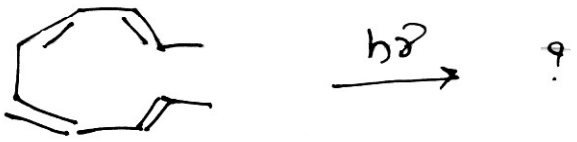


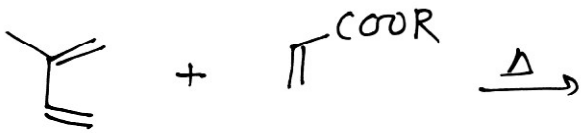
II

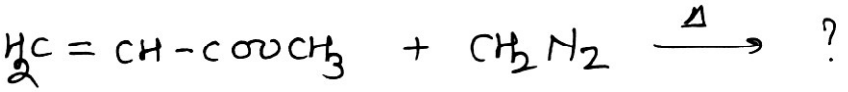
SECTION-II

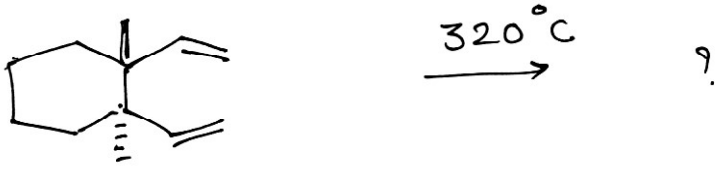
Q4) a) Construct the correlation diagram for disrotatory opening of cyclohexadiene to hexatrine, predict the allowed process on the basis of conservation of orbital symmetry. **[6]**

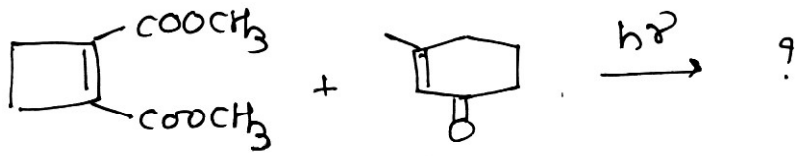
b) Predict the products and explain the stereochemistry (any five): **[10]**

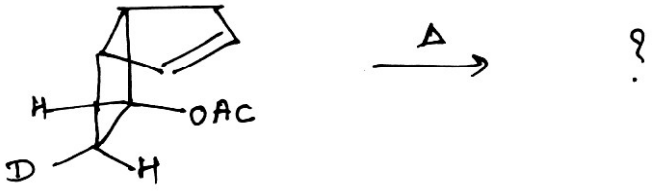
i) 

ii) 

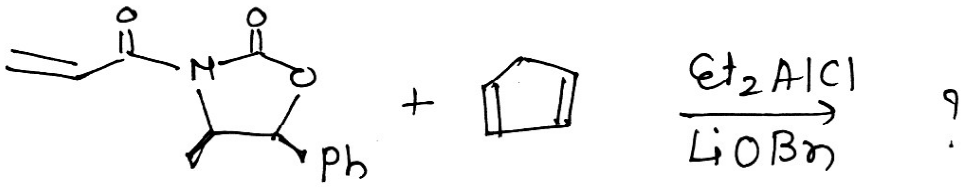
iii) 

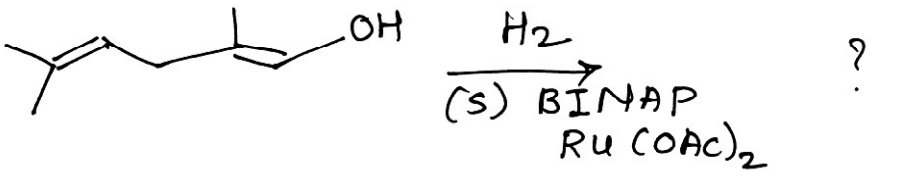
iv) 

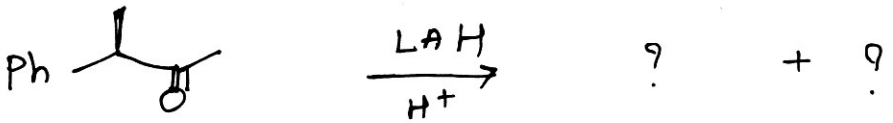
v) 

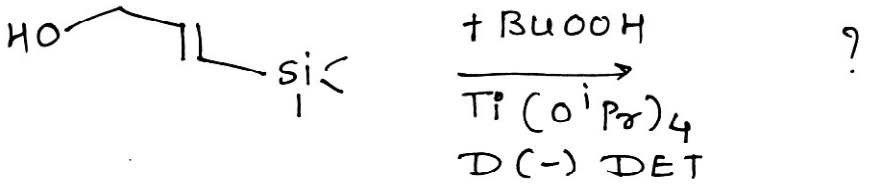
vi) 

Q5) a) Complete the following reactions. Give the mechanism involved (any Three): **[6]**

i) 

ii) 

iii) 

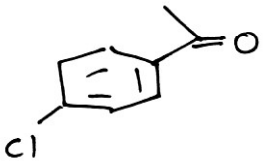
iv) 

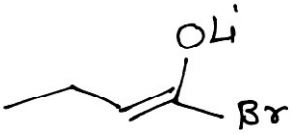
b) Attempt any Three of the following: **[6]**

i) Write a note on chiral Auxillary.

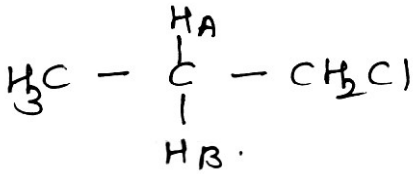
ii) Asymmetric Aldol condensation.

iii) Identify Re & Si faces from the following





iv) Write Pro R & Pro S for the following compound.



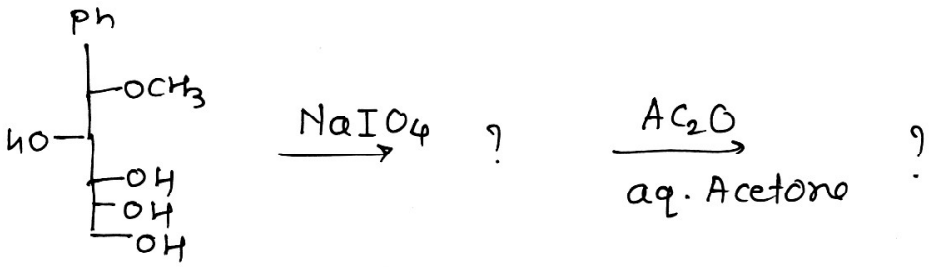
Q6) a) Write the reaction sequence for the conversion of aldohexose to aldopentose. **[4]**

b) Give the evidences for the ring structure of D-Glucose. **[2]**

c) Write $^{4}C_{1}$ and $^{1}C_{4}$ conformations of D-Glucose. **[2]**

d) Write the appropriate reagent and the product in any two of the following reactions. **[4]**

i)



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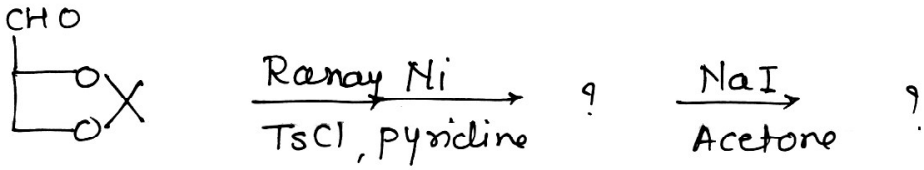

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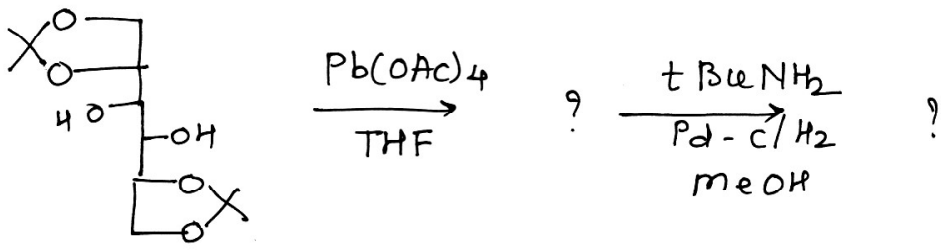


Total No. of Questions : 6]

SEAT No. :

P2882

[Total No. of Pages : 4

[5532]-4001
M.Sc. - II
DRUG CHEMISTRY
CHD-461 : Advanced Organic Synthesis, Principles and Strategies
(2013 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 50*

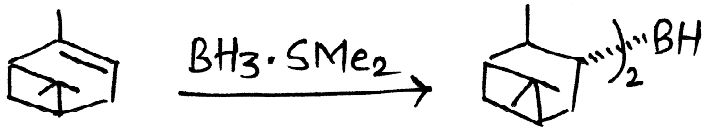
Instructions to the candidates:

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

SECTION - I

Q1) a) Answer any three of the following : **[6]**

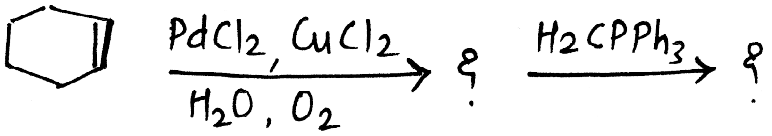
i) Explain the regio and stereoselectivity in the formation of organoborane from the alkene.



ii) 2-substituted 1, 3 dimethoxy benzene derivatives can be synthesized from 1, 3 dimethoxy benzene using organolithium compound.

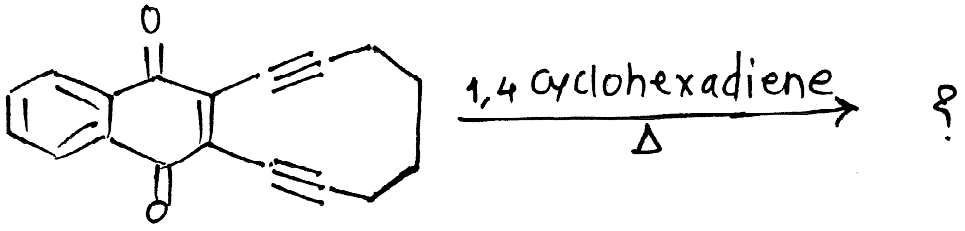
iii) The wittig reagent prepared from 5-Bromo-1, 3 cyclopentadiene is unreactive towards ketones & aldehydes?

iv) Complete the following transformation

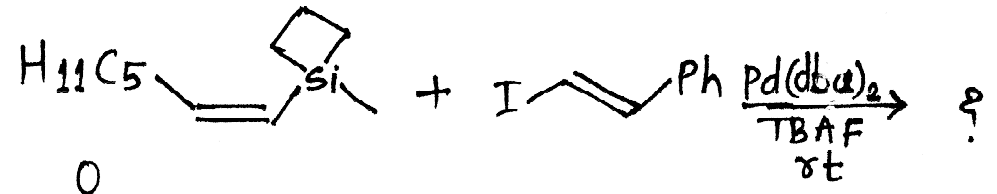


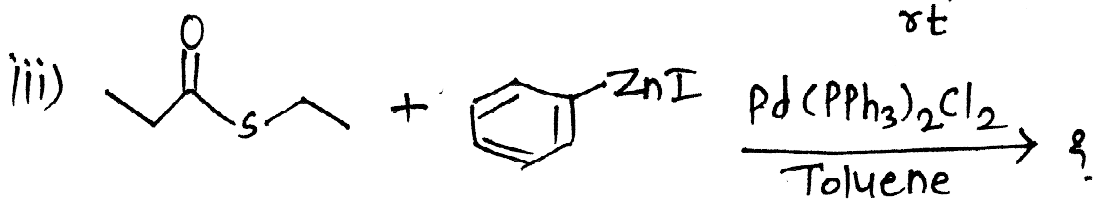
b) Predict the product for any two of the following reactions : **[4]**

i)

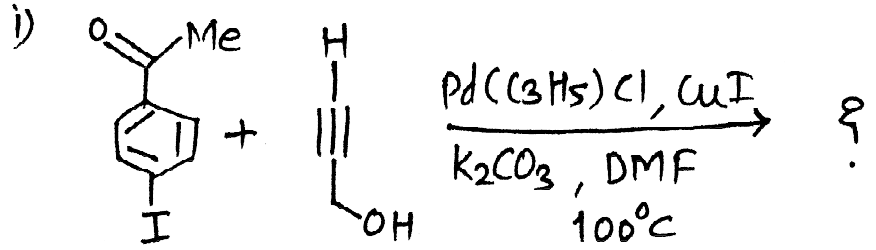


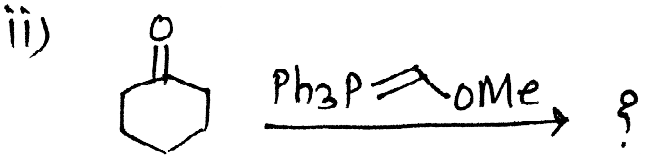
P.T.O.

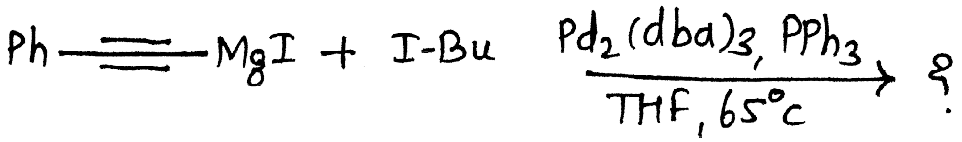
ii) 

iii) 

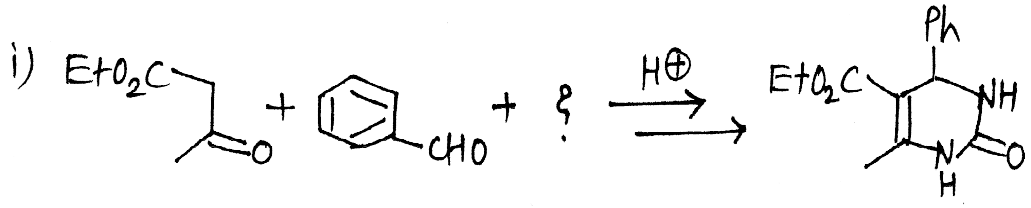
Q2) a) Predict the product and suggest a suitable mechanism for its formation (Any two) : **[4]**

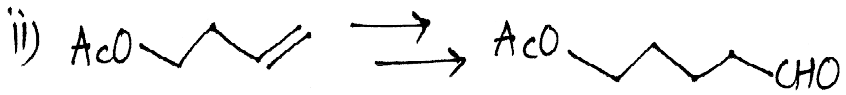
i) 

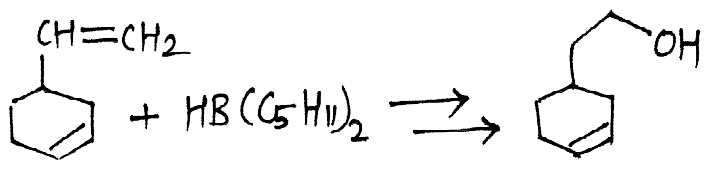
ii) 

iii) 

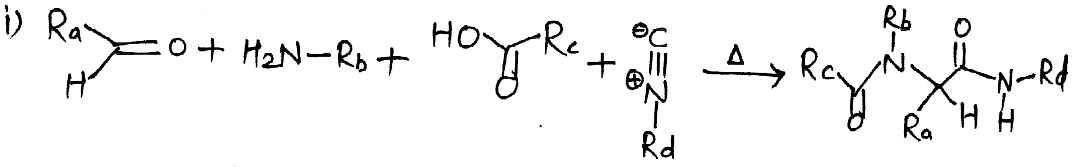
b) Carry out the following conversions and justify your answer (Any Two) : **[4]**

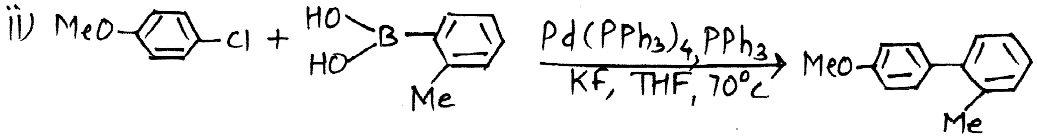
i) 

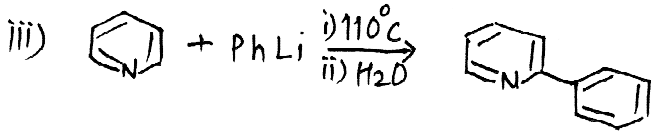
ii) 

iii) 

Q3) a) Explain the mechanism for <u>any two</u> of the following : **[4]**

i) 

ii) 

iii) 

b) Write short note <u>any two</u> **[3]**

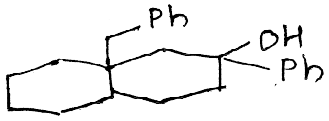
i) Heck reaction.

ii) Nazerov cyclization.

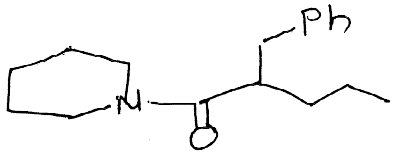
iii) Criterion for click reaction.

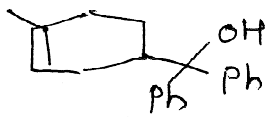
SECTION - II

Q4) Using retrosynthetic analysis, suggest the suitable method to synthesize <u>any three</u> of the following compounds. **[9]**

i) 

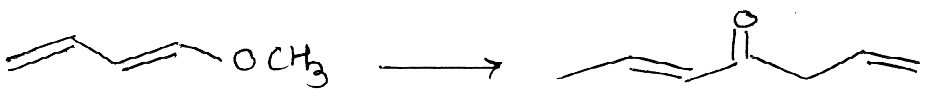
ii) 

iii) 

iv) 

Q5) a) Answer <u>any two</u> of the following. Carry out the following transformations. **[4]**

i] 

ii] 

iii] 

b) Answer any two of the following : **[4]**

i) Give four methods for the synthesis of epoxides.

ii) Benzyloxy carbonyl protection is preferred over benzyl group for protection of amino group of amino acid during peptide synthesis.

iii) Role of Trityl chloride in protection of 5'-OH group of nucleoside in nucleotide synthesis.

Q6) a) Answer any two of the following : **[4]**

i) Advantages of Green chemistry in organic synthesis with one example.

ii) Discuss the importance of following in organic synthesis :

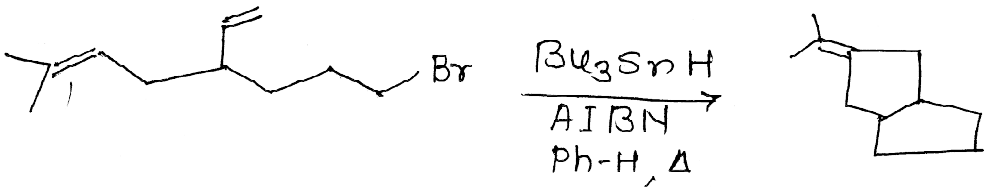
1) Microwave

2) Ionic liquids.

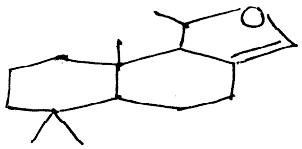
iii) Use of sulphur compounds in organic synthesis.

b) Answer any two of the following : **[4]**

i) Explain the steps involved in following reaction.



ii) Explain the biomimetic approach to the retrosynthesis of the following :



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

Total No. of Questions : 6]

SEAT No. :

P2884

[Total No. of Pages : 3

[5532]-4003

M.Sc.

DRUG CHEMISTRY

CHD-463 : Principles and Applications in Drug Design

(2013 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

SECTION-I

Q1) Answer any three of the following: **[9]**

a) What is DNA Microarrays? How it could be used to diagnose a disease.

b) What is Genetic engineering? Enlist the products obtained from it.

c) Define the following terms:

i) Tolerance

ii) Dependence

iii) Agonist

d) Define Monoclonal Antibodies. Explain the steps in preparation of it.

P.T.O.

Q2) Answer <u>any three</u> of the following: **[12]**

a) Describe the steps involved in signal transduction mechanism involved in GPCR.

b) Explain structures fo Ion channel receptor with schematic diagram.

c) Discuss in brief:

i) Equation of Best fit

ii) 3D QSAR

d) How has the concept of prodrugs helped to make better drugs. Explain with relevent examples.

Q3) Write short notes on <u>any two</u> of the following: **[4]**

a) Biologicals used as a drugs.

b) Fluid-Mosaic Model of cell membrane.

c) Design of Agonists.

SECTION-II

Q4) Answer <u>any three</u> of the following: **[9]**

a) Define the term 'Energy Minimization'. Explain how this technique is central in many of the drug design technologies.

b) Discuss how Hansch developed a Co between biological activity and physicoshemical parameters?

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

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

Q5) Answer <u>any three</u> of the following: **[12]**

a) Discuss in brief of the following:

i) COMFA

ii) Drug target

b) Discuss the Advantages of 3D QSAR over traditional QSAR.

c) What is solid phase synthesis? Discuss how it can be applied to synthesize Combinatorial Libraries.

d) Discuss in brief of the following:

i) Molecular mechanics.

ii) Quantum mechanics.

Q6) Write short notes on any two of the following: **[4]**

a) Dynamic combinatorial chemistry.

b) High throughput screening.

c) Docking.

✈ ✈ ✈

Total No. of Questions : 9]

SEAT No. :

P2885

[Total No. of Pages : 4

[5532]-4004

M.Sc. - II

DRUG CHEMISTRY

CHD-464 A : Bio Informatics, Cheminformatics and Biostatistics in Drug Discovery and Design

CHD-464 B : Current Trends in Organic Chemistry, Supramolecular, Green Chemistry, Photochemical and Free Radical Reactions

CHD-464 C : Entrepreneurship Development and Project Management

(2013 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any two of 464 A, 464 B, 464 C sections only.***
2) ***Each section is for 25 marks.***
3) ***All questions are compulsory.***
4) ***Answer to the two sections to be written in separate answer books.***
5) ***Figures in right indicate maximum marks.***

SECTION-I

(CHD-464 A : Bioinformatics, Cheminformatics and Biostatistics in Drug Discovery and Design)

Q1) Answer any three of the following: **[12]**

a) What is standard deviation? Explain it's significance. Compute the same for the following data of weight in gms. of 10 Apples -154, 156, 153, 159, 150, 152, 160, 149, 157, 158.

b) Compute Karl-Pearson's coefficient of correlation between number of workers and amount of the time in minutes it takes them to harvest the sugarcane in particular field.

Workers (n)	3	4	5	6	8	9	10
Time (t)	799	703	645	570	422	322	241

P.T.O.

c) Define Median and Mode. Compute the same for both.

Class:	10-20	20-30	30-40	40-50	50-60
Frequency	30	20	14	25	19

d) Explain the following:

i) Variance

ii) Normal distribution

iii) Multivariate analysis

iv) Correlation

Q2) Attempt any two of the following: **[8]**

a) Describe the types of Biological databases in brief.

b) Short note on : Structural bioinformatics.

c) Describe the significance and use of graph connection tables and linear notations in cheminformatics.

Q3) Attempt any two of the following: **[5]**

a) Briefly explain significance of Reaction databases.

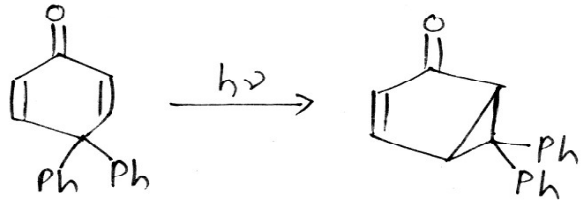
b) Short note on : Metabolomics.

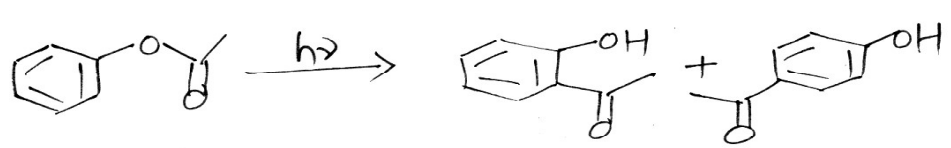
c) Briefly describe the use of Gene prediction programs.

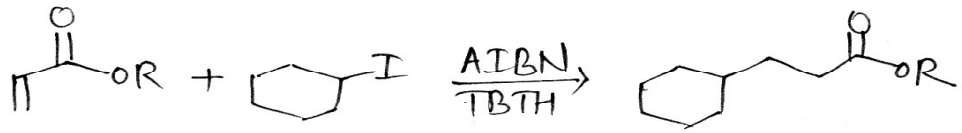
SECTION-II

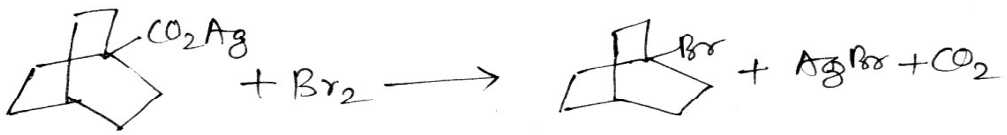
(CHD-464 B : Current trends in Organic Chemistry : Supra-molecular, Green Chemistry, Photochemistry and Free Radical Reactions)

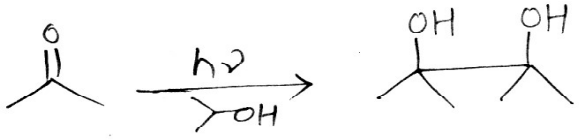
Q4) Suggest the mechanism and explain the following (any five): **[10]**

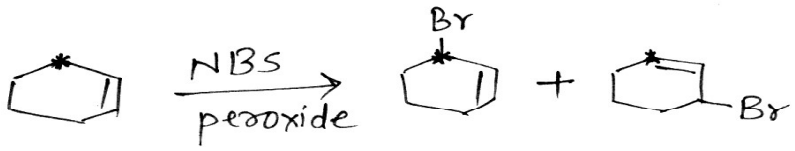
a) 

b) 

c) 

d) 

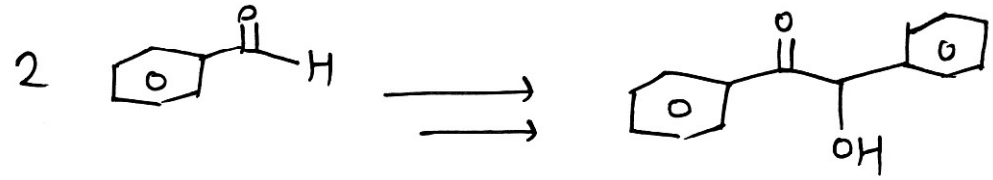
e) 

f) 

Q5) Solve the following (Any Four): **[10]**

a) Write a short note on "Molecular channels and transport process".

b) How can you prepare Benzoin using Green Chemistry approach?



c) Discuss Ultrasound assisted reactions with suitable examples.

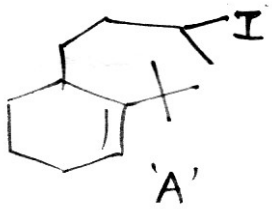
d) Explain the role of Green Chemistry in day to day life.

e) Give the uses of bio-catalyst in organic synthesis.

Q6) Answer the followings (Any two): **[5]**

a) Write short note on Norrish type II cleavage.

b) The compound 'A' follows free radical substitution pathway but not addition pathway with AIBN/TBTH. Explain.



c) Applications of ionic liquids in organic synthesis.

SECTION-III

(CHD-464 C : Entrepreneurship Development and Project Management)

Q7) Write short notes on any three of the following: **[6]**

a) Woman Entrepreneur.

b) Innovation theory of Entrepreneurship by schumpeter.

c) Entrepreneurship as style of management.

d) Concept of Entrepreneurship.

Q8) Answer any three of the following: **[9]**

a) Discuss the common errors made in writing a business plan that make it Failure.

b) Differentiate between Entrepreneur and Entrepreneurship.

c) Make a comment on Leibenstein's X-efficiency theory.

d) What economic factors affect the Entrepreneur environment?

Q9) Answer any two the following: **[10]**

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

b) Explain in brief "Conducting Feasibility Studies".

c) How external factors affect entrepreneurial growth?

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Total No. of Questions : 6]

SEAT No. :

P2875

[Total No. of Pages : 4

[5532]-41
M.Sc. - II
DRUG CHEMISTRY
CH-461 : Synthetic Methods in Organic Chemistry
(2008 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80*

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) Explain any three of the following : **[9]**

i) Formation of 4, 4'-dimethoxy benzoin from p-anisaldehyde involves umpolung of reactivity.

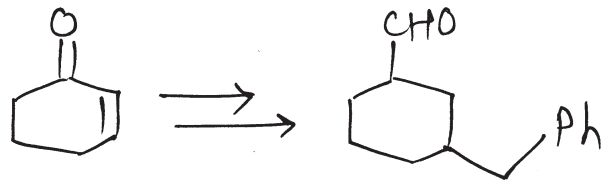
ii) Non terminal alkenes can be converted to terminal alkenes by use of hydroboration reaction.

iii) Enamines are usually preferred from secondary amines rather than primary amines.

iv) Organophosphoranes prepared from triethyl phosphite are preferred over phosphoranes prepared from tri-phenyl phosphine.

b) Complete the following transformation and justify your answer (any two) : **[6]**

i)



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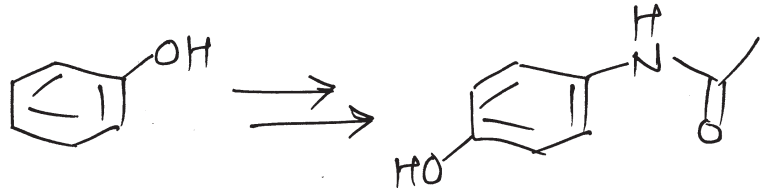

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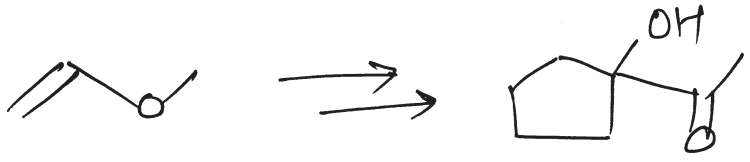
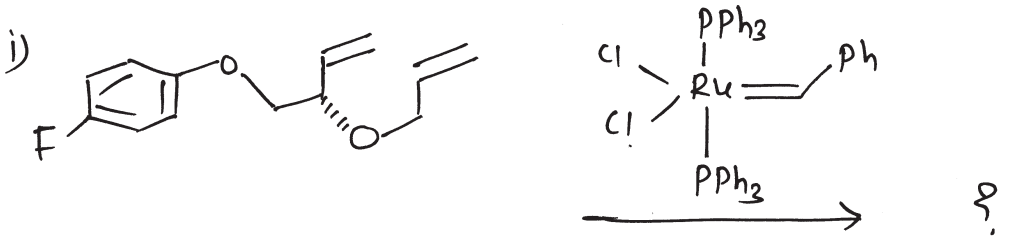


P.T.O.

Q2) a) Predict the product explaining the role transition metal complex (any three) **[9]**

i)



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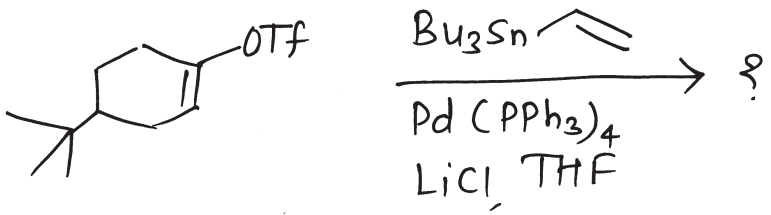

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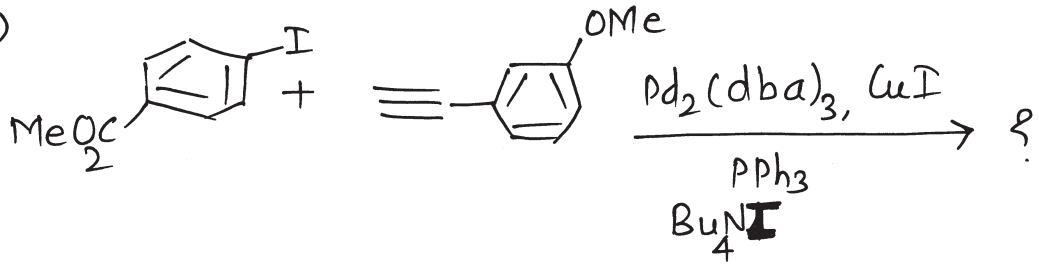
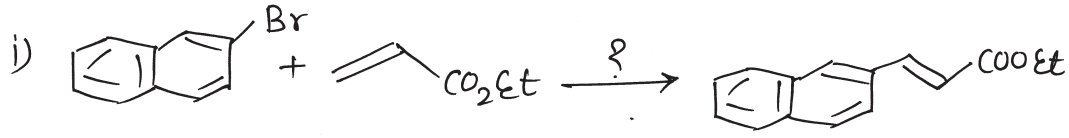


iv) $H_2C=CH_2$ $\xrightarrow[H_2O,\ O_2]{CuCl_2,\ PdCl_2}$?

b) Predict the reagent in the following conversion (Any Two) : **[6]**

i)



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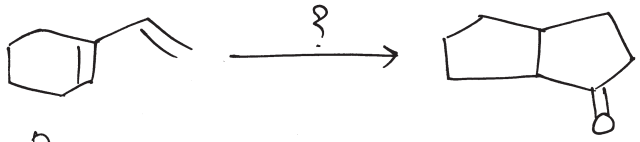

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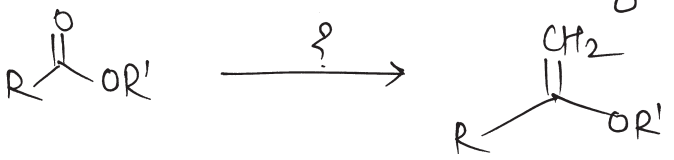
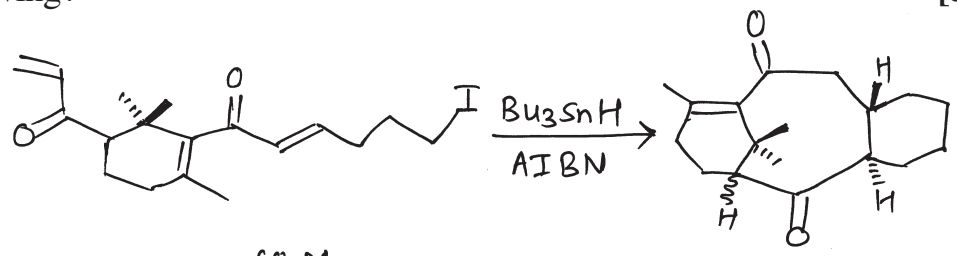


Q3) a) What is Domino reaction? Explain the steps involved in any one of the following? **[5]**

i)



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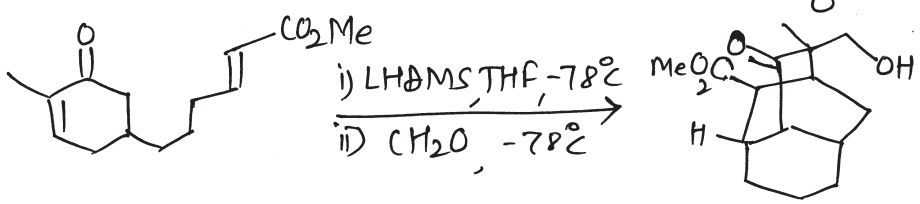
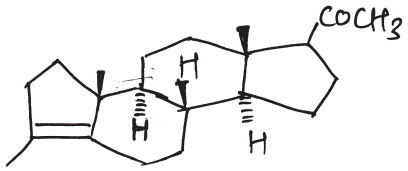
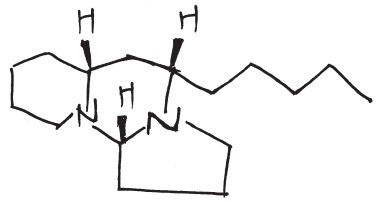


b) Explain the biomimetic approach to the retrosynthesis of any one of the following. **[5]**

i)



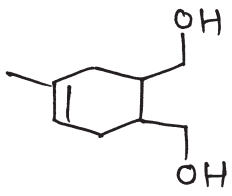
ii)



SECTION - II

Q4) Using retrosynthetic analysis, suggest a suitable method to synthesize any three of the following **[12]**

i)



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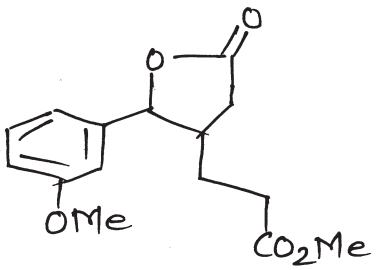

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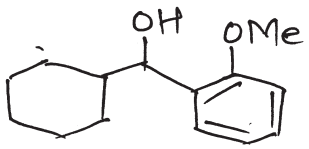
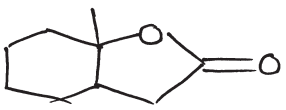
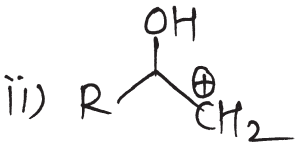


iv)



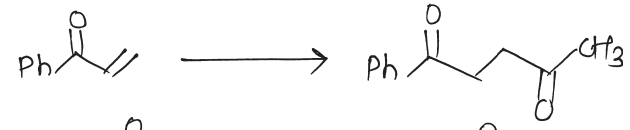
Q5) a) Give one reaction with reagent, for each synthon given below : **[6]**

i) 

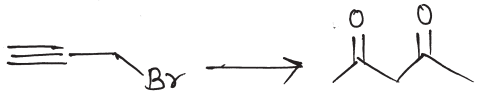
ii) 

iii) 

b) Using the method of umpolung carry out following transformations (any two) : **[6]**

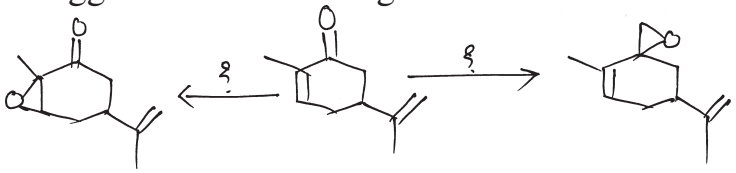
i) 

ii) 

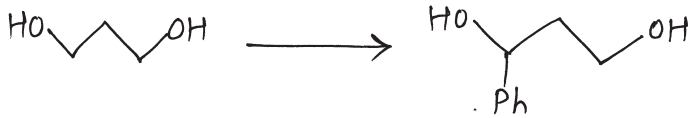
iii) 

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

i) Suggest the suitable reagents.



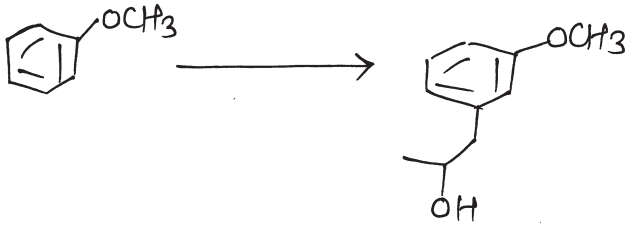
ii) Arrange the reagents in proper order to carry out the conversion.



Reagents - DHP, $H^{\oplus}$; PhMgBr, $H_3O^{\oplus}$; PCC, NaOAc; MeOH, $H^{\oplus}$

iii) Discuss the oxo process in organic synthesis.

iv) How the following conversion can be achieved?



v) Discuss the various protecting groups used for protection of hydroxyl group in nucleosides.

b) Attempt any one of the following : **[4]**

i) Principles of Green Chemistry.

ii) Use of nitroalkanes in 1, 4 dicarbonyl synthesis.

Total No. of Questions : 6]

SEAT No. :

P2877

[Total No. of Pages : 3

[5532]-43

M.Sc.

DRUG CHEMISTRY

CH-463 : Drug Design

(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

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

SECTION-I

Q1) Answer any two of the following: **[14]**

a) What is gene therapy? How someone suffering from SCID is treated by gene therapy?

b) Explain any two of the following:

i) Restriction endonuclease type II

ii) DNA vaccines

iii) Monoclonal antibodies

c) Define the terms proteomics, genomics and bioinformatics and give their applications.

P.T.O.

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

a) In an experiment of pea breeding out of 1600 seeds 908 were round, 293 were wrinkled green, 310 were round yellow and 89 were wrinkled yellow. The Mendel's theory says that these seeds should be in ratio of 9 : 3 : 3 : 1. Test at 5% level of significance whether the experiment fits the theory or not. $\left(x_3^2, 5\% = 7.813\right)$.

b) What is a regression line? Fit a linear regression line for the data given below.

Height of father in cm (x) :	162	165	166	168	173	174	178
Height of son in cm (y) :	164	168	166	170	176	173	180

c) In a sports event every year an average of 5 students take part in certain competition. Assuming Poisson distributions in a particular year find the probability that:

i) Exactly ten student participate

ii) At least one student participates

iii) Less than three will participate

Q3) Answer any two of the following: **[14]**

a) Draw a neat diagram of membrane, highlighting the membrane bound proteins. Explain their functions. Discuss their importance as drug target.

b) Explain in brief combinatorial synthesis. How is it important in pharmaceutical industries. Discuss the method used for mixed and parallel synthesis.

c) Explain in brief the reasons for designing pro-drugs. Discuss with suitable example how prodrugs have improved the pharmacokinetic profiles of drugs.

SECTION-II

Q4) Answer any three of the following: **[18]**

a) Discuss in detail the history and development of QSAR by Corwin Hansch.

b) Explain how the following are calculated/determined for a QSAR analysis:

i) 6 ii) π

iii) Es iv) Optimum log P

c) Discuss various terms involved in standard molecular mechanics force field. How does molecular mechanics differ from Quantum Mechanics.

d) Discuss in brief:

i) Systematic search

ii) Monte-Carlo Simulation

iii) Distance Geometry

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

a) Discuss how would you approach to design a drug molecule when the structure of the target is unkown and when the structure of the target is known. Justify your approach.

b) There are several ligands known to be ACE inhibitors. There biological activity has been determined. State which technique may be used to identify/develop a new lead from this data set. Justify your approach.

c) Discuss in brief structure based drug designing. Explain various steps involved and its application.

Q6) Attempt any two of the following: **[10]**

a) Receptor theories of drug action.

b) Application of Craigs plot and Topliss method.

c) Role of internet and databases in drug designing.

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