Total No. of Questions :6]

SEAT No. : ____

P1243

[Total No. of Pages :4

[5432]-31
M.Sc.
DRUG CHEMISTRY
CH-361: Chemistry of Heterocycles and Biologically Active Compounds
(2008 Pattern) (Semester-III)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figure 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) Compare the chemical behaviour of benzene, pyridine and pyrrole.

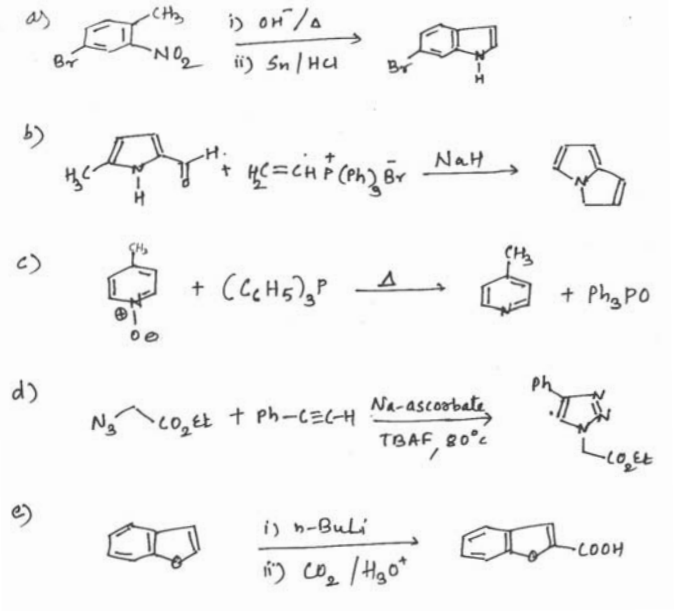
b) Explain the nitration of pyrrole.

c) Discuss the basicity of imidazole, thiazole and oxazole.

d) Pyrimidine undergoes electrophilic substitution mainly at C_5 - position. Explain.

e) Furan has lower boiling point than pyrrole. Explain.

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



P.T.O.

Q3) a) Write Short notes on any three of the following: **[9]**

i) Knorr pyrrole synthesis

ii) Medlung indole synthesis

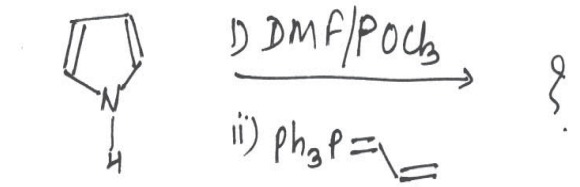
iii) Skraup quinoline synthesis

iv) Hinsberg thiophene synthesis

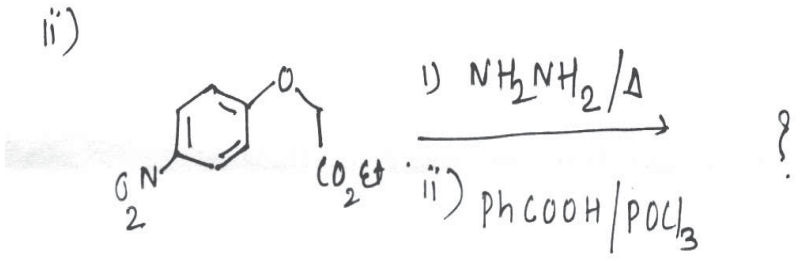
v) Role of amidine in imidazole synthesis

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

i)



ii)



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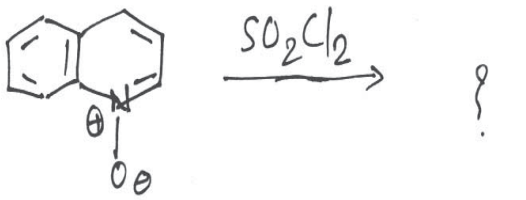
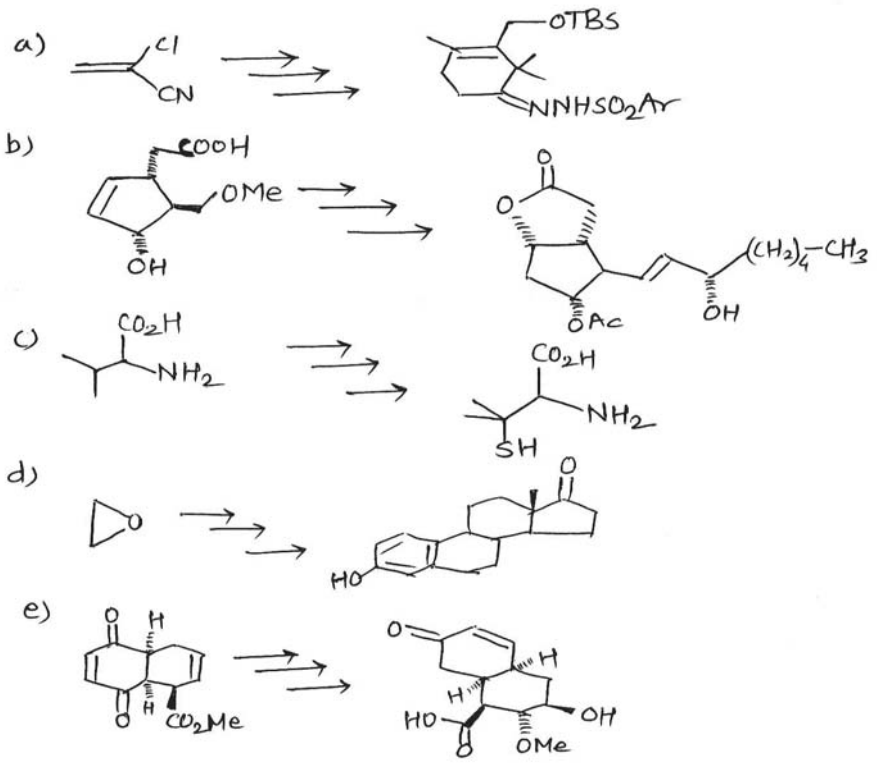
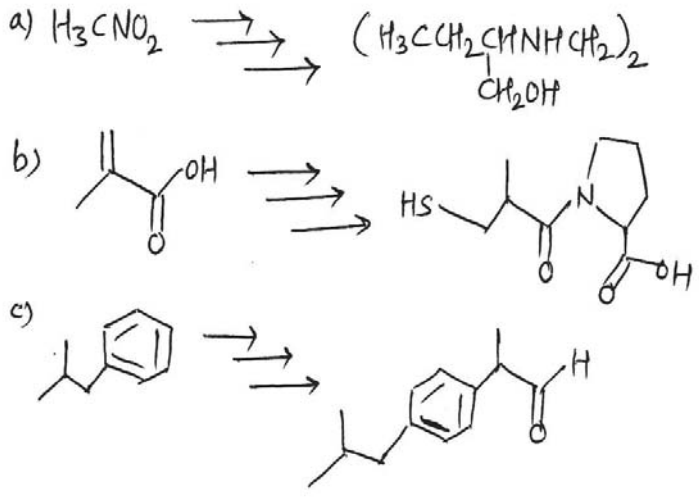


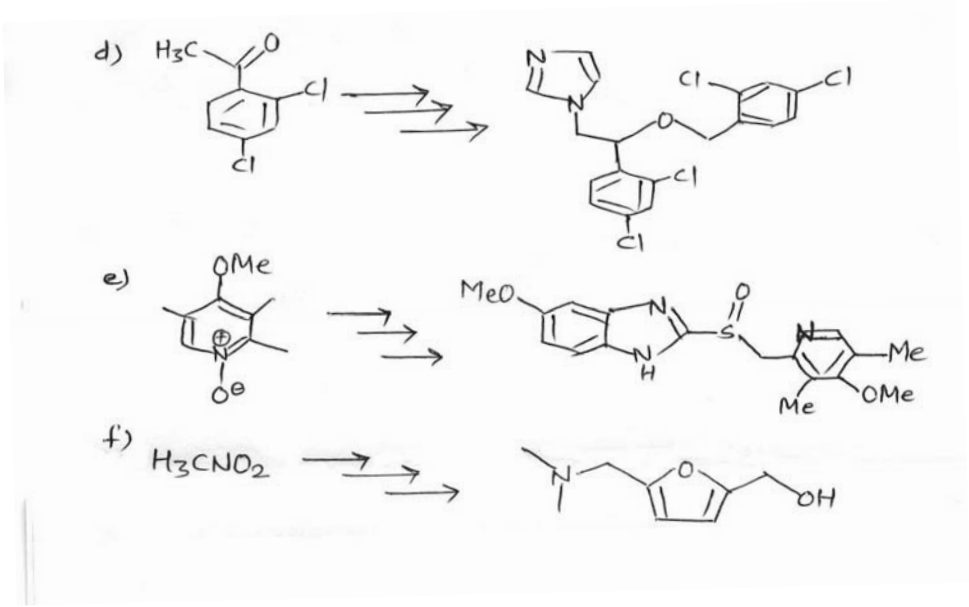
SECTION-II

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



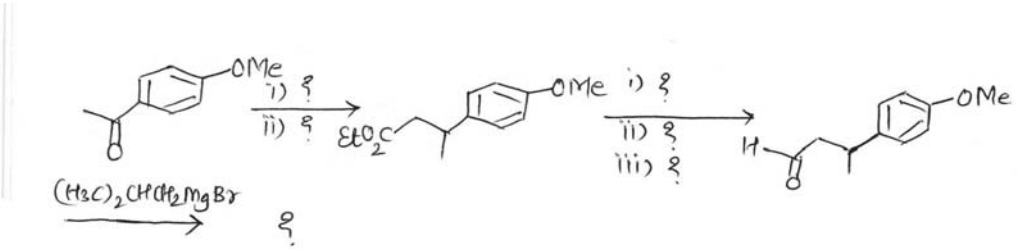
Q5) Discuss the steps involved in the synthesis of following drug molecules. Explain the mechanism involved (any four) **[16]**





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

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



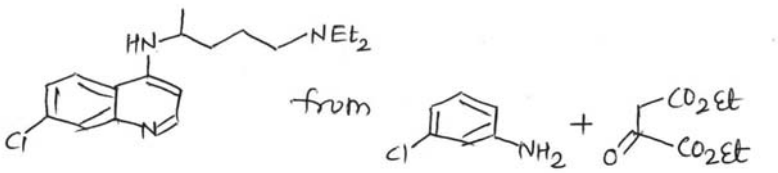
b) Explain with examples the following (any two)

i) McMurray Pinacol coupling.

ii) Horner-Wadsworth- Emmons reaction

iii) Darzens condensation reaction

c) Devise a synthetic pathway for the following.



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Total No. of Questions :6]

SEAT No. :

P1244

[Total No. of Pages : 4

[5432]-32
M.Sc.
DRUG CHEMISTRY
CH-362: Advanced Analytical Methods
(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 book.***
3) ***Figures to the right indicate full marks.***

SECTION-I

Q1) Explain any four of the following:

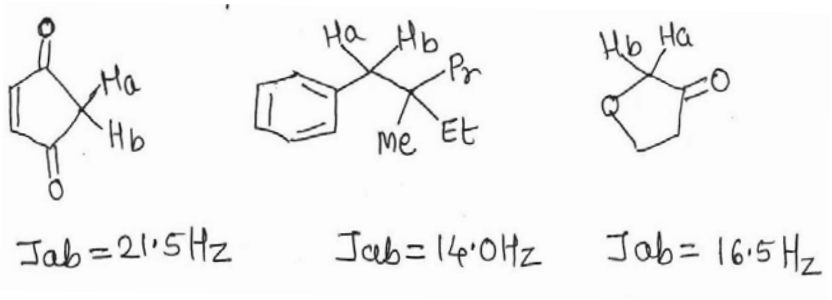
a) CD_3C1 shows seven lines of unequal intensity in CMR. **[12]**

b) One of the chemical shifts of acetylacetone appears at 15.1 as a singlet in PMR.

c) DEPT experiment is advantageous than APT.

d) $CH_3CH_2OCH{=}CH_2$ shows a strong peak at m/z-44.

e) The observed coupling constant values in following compounds.



Q2) Deduce the structure of any four of the following: **[16]**

a) MF : C_5H_6O

PMR : 6.3 dd, 15 & 2 Hz, 1H

4.5 dd, 15 & 6 Hz, 1H

3.8 s, 3H

3.1 dd, 6 & 2Hz, 1H

P.T.O.

b) MF : $C_5H_8O_2$
IR : 1780, 1170 Cm^{-1}
PMR : 1.35 d, 6Hz, gmm
1.5-2.6, m, 12mm
4.55, distorted sextet, 6Hz, 3mm
Mass : 100 (4.2), 85 (55), 56 (100), 43 (33)

c) MF : $C_6 H_g NO_2$
CMR : 21, 23, 26, 28, 136, 150
DEPT : 135: 21, 23, 26, 28 down, 136 up.
DEPT : 90: 136 up

d) MF : $C_{10} H_{10}O_3$
IR : 1680, 1602 Cm^{-1}
PMR : 3.1 (t,6Hz, 2H);
3.9 s, 3H
4.5, t, 6Hz, 2H
6.75 d, 2Hz, 1H
6.9 dd, 8 & 2Hz, 1H
8.05 d, 8Hz, 1H

e) MF : $C_8H_{10}O$
CMR : 23(q), 70 (d), 125 (d), 127(d,strong) 129 (d, strong), 146(s).

Q3) Write short notes on any three of the following: **[12]**

a) Factors affecting chemical shiftin PMR
b) Nuclear overhauser effect
b) Ionization techniques in mass spectrometry
d) Lanthanide shift Reagents.

SECTION-II

Q4) a) Explain the genesis of the lons for any three of the following: **[9]**

i) $C_6H_5CH_2OCOCH_3$ 108, 91, 77, 43

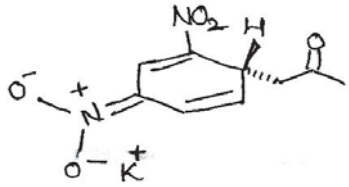
ii) Ethyl isobutyl ether 102, 87, 73, 59, 45, 31

iii) 4-Chlorobenzophenone 218, 216, 141, 139, 113, 111, 105, 77

iv) n-Butylbenzene 92, 91, 77, 65

b) Three isomeric compounds with M.F.-$C_6H_{14}O$ show base peak at 56, 45, 59 respectively. Write the three structures and justify your answer. **[3]**

Q5) A) Assign the given 13C-NMR signals to various carbons in the given compounds. **[4]**



205.6 (s,w); 133.4 (s); 127.6 (d,str); 121.6 (s,w) 47.0 (t); 34.5 (d); 29.8(q).

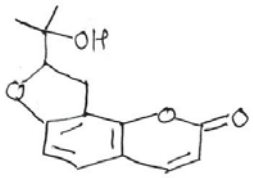
B) Answer any two of the following: **[6]**

i) Explain the factors which affect the resolution in HPLC.

ii) Write a short note on 'Detectors in HPLC'

iii) 'Discuss in brief applications of COSY and HETCOR

C) Assign the signals to the protons of the compound shown below. Justify your choice. Explain decoupling experiment. **[6]**



1.2 S, 9mm; 1.3 S, 9mm;

2.0 S, 3mm, exch; 3.3 d J=7 Hz, 6mm;

4.82 t, J=7Hz, 3mm; 6.25 d J=10 Hz, 3mm;

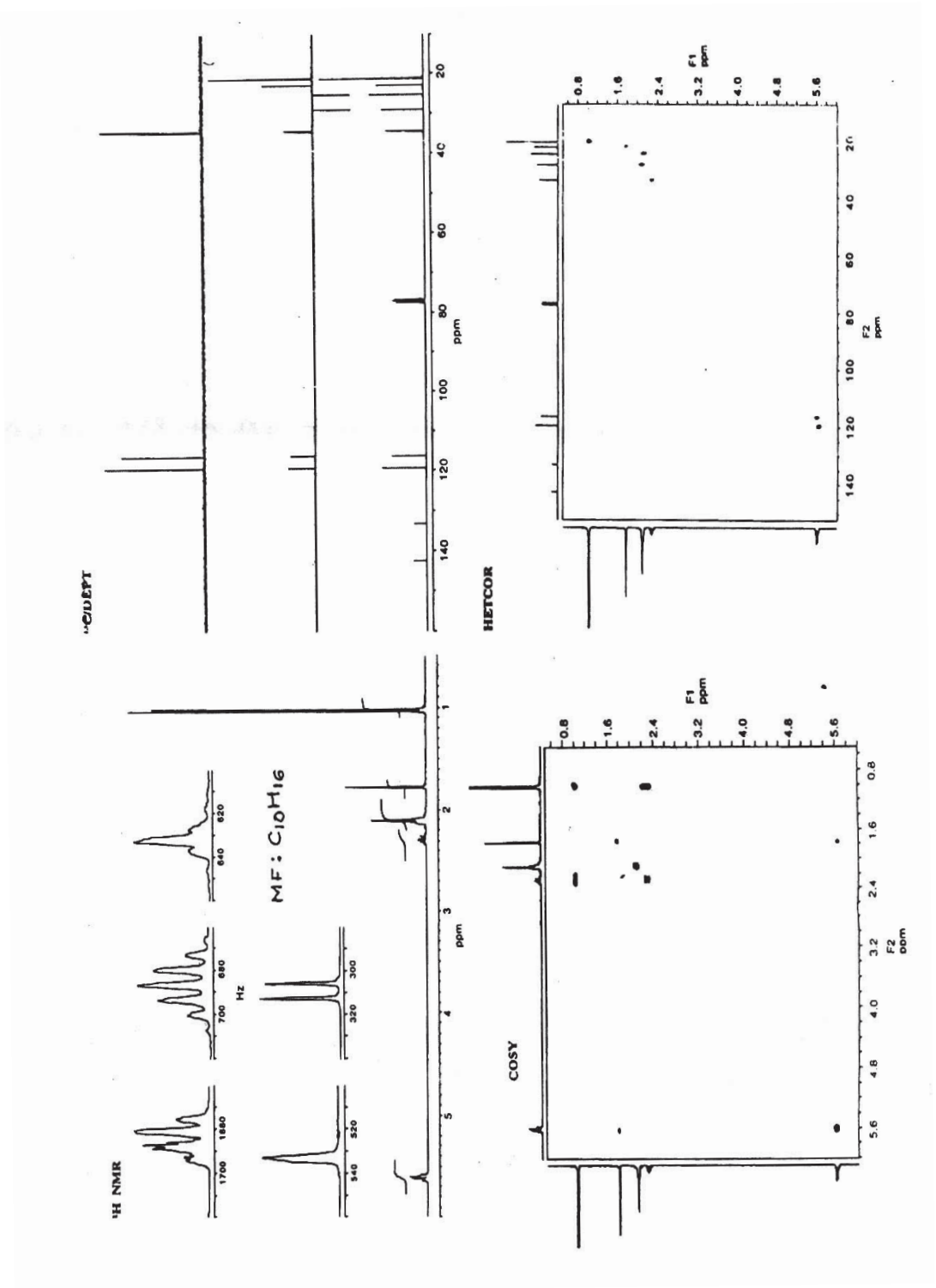
6.77 d, J= 8Hz, 3mm; 7.23 d J= 8Hz, 3mm

7.72 d, J=10Hz, 3mm

Decoupling Experiment:

Irradiated.	Observed.
3.3	4.82 t $\rightarrow$ s
6.25	7.72 d $\rightarrow$ s

Q6) You are provided with spectras of a compound on the next page. Analyse the spectras and deduce the structure. Justify your answer. **[12]**



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Total No. of Questions : 6]

SEAT No. :

P1245

[Total No. of Pages : 2

[5432]-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) Answer any three of the following: **[15]**

a) Give a brief classification of microbes.

b) Describe a typical bacterial growth curve.

c) Short note on: Chemical methods of effluent treatment.

d) Give a brief account of Primary and Secondary Screening of Industrially important microbes.

e) Enlist the components of a typical nutrient medium used for growing bacteria. State function of each.

Q2) Attempt the following (any three): **[15]**

a) Differentiate between Innate & Adaptive Immunity.

b) Short note on: Immunomodulators.

c) Describe type I or type IV Hypersensitivity.

d) What are Immunosuppresants. Give their significance.

e) Describe the structure of typical antibody molecule.

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

a) Explain the following:

i) FDA

ii) Pharmacoepia

b) Define Bioavailability and Bioequivalence. Discuss the need of Bioavailability.

c) How can we screened Lead Compounds from the following.

i) Natural Products. ii) Natural Ligand

P.T.O.

SECTION - II

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

a) Discuss the following in brief.

i) Carcinogenicity.

ii) Reproduction studies.

b) What is mean by GMP? Explain the various guidelines used in GMP.

c) Give a brief account of the toxicological tests performed on an NCE.

d) What is need of clinical trials? Explain all the phases involved in clinical trials.

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

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

b) Define the term patent. Discuss the patentable inventions.

c) Define dosage forms. Discuss the solid dosage forms with proper examples.

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

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

b) Make a comment on - 'Ayurveda system of medicine'.

c) Discuss the following:

i) Pharmacophore Identification.

ii) Documentation.

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Total No. of Questions : 6]

SEAT No. :

P1246

[Total No. of Pages : 4

[5432]-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 seperate answer books.***
3) ***Figures to the right indicates full marks.***

SECTION - I

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

a) Draw the stereostructures of perhydrophenanthene write their nomenclature.

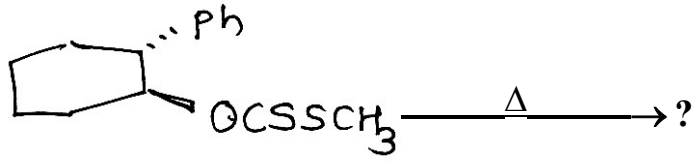
b) Trans 4-t butyl cyclohexanol is more strongly adsorbed on alumina than cis isomer.

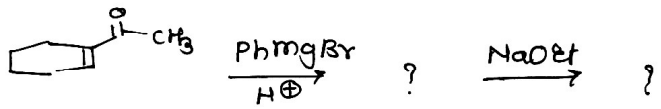
c) Bromocamphor fails to undergo dehydrobromination on reaction with base.

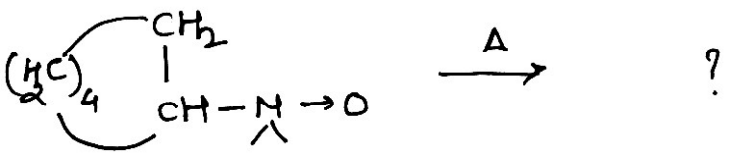
d) In 3 & 4 membered rings $SP^2 \rightarrow SP^3$ is facile process, whereas in 5 membered rings $SP^3 \rightarrow SP^2$ is facile process.

e) For cyclohexane 1,2 dicarboxylic acid PKa_2 - PKa_1 is higher than its trans isomer.

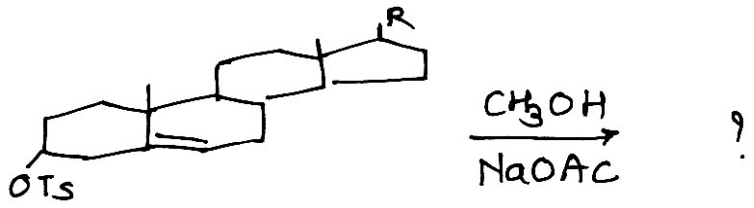
Q2) Write the mechanism of any four of the following. Explain the stereochemical principles involved. **[12]**

a) 

b) 

c) 

P.T.O.

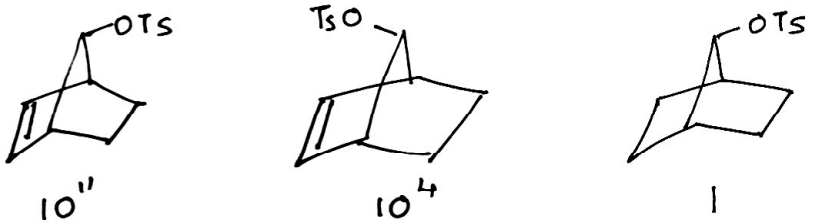
d) 

e) 

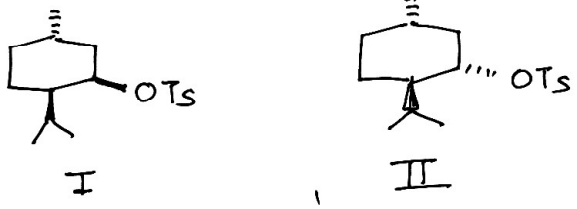
Q3) Solve <u>any three</u> of the following : **[12]**

a) Write a note on 'van Aurves. Skita Rule'. Give its Limitations.

b) Relative rate of acetolysis for the following compounds are mentioned below. Explain



c) Compound I solvalyze 170 times faster in acetic acid than compound II. Explain



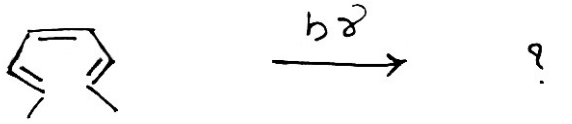
d) Write a note on 'Transannular Interaction' with example.

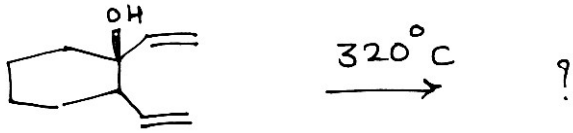
SECTION - II

Q4) a) Draw co-relation diagram for cycloaddition between 1,3 butadiene and ethylene. Explain supra and antrafacial reaction condition **[6]**

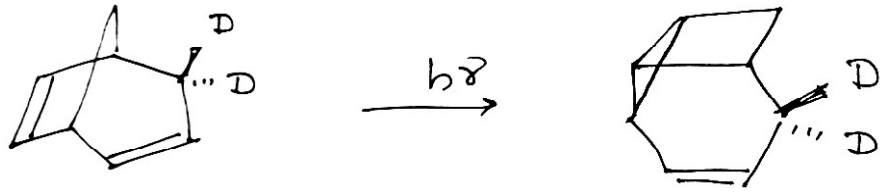
b) Predict the product/s in the following reactions (any two) **[5]**

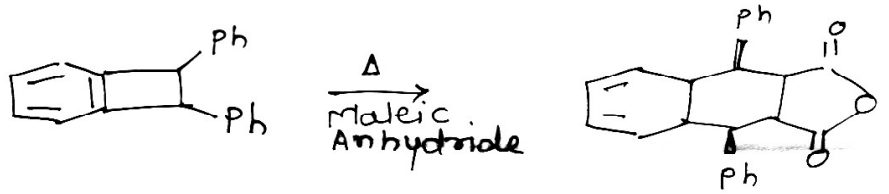
i) 

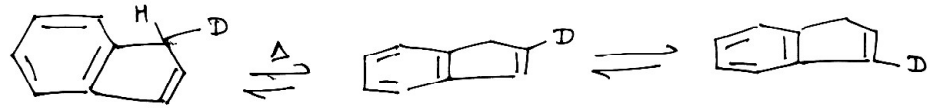
ii) 

iii) 

c) Suggest mechanism for any two of the following : **[5]**

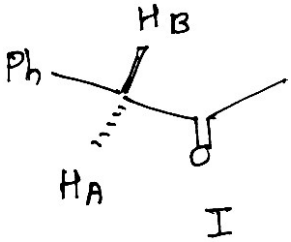
i) 

ii) 

iii) 

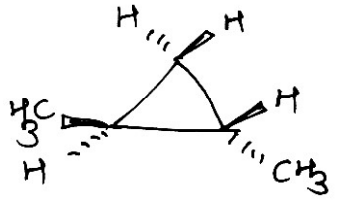
Q5) a) Attempt the following (any two) : **[6]**

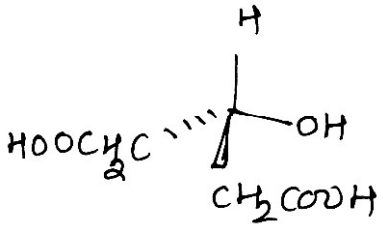
i) Write Pro R / Pro S for H_A & H_B in compound I



I

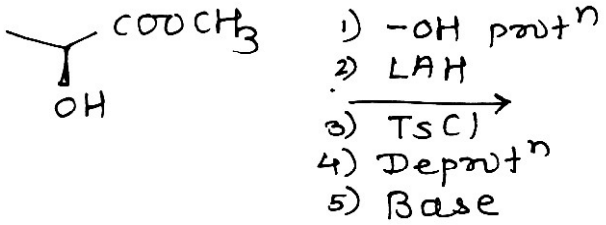
ii) Identify the homotopic or heterotopic group/ atoms in following compounds

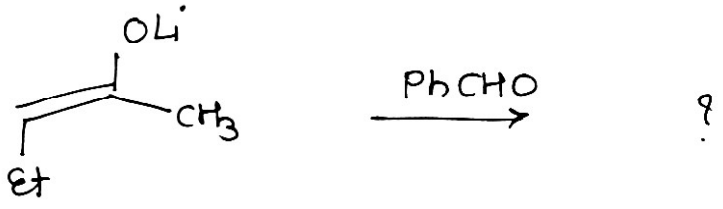


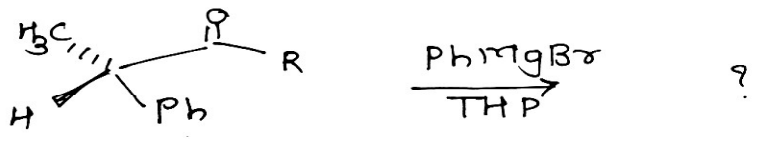


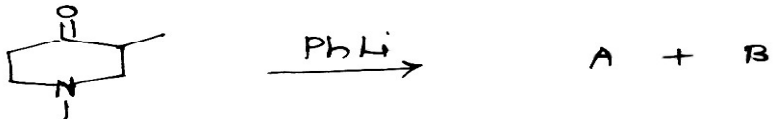
iii) Explain the Felkin's model and cram's model with suitable example.

b) Predict the product/s in the following reactions. (any three) **[6]**

i) 

ii) 

iii) 

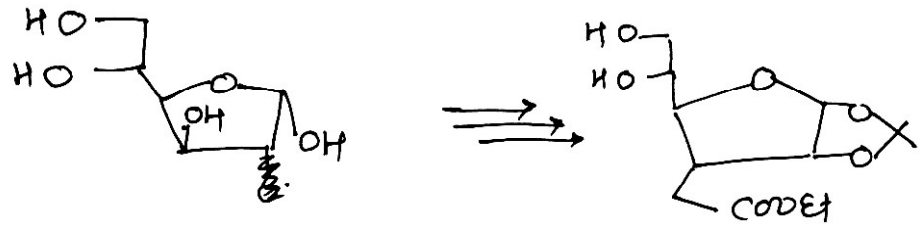
iv) 

Q6) Attempt the following any four : **[12]**

a) Hexose 'C' on catalytic reduction give two hexahydric alcohol D and E. Compound D can be obtained from D (+) glucose. Identify C, D, E.

b) Write a note on 'Anomeric Effect'.

c) Complete the following reactions :

i) 

OR

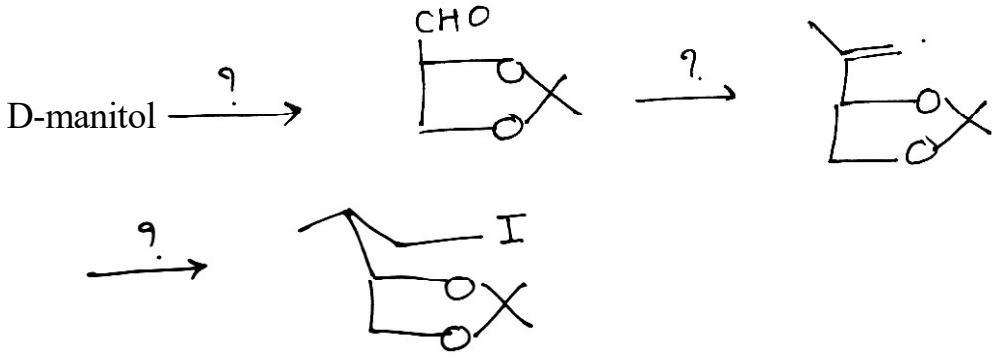
ii) D-Manitol $\xrightarrow{O}$ (S) propanediol

d) Give the product/s Obtain when D-Glucose is reacted with

i) $PhNHNH_2$ ii) Br_2 Water

iii) $CH_3OH/HClq$

e) Give the reagents for the following reaction products.



Total No. of Questions : 6]

SEAT No. :

P1247

[Total No. of Pages : 4

[5432]-41
M.Sc.
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 the two sections should be written in separate answer books.***
3) ***Figures to the right side indicate full marks.***

SECTION - I

Q1) a) Explain any three of the following with an example. **[9]**

i) 2-substituted 1,3 dimethoxybenzene derivatives can be conviniently synthesized from 1,3 dimethoxybenzene using organolithium reagent.

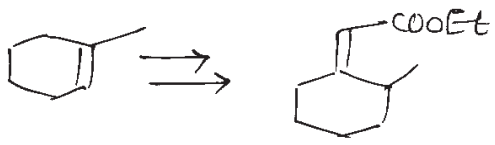
ii) Give the methods for epoxide synthesis.

iii) Organosulphur compounds can be used for umpolung reactions.

iv) Tertiarybutyl dimethylsilyl is used for selective protection of 5^1-hydroxy group in deoxynucleosides.

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

i)



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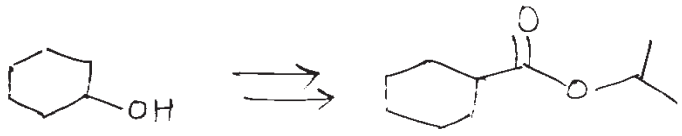
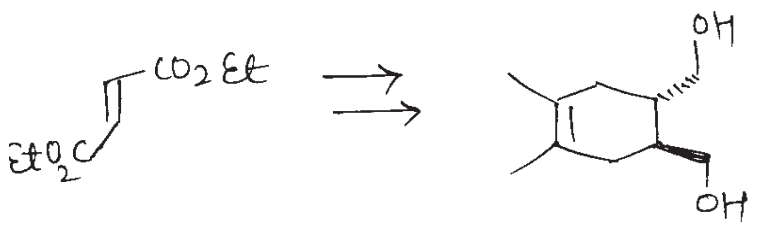
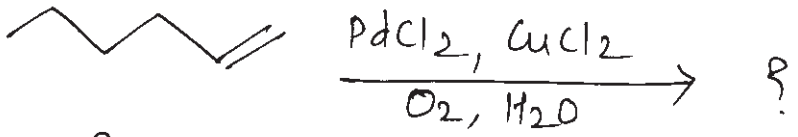


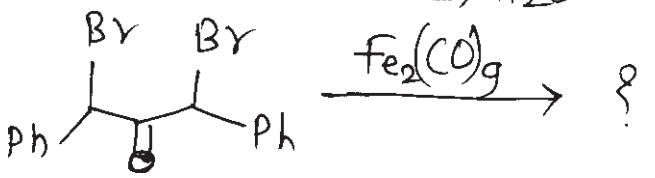
iii

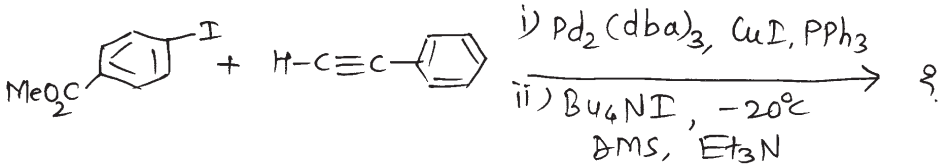


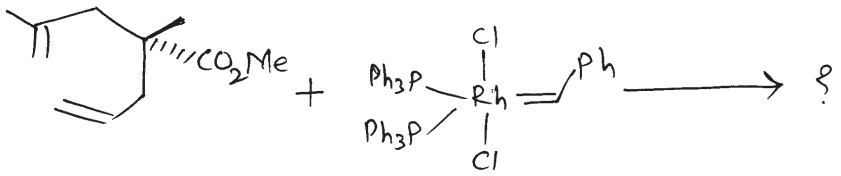
P.T.O.

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

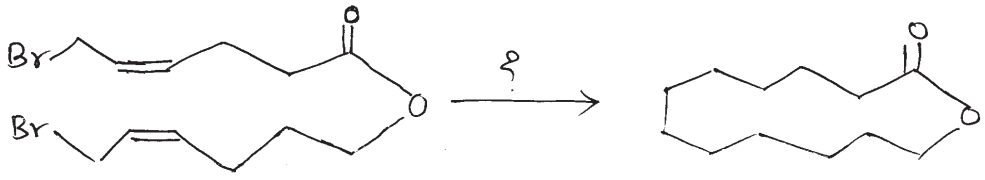
i) 

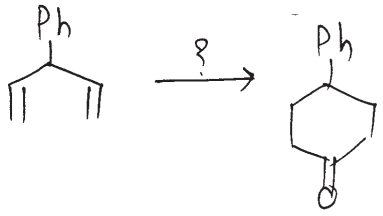
ii) 

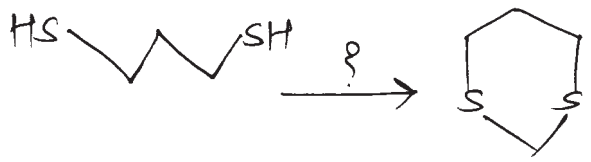
iii) 

iv) 

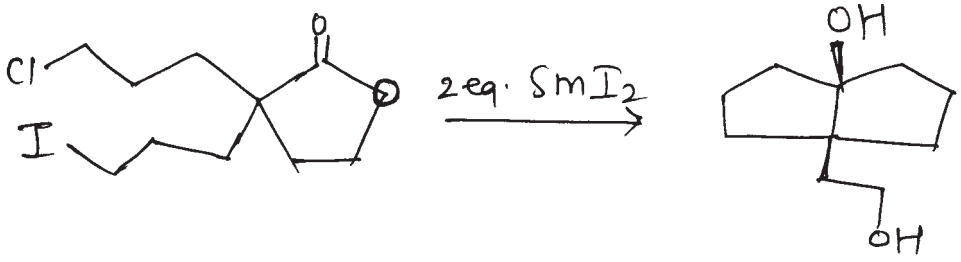
b) Predict the reagent in the following conversions. (any two) : **[6]**

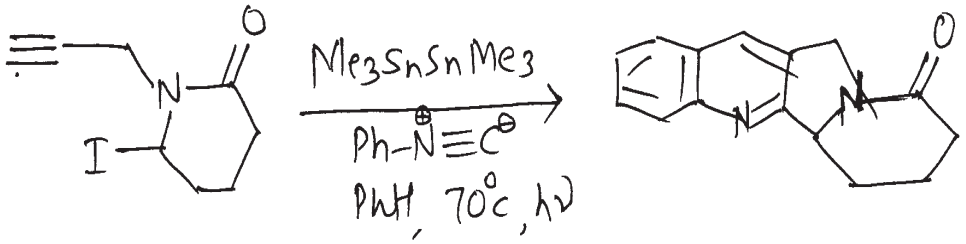
i) 

ii) 

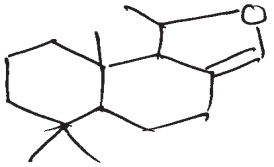
iii) 

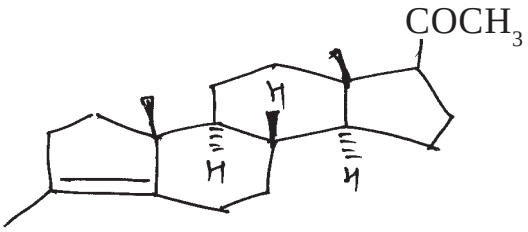
Q3) a) What is Domino reaction? Explain the steps involved in any one of the following reaction. **[5]**

i) 

ii) 

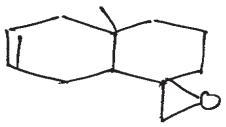
b) Explain the biomimetic approach to retrosynthesis to obtain any one of the following compounds. **[5]**

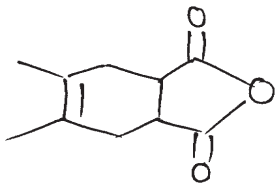
i) 

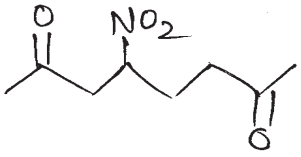
ii) 

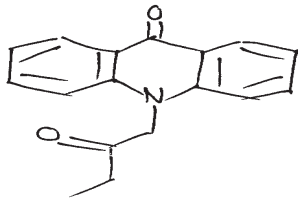
SECTION - II

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

a) 

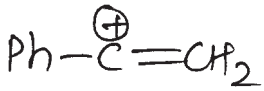
b) 

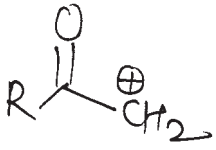
c) 

d) 

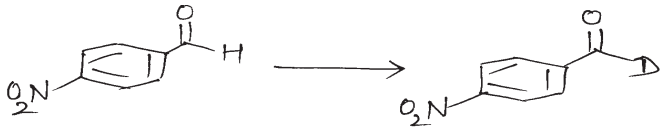
Q5) a) Give one reaction with reagents, for each synthon given below. **[6]**

i) 

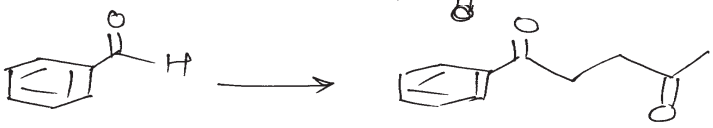
ii) 

iii) 

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

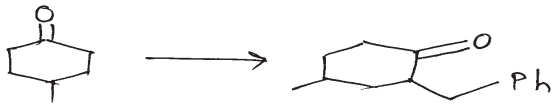
i) 

ii) 

iii) 

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

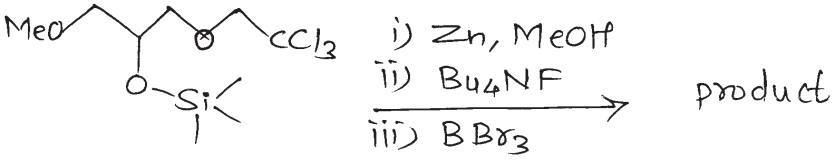
i) Carry out the following transformation by enamine approach.



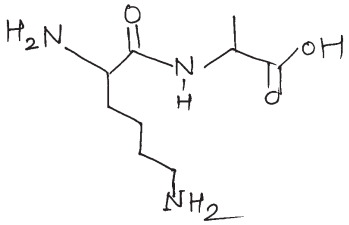
ii) Explain how organoboranes can be used to bring about the following transformation.

iii) Advantage of convergent synthesis over linear synthesis.

iv) Write the intermediates & final product for the reaction.



v) Discuss the steps involved in synthesis of the following peptide.



b) Give brief account of any one of the following: **[4]**

i) Use of microwave & ultrasonification in organic synthesis.

ii) Principles of Green Chemistry.

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Total No. of Questions : 6]

SEAT No. :

P1248

[Total No. of Pages : 2

[5432]-42
M.Sc. - II
DRUG CHEMISTRY
CH - 462 - Chemotherapy
(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 side indicate maximum marks.***

SECTION - I

Q1) Answer any three of the following. **[15]**

a) What are the characteristics of an ideal antibiotic ? How do B - lactum antibiotics affect the function of cell membrane in bacteria ? Explain.

b) Discuss in brief the development of I, II and III generation cephalosporins. Explain the benefits achieved in each generation.

c) Explain viral life cycle & discuss how Acyclovir & Cytrabine exhibit their activity.

d) Give a brief overview of drug resistance.Explain the mechanism of drug resistance.

Q2) Answer any two of the following. **[16]**

a) Give a brief overview of cancer. Discuss mechanism of action of alkylating Agents & Intercalators.Also explain about the side effects of these drugs.

b) What are common gastrointestinal disorders ? Explain Vomitting & Hyperacidity & Drug of choice to manage them.

c) With a neat diagram of neuron, explain the steps involved in neurotrans mission. Explain in brief depression & drug of choice with mechanism of action.

Q3) Discuss in brief any three of the following. **[9]**

a) Antimetabolites

b) Fungal infections

c) Tuberculosis

d) MAO inhibitors

P.T.O.

SECTION - II

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

a) Give a brief account of following C V S disorders (any 3).
   i) Hypertension
   ii) Angina
   iii) Congestive heart failure
   iv) Myocardial Infarction

b) How does the endocrine system maintain homeostasis ? Explain feed back mechanism of hormone release.

c) Explain in brief diabetes & management of NIDDM & IDDM.

d) Explain mechanism of Inflammation. How do different antiinflammatory drugs exhibit their activity ?.

Q5) Answer any two of the following. **[10]**

a) Discuss the role of natural products as drugs in disease management, explain mechanism wherever possible.

b) Explain the life cycle of plasmodium.Discuss the various strategies to control & treat Malaria.

c) Discuss the management of following disease.
   i) Emesis
   ii) Constipation
   iii) Epilepsy.

Q6) Discuss the mode of action & uses of any four **[12]**

a) Methotrexate

b) Sulbactum

c) Vinblastin

d) Trimethoprim

e) Clavulanic acid

f) Ketoconazole.

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Total No. of Questions : 6]

SEAT No. :

P1249

[Total No. of Pages : 2

[5432]-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) Explain in brief the basis of Gene therapy and antisense technology as novel therapeutic tools and their use.

b) Explain any two of the following :

i) DNA / RNA microarrays.

ii) Pharmacogenomics.

iii) Monoclonal antibodies.

c) Describe how medicinally important polypeptides and protein could be produced using recombinant DNA technology? Name some of the products currently used as drugs.

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

a) What is correlation? Find coefficient of correlation for the data of income X and expenditure Y in thousand Rs. of 8 families per month.

X :	4.8	5.2	5.4	6.0	6.7	8.5	9.1	9.5
Y :	3.9	5.0	5.1	5.9	6.5	8.4	9.0	9.4

b) Explain the following :

i) Standard deviation.

ii) Regression.

iii) Coefficient of variation.

c) Explain the terms arithmatic mean, median and mode with formula for discrete data. Also find the same for the data of weight (in Kg) of 10 experimental rabbits.

2.5, 3.8, 4.1, 2.0, 3.4, 3.8, 4.0, 3.8, 3.9, 3.1.

P.T.O.

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

a) Discuss the function of membrane bound receptor super families and explain the steps involved in signal transduction pathways.

b) Explain in detail the prodrug designing. Discuss their eventual ADMET benefits.

c) Give a brief overview of drug-receptor interactions. How these are helpful in drug designing?

SECTION - II

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

a) Describe three methods of energy minimization, enumerate the strength and weakness of each method.

b) What is meant by Forcefield? How is the energy calculated by Forcefield is different from quantum chemical calculations?

c) Explain in brief the development of QSAR. How was Hansch equation developed and applied for drug designing.

d) Give a brief overview of combinatorial libraries. Discuss the approaches to library design and synthesis. Explain the convolution and deconvolution process.

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

a) Discuss the Topliss scheme for aromatic and aliphatic substituents and its applications.

b) Discuss the following in brief :

i) Ab Initio method.

ii) Conformational search.

c) How will you approach towards designing a new hypertensive knowing the role of 'Angiotensin converting Enzyme' as an important target whose 3D structure is known?

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

a) Explain any two of the following :

i) COMFA.

ii) 3D Pharmacophore.

iii) High Through put screening.

b) Give brief account of theories of drug action. Discuss merits and demerits of these theories.

c) Discuss the statistical tests used for the validity of a QSAR equation. Explain these in brief.