Total No. of Questions :6]

SEAT No. :

P1452

[Total No. of Pages :5

[5125] - 31

M.Sc.

DRUG CHEMISTRY

CH-361: Chemistry of Heterocycles and Biologically Active Compounds

(2008 Pattern) (Semester - III) (Credit System)

Time : 3 Hours] *[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) Furan can't be alkylated by Friedel-Crafts Reaction.

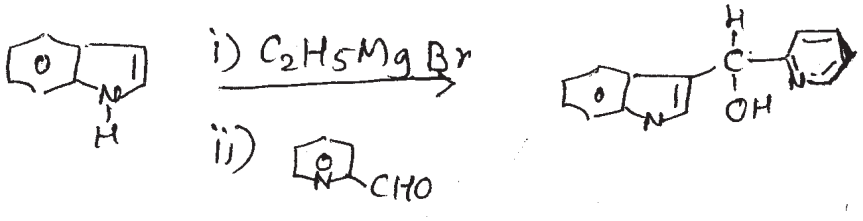
b) 2-Amino quinoline on diazotization gives 2-quinolone.

c) Imidazole is more acidic than pyrrole.

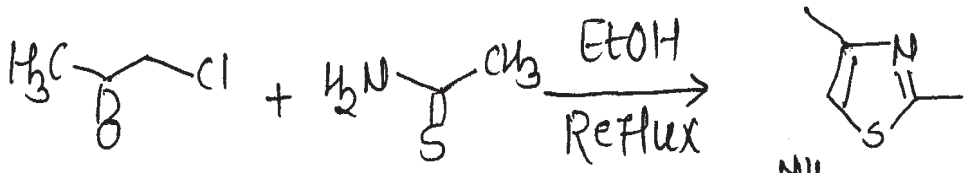
d) Thiazole is less susceptible to electrophilic substitution than thiophene.

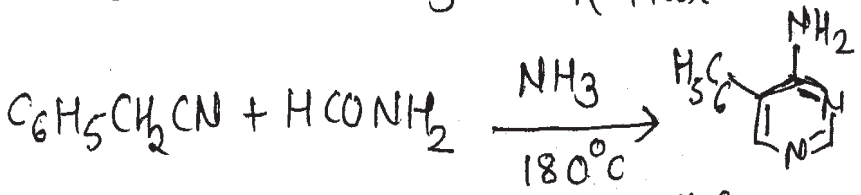
e) Application of 1,3-dipolar cycloaddition reaction is one of the principal method for preparation of 1, 2- azoles.

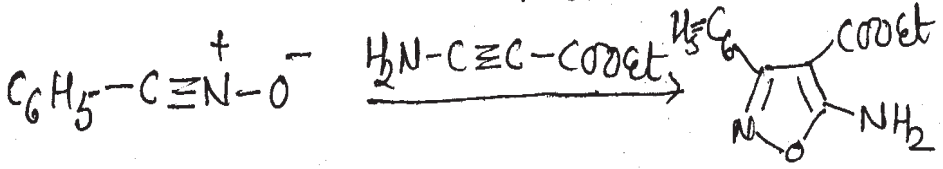
Q2) Suggest the suitable mechanism for any four of the following conversions. **[12]**

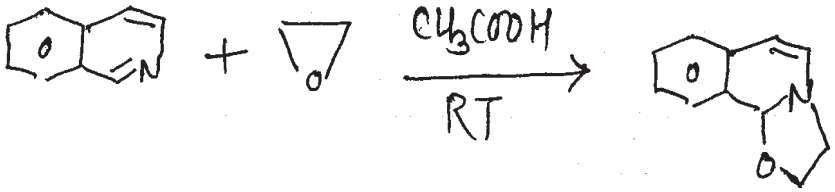
a) 

P.T.O.

b) 

c) 

d) 

e) 

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

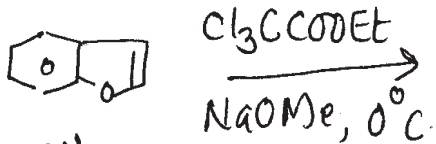
i) Paal - Knorr pyrrole synthesis.

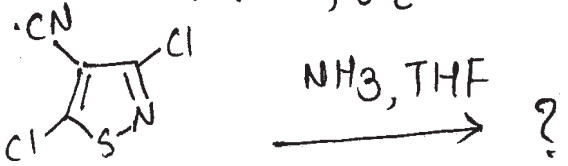
ii) Pomeranz - Fritsch synthesis.

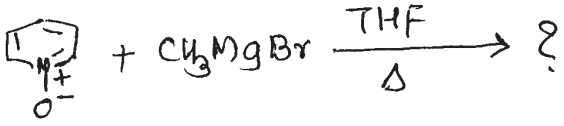
iii) Hantzsch Pyridine synthesis.

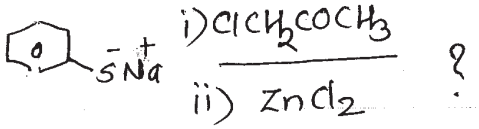
iv) Nenitzescu Indole synthesis.

b) Predict the products with mechanism (any two): **[7]**

i) 

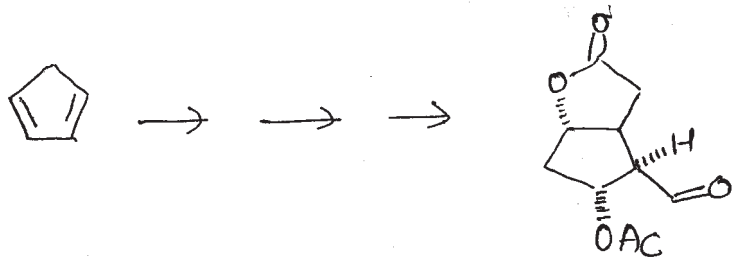
ii) 

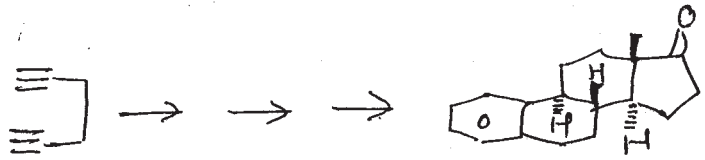
iii) 

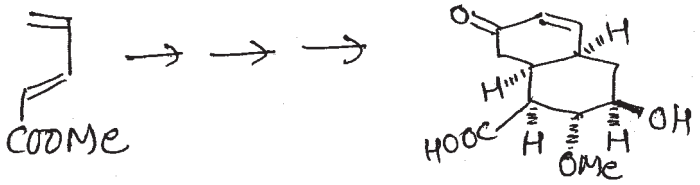
iv) 

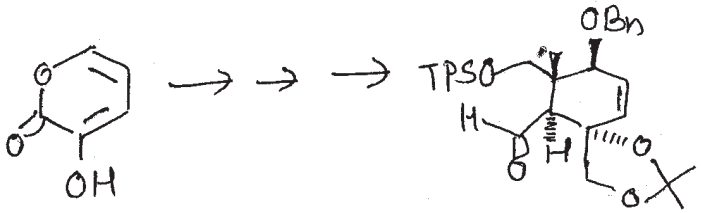
SECTION -II

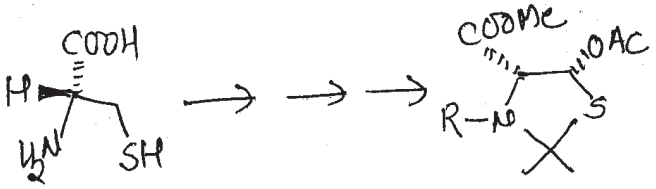
Q4) Discuss the steps involved in the following transformations. Comment on the steps indicating mechanism and reagents used (any three): **[15]**

a) 

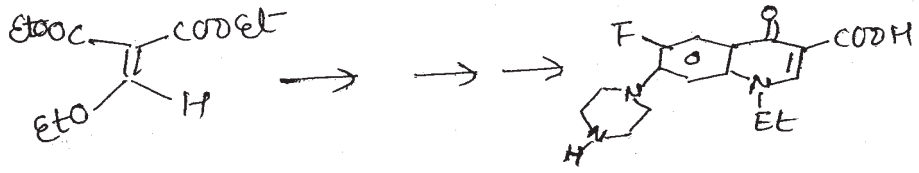
b) 

c) 

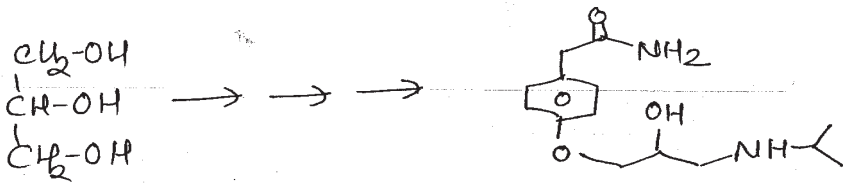
d) 

e) 

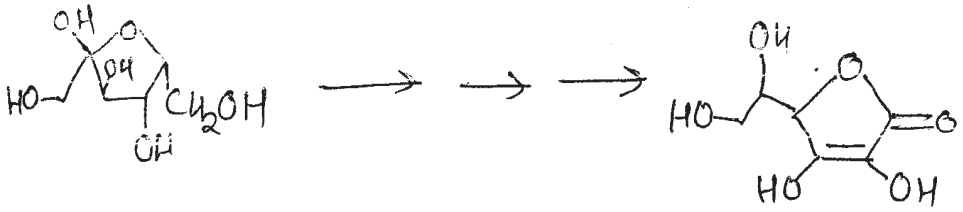
Q5) Discuss the steps involved in the synthesis of following drug molecules. Explain the mechanism involved (any four): **[16]**

a) 

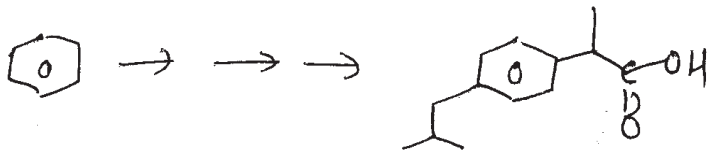
b)



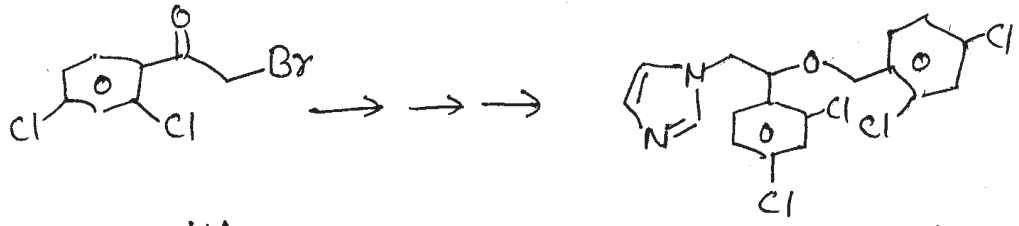
c)



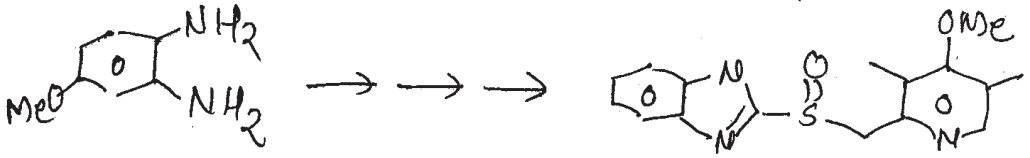
d)



e)

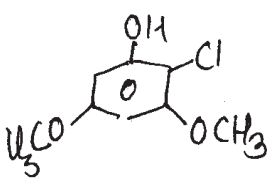


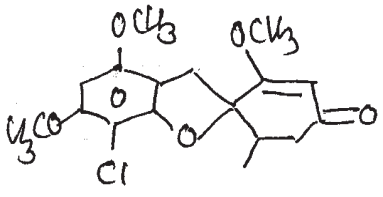
f)



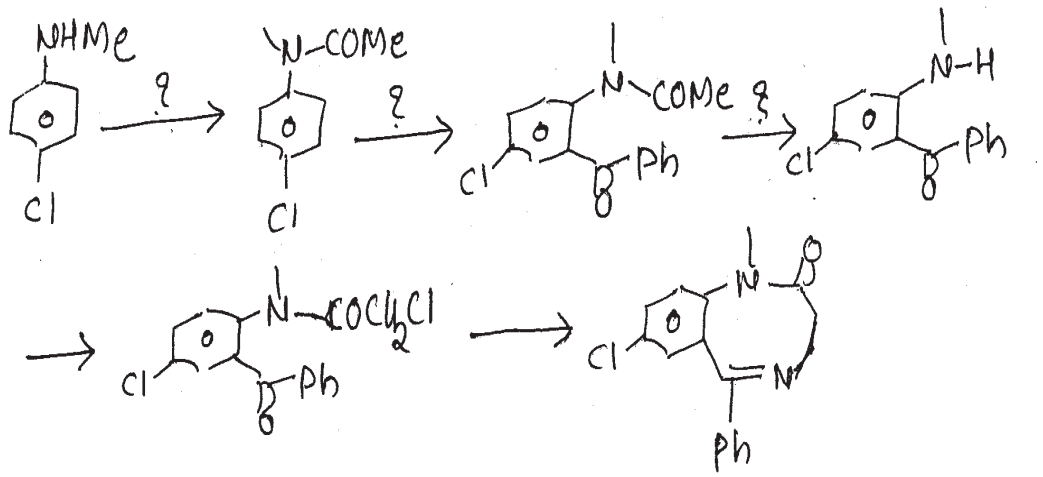
Q6) Answer any three of the following: **[9]**

a) Do a reterosynthetic analysis of give a synthetic pathway for its synthesis starting with





b) Identify the missing reagents and explain the following transformation.



c) Explain the use of Suzuki coupling in synthesis of epothiolone.

d) Discuss the following reactions and their utility;

i) Olefin metathesis.

ii) Boron template strategy.

EEE

Total No. of Questions : 6]

SEAT No. :

P1453

[Total No. of Pages : 5

[5125]-32
M.Sc.
DRUG CHEMISTRY
CH - 362 : Advanced Analytical Methods
(2008 Pattern) (Semester - III)

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

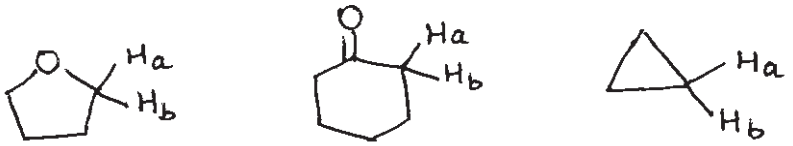
Instructions to the candidates:

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

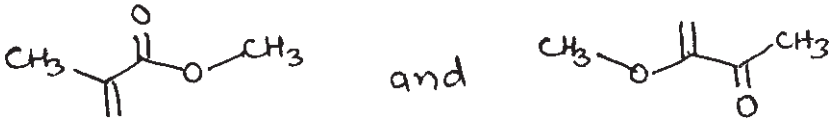
SECTION - I

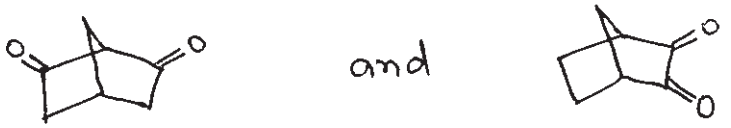
Q1) Answer any four of the following: **[12]**

a) Arrange the following compounds in increasing order of J_{gem}. Justify your order.



b) Differentiate the following pairs of compound by ^{13}C NMR

i) 

ii) 

c) The mass spectrum of a ketone exhibits M^+ at 86 and prominent ions at 71, 58, 43. Arrive at a probable structure.

d) t - Butyl fluoride gives a doublet at 1.46 (20Hz). On treatment with SbF_5 it gives a singlet at 4.5δ. Explain.

e) Sensitivity of ^{13}C signal is about 6000 times less intense than ^1H signal in NMR.

P.T.O.

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

a) Assign the structure and justify your answer.

M.F. : $C_7H_{10}O_2$

PMR : 1.41(d, 7Hz, 3H), 2.4(t, 7Hz,2H), 4.53(sextet, 7Hz,1H), 5.89(tq,7 & 2Hz,1H), 2.1(d,2Hz,3H)

b) Deduce the structure from the following data

M.F. **:** $C_7H_{14}O_2$

IR : $1111cm^{-1}$

Mass : 130,85,57

CMR : 15(q,str) 60(t,str) 101(d) 118(t) 135(d)

c) Assign the structure

IR : $1715\ cm^{-1}$

Mass : 128(M^+,3%) 85(10%) 72(40%) 43(100%)

d) Assign the structure

M.F. : $C_8H_{10}O$

CMR : 23(q) 70(d) 125(d) 127(d,str) 129(d,str) 146(s)

e) Predict the structure and justify your answer

M.F. : $C_9H_8O_3$

CMR : 115.4, 115.9, 126,130, 144.2, 159.9, 168.1

DEPT 90 : 115.4, 115.9, 130, 144.2 up

DEPT 135 : 115.4, 115.9, 130, 144.2 up

126, 159.9, 168.1 absent

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

a) Nuclear Overhauser Effect.

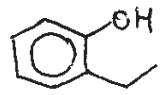
b) Even electron rull in M.S.

c) Factors affecting vicinal coupling constants.

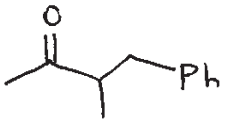
d) Important fragmentation patterns in M.S. of organic compounds.

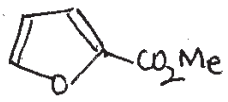
SECTION - II

Q4) a) Write the genesis of the ions (any three) **[9]**

i)  122, 107 (100%) 121 (3.5%) 104 (2%), 77

ii) Ph-NHCO $CH_2CO\,CH_3$ 177, 119, 93, 92, 43

iii)  162, 147, 91, 43

iv)  126, 96, 95, 67

b) Answer any two of the following: **[8]**

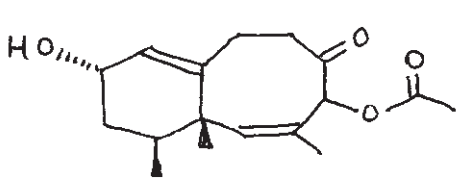
i) Discuss the theory and instrumentation of GLC.

ii) What are the factors affecting the resolution in HPLC? Explain.

iii) What are the various detectors used in GC and HPLC? Give the selection criterion for a particular detector.

c) Three isomeric compounds with M.F. $C_6H_{14}O$ shows base peaks at 56, 45 and 59. Write the possible structures of the three isomers. **[3]**

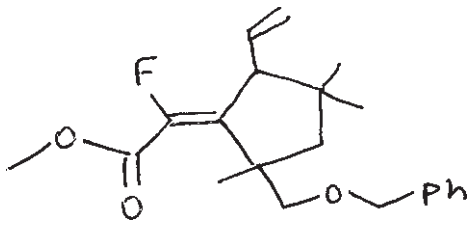
Q5) a) Assign the signals to various carbons of compound Y **[3]**



Y

190.8, 170.4, 149.5, 138.7, 127.1, 125.9, 76.2, 63.4, 44.2, 43.8, 35.8, 34.1, 28.3, 20.9, 20.5, 18.1, 16.6.

b) Assign the chemical shifts and comment on the observed coupling constants and spin-decoupling experiment. **[5]**



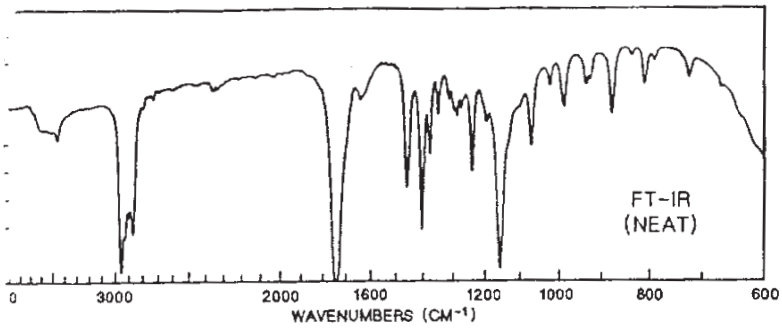
1.47(d,13Hz,1H); 1.82(d,13Hz,1H); 2.88(dd,9&2Hz,1H); 3.46(d,8Hz,1H); 3.63(s,3H); 3.94(d,8Hz,1H); 4.51(s,2H); 5.07(dd, 17 & 2Hz, 1H); 5.27(dd, 10&2Hz,1H); 5.56(ddd,17,10&9 Hz, 1H); Note:- C – CH_3 and aromatic signals are not given.

NOE/Spin - decoupling expt.

i) Irradiation at 2.88 δ changes 5.56 (ddd) into dd with 17 & 10 Hz.

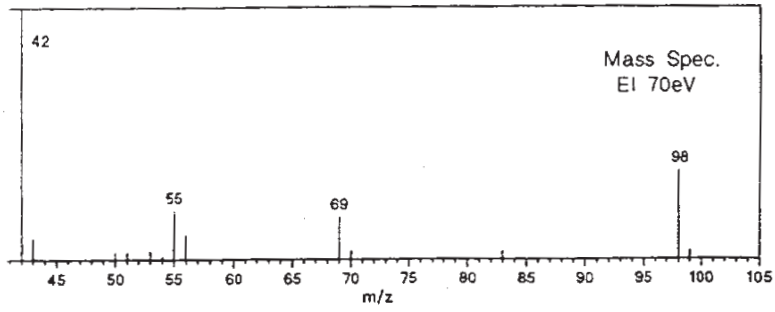
ii) Irradiation at 1.82 δ induces 7% increase in intensity at 2.88 δ.

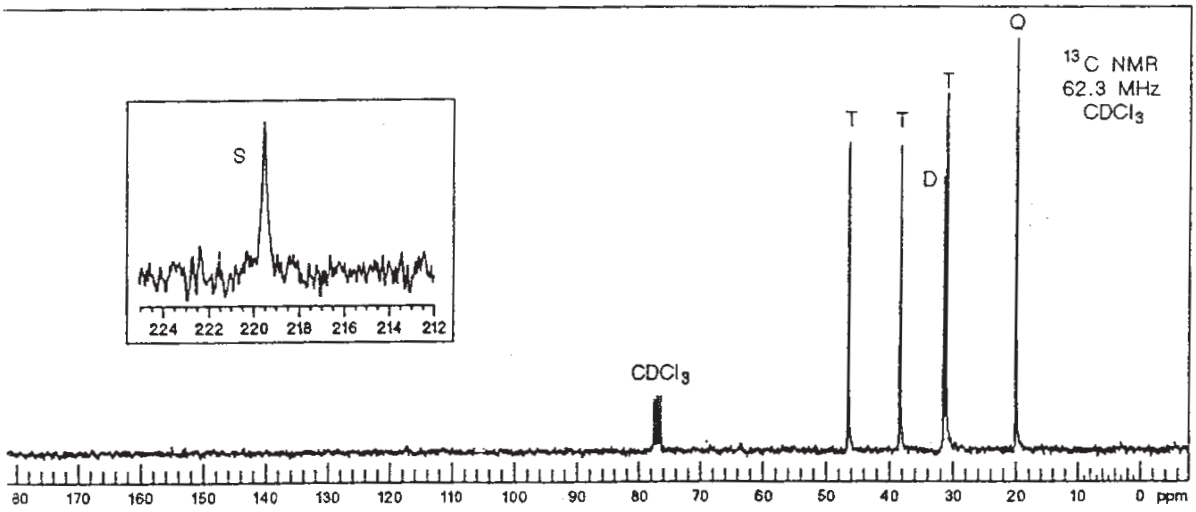
Q6) You are provided with the spectra of a compound. Analyze these spectra and arrive at a structure consistent with the data. Justify your answer. **[12]**

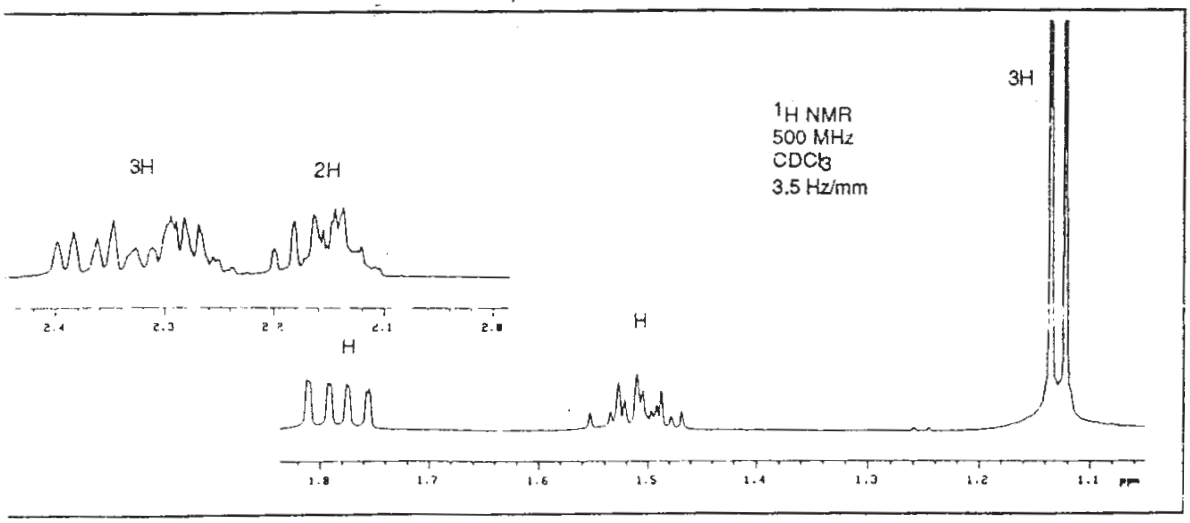


Exact M.S. (EI) = 98.0732

UVλ_{max} = BLANK







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Total No. of Questions : 6]

SEAT No :

P 1454

[Total No. of Pages :2

[5125]-33
M.Sc.
DRUG CHEMISTRY
CH-363 : Drug Development (Immunology & Microbiology)
(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 to be written in separate answer books.***
3) ***Figures to right indicate maximum marks.***

SECTION-I

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

a) Discuss in brief any one method of antimicrobial assay .
b) Explain how effluent treatment is performed.
c) What are the ways of strain improvement. Discuss any one method.
d) Give a broad outline of classification of microbes.
e) Draw a block diagram of fermenter & explain its working.

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

a) Give a brief discussion on the organs of the immune system.
b) Explain in brief Hypersensitivity- what is type I & type II.
c) Discuss the ELISA test & its benefits.
d) Discuss the need of immunization.
e) Explain
   i) Auto immunity
   ii) Innate immunity

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

a) Discuss in brief the sources of drugs? How do they exhibit their effect.
b) Explain in brief rational drug discovery.
c) Explain
   i) IC_{50}
   ii) ED_{50}
   iii) LD_{50}
   iv) Ayurveda
   v) Therapeutic window

P.T.O.

SECTION-II

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

a) Discuss how lead discovery is done with an example.

b) What are the do says forms of drugs? Discuss the benefits of Injectables over tablets.

c) Discuss the phanacokinetics of drug action. What are the factors that affect drug absorption?

d) What are the objectives of the toxicological studies. What is the difference between Acute, Subacute & Chronic toxicity?

e) Explain lead development. Discuss SAR.

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

a) Explain

i) Patent

ii) Patent specification

iii) Patentable invention

b) Discuss in brief the objectives & observation of phase I & II of clinical trials.

c) Give a brief account of bioassays. What are the benefits & short cominps of Invivo & Invitro assays.

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

a) Strategies used in process development & scale up

b) Phase I & II metabolism

c) Routes of drug administration.

✈ ✈ ✈

Total No. of Questions :6]

SEAT No. :

P1455

[Total No. of Pages :5

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M.Sc.

DRUG CHEMISTRY

CH-364: Stereochemical Principles & Applications

(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 full marks.***
3) ***Answers to the two sections should be written in seperate answer books.***

SECTION-I

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

a) The difference between 1st & 2nd dissociation constant of cis & trans cyclohexane 1, 2 dicarboxylic acid is pKa_1 - pKa_2 = 2.42 for cis & 1.75 for trans.

b) 2 halocyclohexanone shows bathochromic shift when halogen is axial, while a small hypsochromic shift if halogen is equatorial.

c) Trans decaline is more stable than cis decaline by 2.7 kcal/mol but trans g methyl decalire is stable than its cis isomer by 0.9 kcal/mol only.

d) Explain the rate of Pb $(OAC)_4$ cleavage of 1, 2 diols for the following

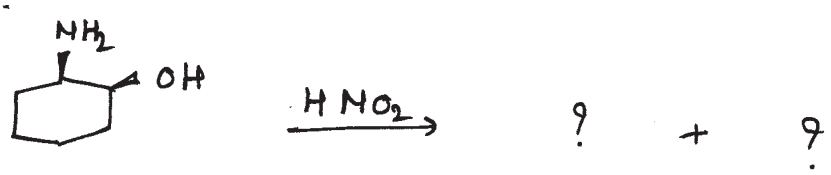
Cyclopentane 1, 2 diol Kcis > K trans

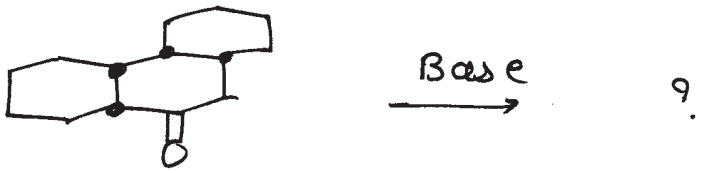
Cyclodecane 1, 2 diol K trans > k cis

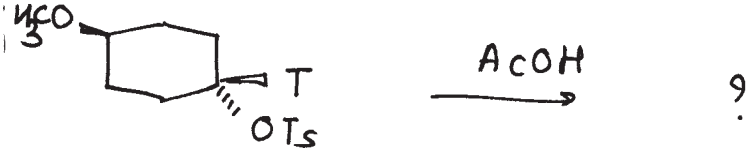
e) Draw the stereostructures for the most stable & the least stable conformations of perhydroanthracene. Give the nomenclature of these isomers with energy calculations.

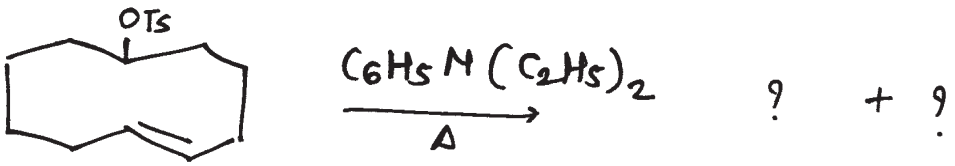
P.T.O.

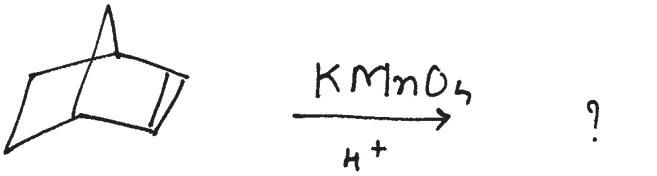
Q2) Predict the product/s. Explain the mechanism & stereochemical principles involved (any 4): **[12]**

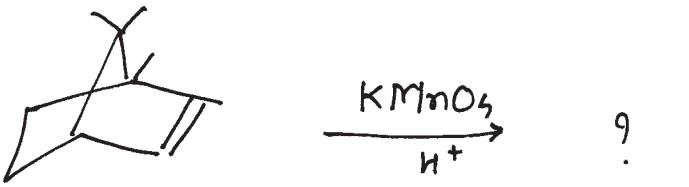
a) 

b) 

c) 

d) 

e) i) 

ii) 

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

a) H-bonding in Cis & trans cyclopentane 1, 2 diol using IR spectroscopy.

b) I - Strain

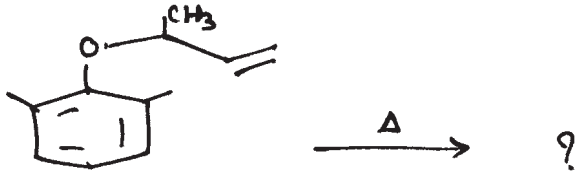
c) Optical activity & relative stability of Cis & trans isomers of 1, 3 dimethyl cyclohexane.

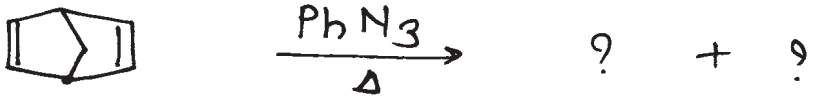
d) Bredt's rule with two examples.

SECTION-II

Q4) a) Predict the product/s & write the stereochemistry. Justify your answer (any 4): **[12]**

i) 

ii) 

iii) 

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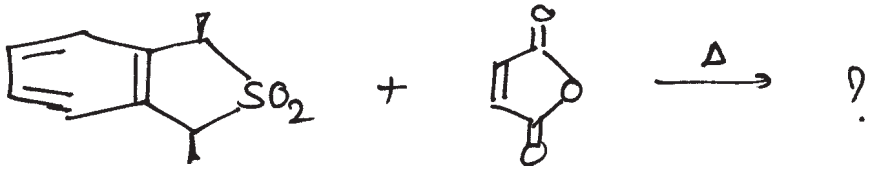
v) 

b) Draw Co. relation diagram for cycloaddition between 1, 3 butadiene & ethyleno in photolytical condition. **[4]**

Q5) Attempt the following (any 4): **[12]**

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

b) Write note on 'Anomeric Effect'.

c) Give the product/s obtained when D-glucose is reacted with

i) $PhNH\text{-}NH_2$

ii) Br_2 water

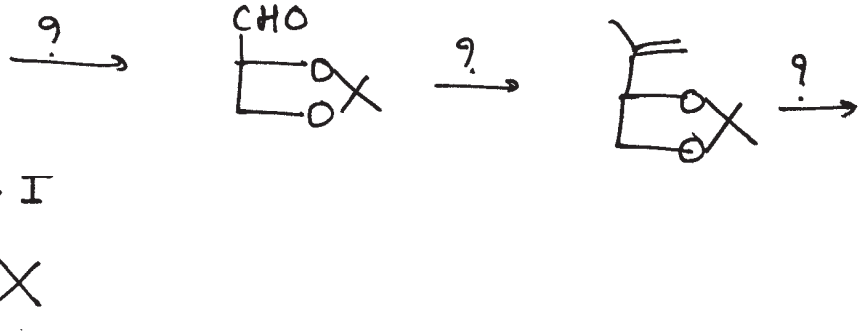
iii) CH_3OH/HCl

d) Write ring structure for any one

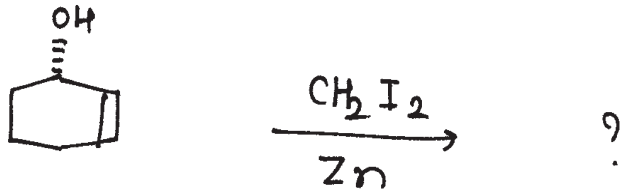
i) D - Glucose $\rightarrow$ D- Gluco furanose

ii) D - Glucose $\rightarrow$ D - Gluco pyranose

e) Give the reagents for the following reaction products.

D - Manitol 

Q6) a) Predict the product/s with correct stereochemistry (any three): **[6]**

i) 

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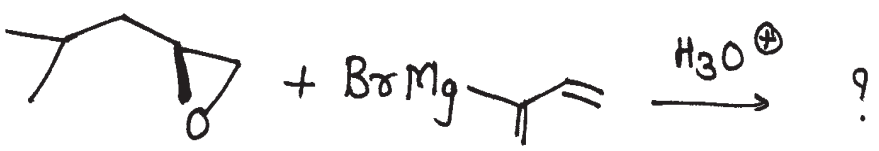
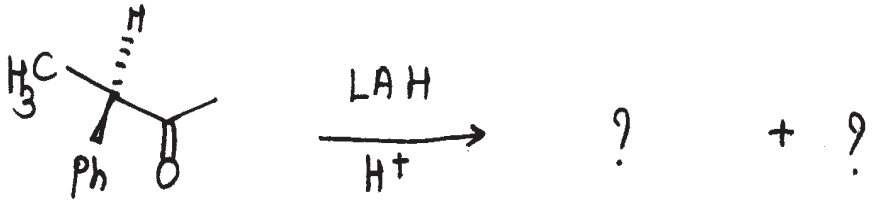
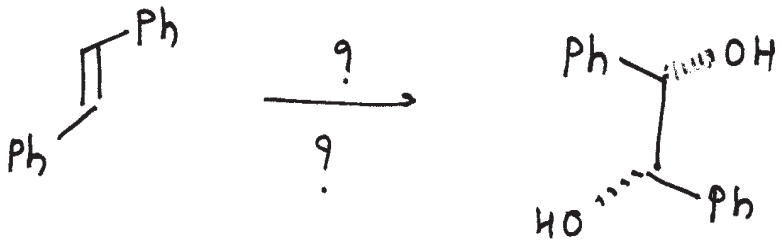
iii) 

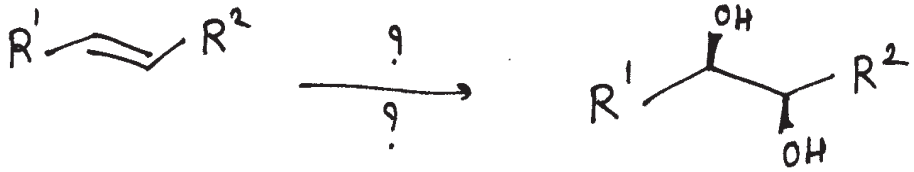
iv) 

b) Suggest the reagent & explain the stereo chemistry of the following reactions (any 3): **[6]**

i)



ii)



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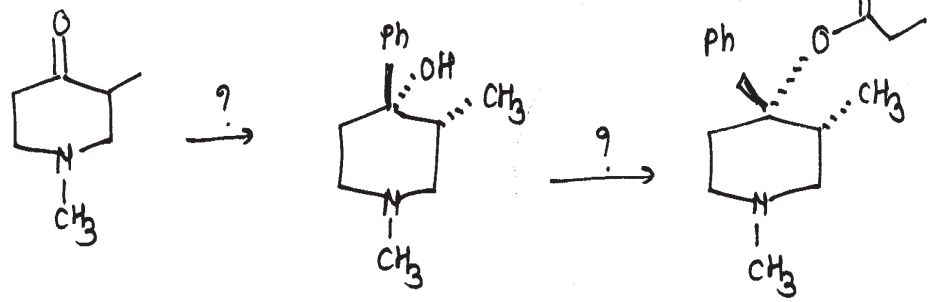

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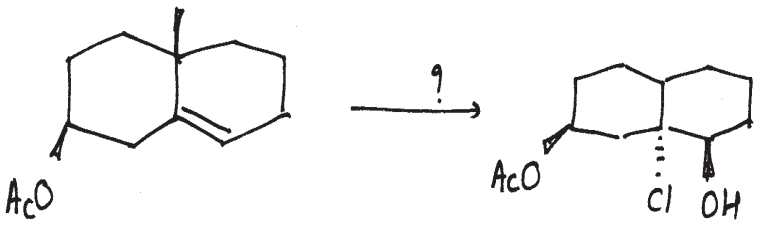

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Total No. of Questions :6]

SEAT No. :

P1456

[Total No. of Pages :5

[5125] - 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) ***Answers 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) Enamines can be used only with reactive alkylating agents.

ii) Ter- butoxycarbonyl protection is preferred over acetyl protection in peptide synthesis.

iii) Ethyl ethylthiomethyl sulphoxide is used for the synthesis of 1,4-dicarbonyl compounds.

iv) Non-terminal alkenes can be converted to terminal alkenes using hydroboration reaction.

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

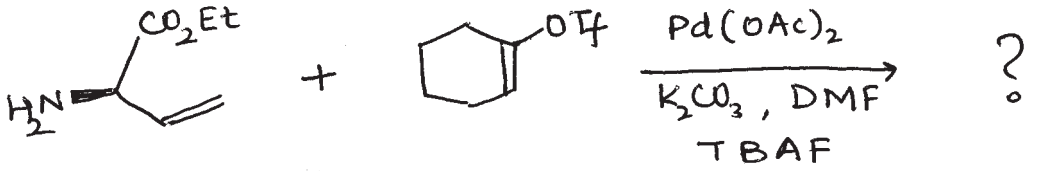
i) 

ii) 

iii) 

P.T.O.

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

i) 

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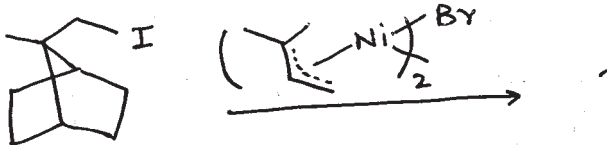
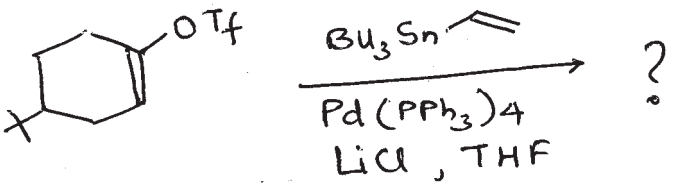
iii) 

iv) 

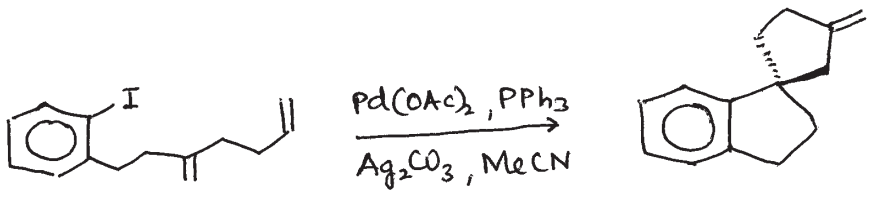
b) Explain <u>any two</u> of the following: **[6]**

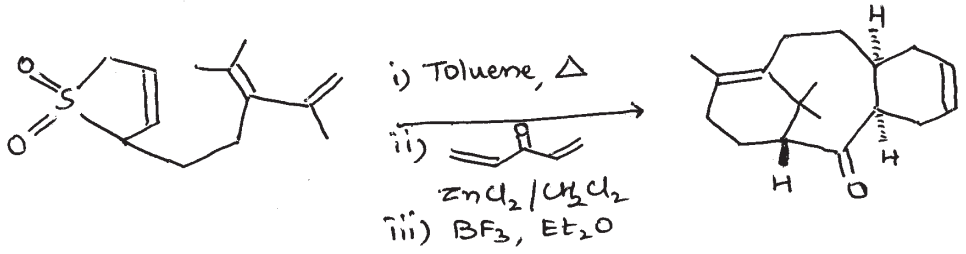
i) Role of chiral organoborane in synthesis of optically active alcohols.

ii) Use of Pd(0) in Suzuki coupling.

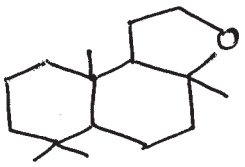
iii) Advantage of homogenous catalysis over heterogenous catalysis.

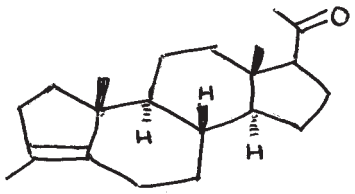
Q3) a) What is Domino reaction? Explain the steps involved in <u>any one</u> of the following Domino reaction. **[5]**

i) 

ii) 

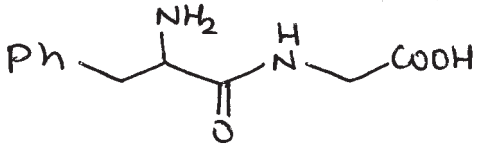
b) Explain how biomimetic approach is used to obtain <u>any one</u> of the following compounds. **[5]**

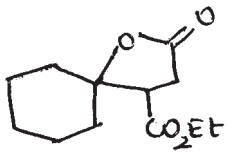
i) 

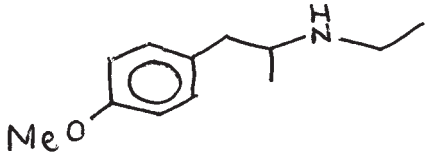
ii) 

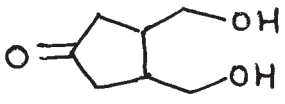
SECTION-II

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

a) 

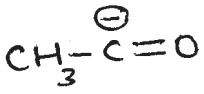
b) 

c) 

d) 

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

i) 

ii) 

iii) 

b) Using the method of umpolung carry out <u>any two</u> of the following conversions: **[6]**

i) 

ii) 

iii) 

Q6) a) Give brief account of <u>any one</u> of the following: **[4]**

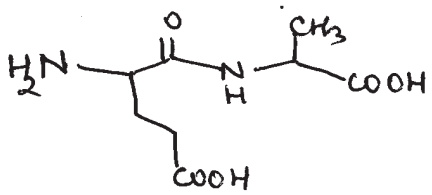
i) Principles of Green Chemistry.

ii) Advantage of convergent synthesis over linear synthesis.

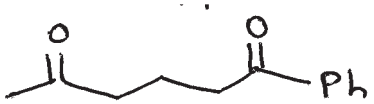
b) Answer <u>any four</u> of the following: **[12]**

i) Carry out the following conversion using organoborane chemistry.

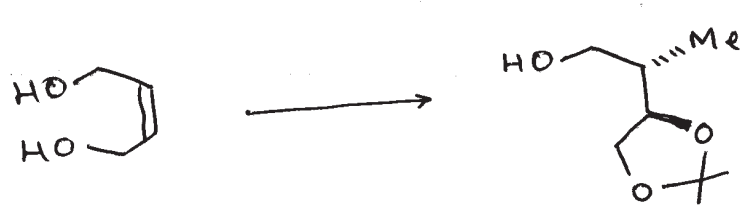
ii) Discuss the steps involved in the synthesis of the following dipeptide.



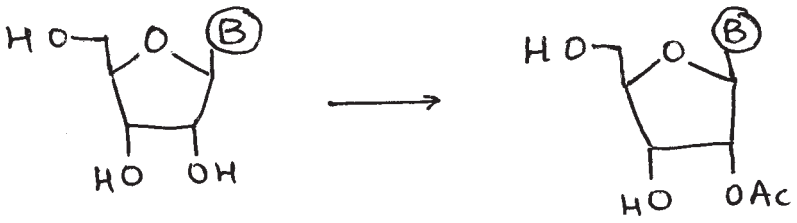
iii) Synthesise the following compound using examine approach.



iv) Discuss the steps involved in the following conversion.



v) Carry out the following conversion.



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Total No. of Questions : 6]

SEAT No. :

P1457

[Total No. of Pages : 3

[5125]-42
M.Sc.
DRUG CHEMISTRY
CH - 462 : Chemotherapy
(2008 Pattern) (Semester - IV)

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

Instructions to 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 three of the following: **[15]**

a) Give a brief account of cell wall synthesis. Dicuss the drugs which affect this process. Why are these drugs safe?

b) Discuss in brief the development of quinolone antibiotics.

c) Discuss in brief various steps involved in protein synthesis. How aminoglycosides and tetracyclines exert their antibiotic action?

d) What is drug resistance? Explain with suitable examples the mechanism of drug resistance and strategies to combat drug resistance.

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

a) Discuss in brief biochemical basis of cancer. What are the different classes of anticancer agents. Explain the importance of vinca alkaloids in cancer treatment.

b) Discuss in brief intra and interneuronal signal transmission. Explain in brief depression and various classes of antidepressant drugs.

c) Give a brief account of common viral infections. Discuss the agents interfering with viral nucleic acid replication in details.

P.T.O.

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

a) Antifungal agents.

b) Analgesics.

c) Anticonvulsants.

d) Sedatives.

SECTION - II

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

a) Explain in brief the organization of endocrine system. What is negative feedback mechanism? Explain the role of thyroid hormones.

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

c) Explain in brief any two of the following CVS disorders. Discuss the pathophysiological changes and at least one drug to treat them

i) Congestive Heart Failure.

ii) Angina pectoris.

iii) Arrhythmia.

d) Explain how the following group of compounds help in management of disease (any three)

i) Organic Nitrates

ii) Na^+ channel Blockers

iii) Vasodilators

iv) Phosphodiestrase III inhibitors

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

a) Describe in brief following GIT disorders. What are the common strategies to treat them (any two)

i) Nausea and vomitting

ii) Dirrheoa

iii) Hyperacidity

b) Explain the life cycle of plasmodium and expalin the role of mefloquin and pyrimethamine as antimalarials with their mechanism of actions.

c) What is diabetis? How NIDDM is different from IDDM. Explain how oral hypoglycemic agents control the blood sugar level.

Q6) Give the mode of action and uses of the following drugs (any four): **[12]**

a) Pantoperazole.

b) Chloramphenicol.

c) Roxithromycin.

d) Ritonavir.

e) Dapsone.

f) Rifampin.

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Total No. of Questions : 6]

SEAT No. :

P1458

[Total No. of Pages : 2

[5125]-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 to be written in separate answer books.***
3) ***Figures to the right indicate maximum marks.***

SECTION - I

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

a) Explain in brief recombinant DNA technology & its applications.

b) Discuss any two:

i) Antisense therapy

ii) PCR

iii) Proteome

c) Give a brief account of monoclonal antibodies & their uses.

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

a) The number of emergency admissions in hospital in a day due to heart problem is known to follow a Poisson distribution with mean admissions 5 per day. Find the possibility than on a particular day there wil be

i) No admissions

ii) Exactly 3 admissions

iii) Atleast 2 admissions

b) What is the significance of arithmetic mean & standard deviation in dealing with a data set? Compute the same for the number of hours of sleep recorded for 10 persons.

12.1, 13.2, 12.8, 10, 14.2, 13.8, 14.8, 9.0, 10.9, 11

c) Explain:

i) Sample & population

ii) Correlation analysis

iii) Karl Pearsons coefficient

P.T.O.

Q3) Answer any two in brief: **[14]**

a) Discuss the uses of combinational Chemistry in Pharma industry? Explain any one method to make Combinational Libraries.

b) Explain the concept of prodrugs. With proper examples discuss the benefits of making prodrugs.

c) Discuss in brief the receptor theories of drug action.

SECTION - II

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

a) Discuss the signalling mechanism of G protein coupled receptors. What is the role of secondary messengers.

b) Explain Hansch analysis in brief.

c) How are the following obtained in QSAR.

i) π

ii) E_s

iii) σ

d) Discuss in brief:

i) Topliss scheme

ii) Free Wilson analysis

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

a) Explain :

i) Conformational search

ii) Potential energy surface

b) Write the terms in molecular mechanics force field & explain their contribution.

c) How is a drug designed when the structure of the target enzyme is known. Discuss in brief.

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

a) Discuss in brief 3D QSAR - COMFA.

b) Explain the benefits of Virtual Screening.

c) Discuss the methods need for de novo drug design (SBDD).