**Total No. of Questions : 8]**

**SEAT No. :** ____

**P365**

**[Total No. of Pages : 2**

# [5832]-302
## M.Sc.-II
## DRUG CHEMISTRY
## Chd-361 : Drug Discovery and Development
## (2019 Pattern) (Semester-III)

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

***Instructions to the candidates:***

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

## SECTION-I

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

i) Pharmacophore ii) Efficacy

iii) Bioisosteres iv) Aganist

b) Make a overview on History of drugs with exmaples. **[3]**

***Q2)*** a) Answer <u>any one</u> of the following. **[6]**

i) Define dosage forms. Discuss the solid dosage forms with examples.

ii) Explain in brief ADME of drug action discuss the factors affecting each of the component.

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

i) Existing drugs

ii) Synthetic compound Libraries

iii) Me too drugs.

***Q3)*** a) Answer <u>any one</u> of the following. **[6]**

i) Discuss the following system of medicines.

1) Unani 2) Siddha

ii) Define pharmacodynamics and pharmaco-kinetics. What are the factors that affect the pharmacokinetics of durg action.

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

i) Carbohydrates as a drug target

ii) FDA

iii) Proteins as a drug target

***P.T.O.***

## SECTION-II

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

i) Claim ii) Placebo

iii) First pass effect iv) Trademark

b) What is mean by GMP? Explain the various guidelines used in GMP **[3]**

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

i) Explain roel of the following in pharma industry.

1) Process development

2) QA and QC

3) Pharmacoepia

ii) Explain the following.

1) Intellectual property rights.

2) Patentable inventions.

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

i) Reproduction studies

ii) Acute toxicity studies

iii) Carcinogenicity studies.

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

i) Define Bioequivalence and Bioavailability. Explain types of Bioavailiability and discuss the objectives of Bioavailability.

ii) Give an account of strategies involved in drug discovery.

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

i) Pilot plant

ii) Pharmacophore identification

iii) Documentation

**Total No. of Questions : 6]**

**SEAT No. :** ____

**P366**

**[Total No. of Pages :5**

# [5832] - 303
## M.Sc. - II
## DRUGCHEMISTRY
## CCTP - 9 -CHD -362 : Stereochemical Principles and Applications
## (2019 Pattern) (Semester - III)

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

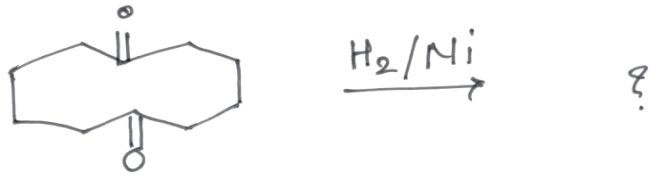
***Instructions to the candidates:***

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

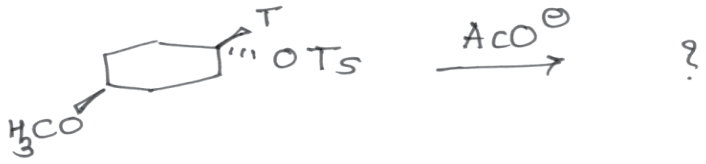
## SECTION - I

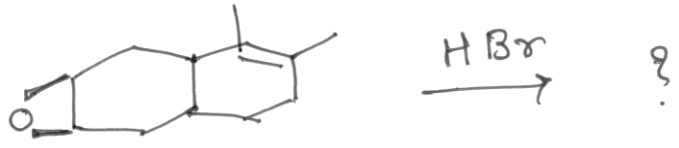
(Stereochemistry)

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

a) 


b) 


c) 


d) 


B) Draw cis - anti - trans and cis - anti - cis isomers of perhydrophenan threne and compare their stability. Also comment on their optical activity. **[3]**

***P.T.O.***

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

a) i) Write short note on 'Von Auwers - Skita' rule.

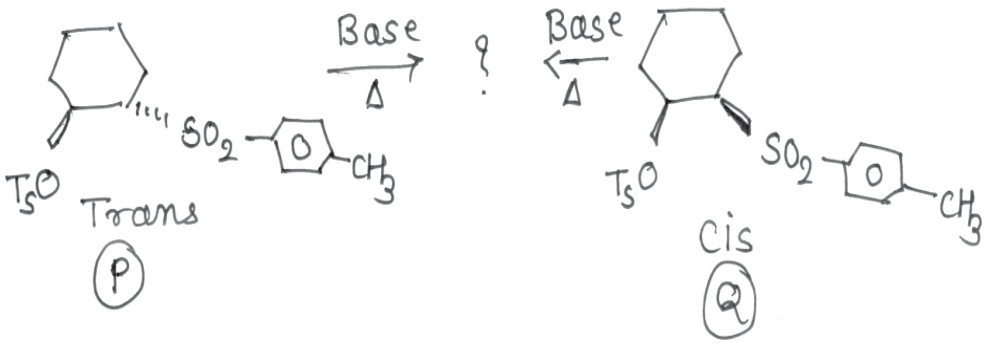
ii) Explain with examples 'transannular interactions'.

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

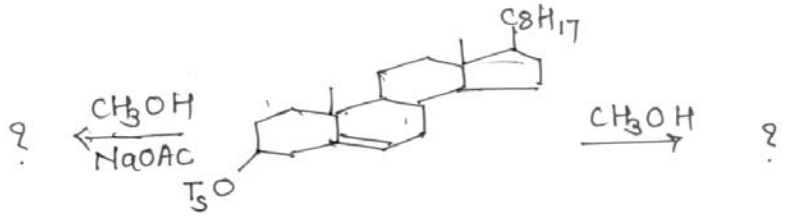
ii) Write note on I - strain.

B) Answer the following (Any Two) **[6]**

a) Compound (P) and (Q) forms the similar products after elimination.




b)



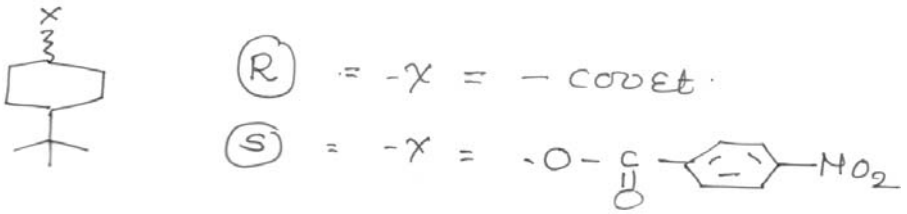

c) Write a note on 'Bredt's rule'.

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

a) i) Write a note on 'Abiraterone'.

ii) Explain the relative rates of saponification of (R) and (S).

(R) are $\frac{Ktrans}{Kcis} = 20$, for (S) $\frac{Ktrans}{Kcis} = 2.5$



b) i) Why trans decaline is more stable than cis decaline? Explain with stereostructure.

ii) Which form of bicyclo [3, 3, 1] nonane is more stable? Why?

B) Answer the following (Any two) **[6]**

a) Reduction of camphor with LAH gives mainly isoborneol. Explain.

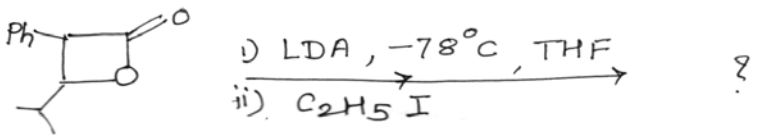
b) Chair boat interconversion is more facile in cyclohexanone than in cyclohexane. Explain.

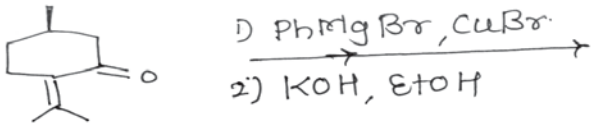
c) Equatorial 2 chloro cyclohexanone shows higher IR stretching frequency than axial isomer. Explain.

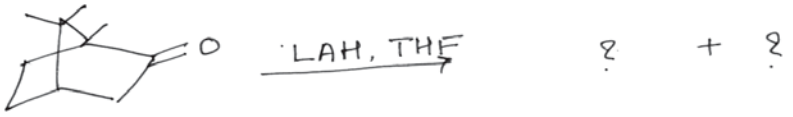
## SECTION - II

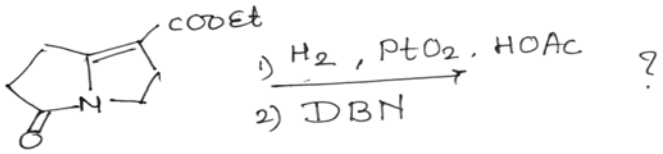
(Principles and Applications of Asymmetric Synthesis)

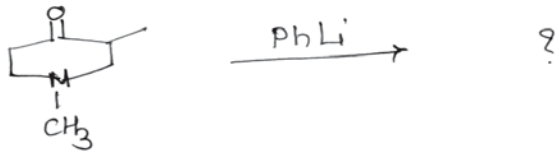
***Q4)*** Predict the product/s of the following and explain the stereochemical principles involved. Justify. (any 6). **[12]**

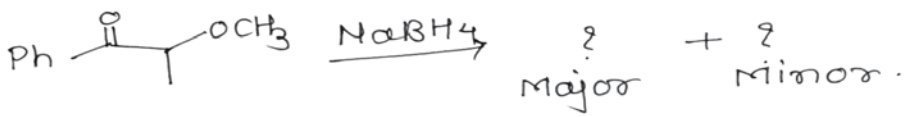
a) 

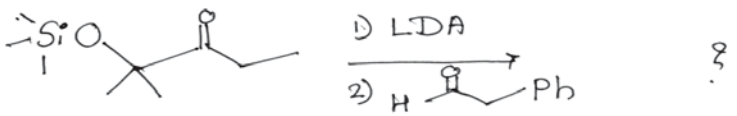

b) 


c) 


d) 

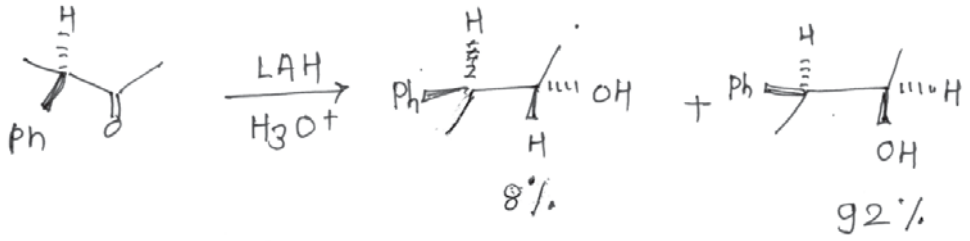

e) 


f) 


g) 

***Q5)*** A) Explain the following (Any Two) **[6]**

a) Explain diastereomerio excess (de). Calculate the de of the following reaction.




b) Give the comparison between chiral auxillary and catalyst. Give the sysnthesis of David Evan's Auxillary.

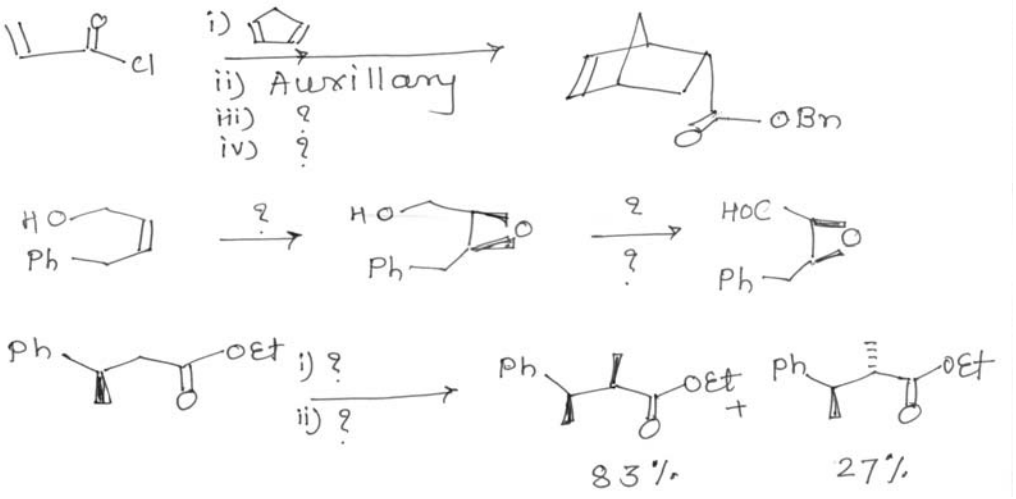
c) Explain use of chiral solvating agents.

B) Suggest the reagent and write mechanism of the following reactions (Any Two) **[6]**

a)

b)

c)




***Q6)*** A) Write a short note on the following (any three) **[9]**

a) Sharpless Asymmetric Epoxidation.

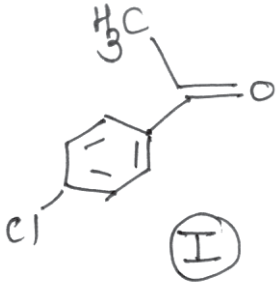
b) Asymmetric Aldol Condensation.

c) Types and examples of Tacticity.

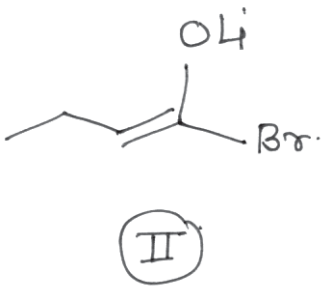
d) Resolution by Chromatography.

B) Answer the following. **[2]**

a) Identify Re and Si faces from the following.

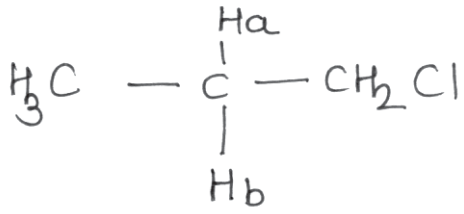



(I)




(II)

b) Write Pro-R and Pro-S for (III).



Total No. of Questions : 6]

SEAT No. :

**P367**

[Total No. of Pages :6

# [5832] - 304
## M.Sc. - II
## DRUG CHEMISTRY
## CBOP-3, CHD-363(A) - Chemistry of Heterocycles and Biologically Active Molecules
## (2019 Pattern) (Semester - III)

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

***Instructions to the candidates:***

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

## SECTION - I

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

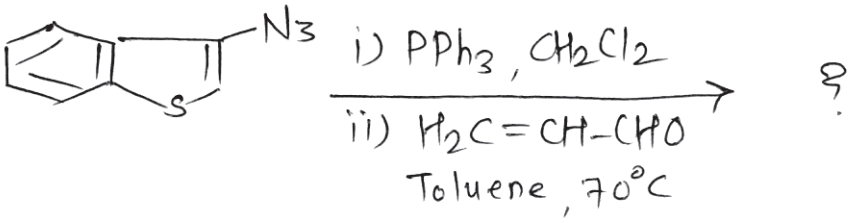
i) 2 chloro-3-formyl quinoline can be prepared from acetanilide with $DMF/POCl_3$.

ii) Indole shows better selectivity for electrophilic substitution than benzofuran.

iii) Pyrimidine is resistant to electrophilic substitution as compared to imidazole.

iv) 1,3-oxazole has low boiling point than imidazole.

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

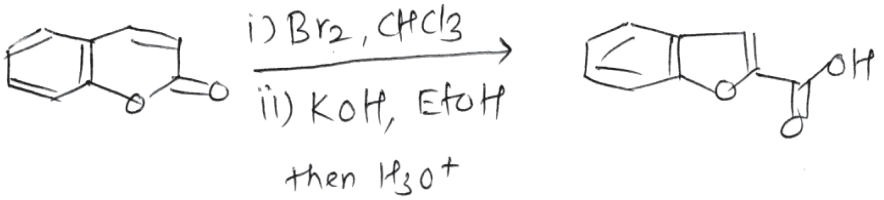
i) 


ii) 


***P.T.O.***

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

I) i)

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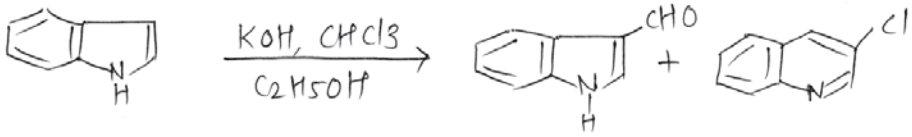
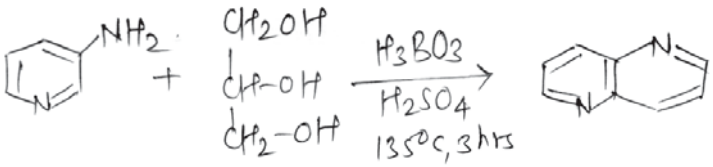
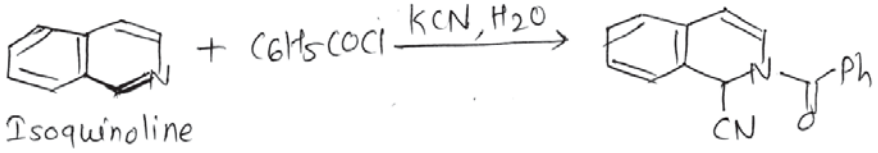



II) i)




ii)




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

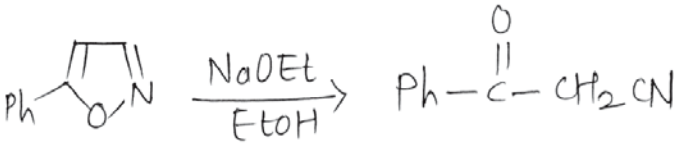
i) Pechmann coumarine synthesis

ii) Reissert Indole synthesis.

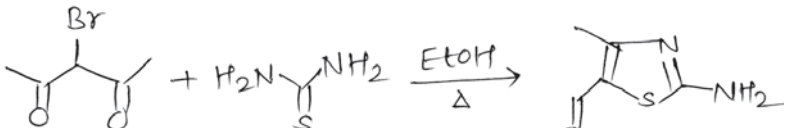
iii) Pomeranz - Fritsch Isoquinoline synthesis.

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

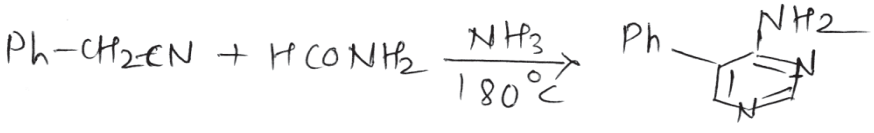
I) i)




ii)




II) i)

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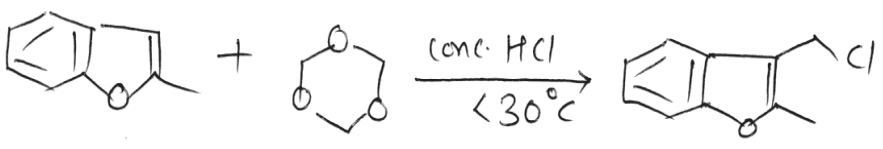
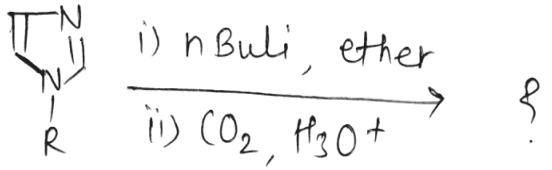


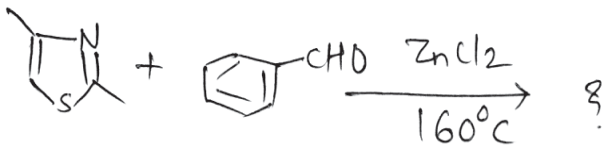
b) Answer any two of the following. **[6]**

i) Oxazole is less basic than imidazole.

ii) Write short notes on Fischer Indole synthesis.

iii) Predict the product in the following.

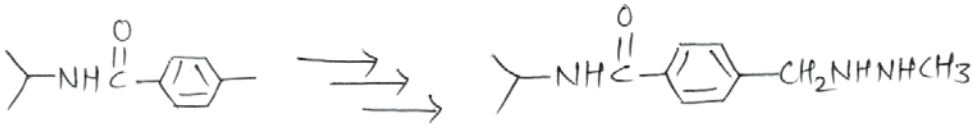


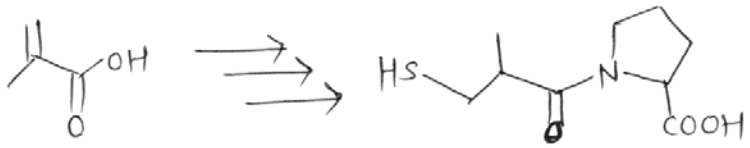

## SECTION - II

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

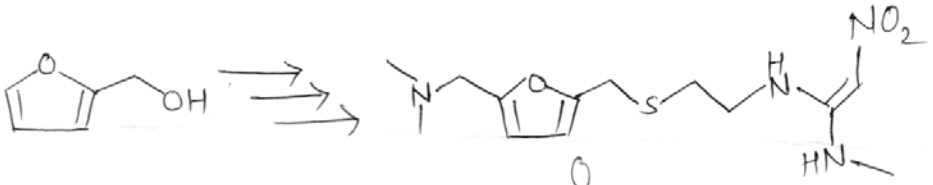
i)



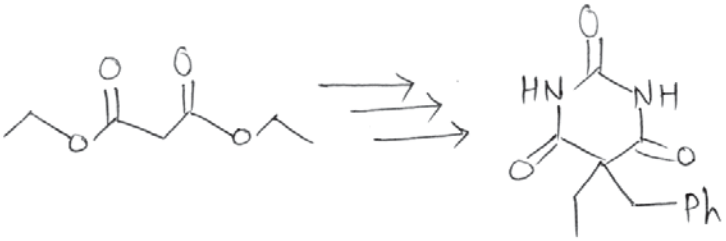

ii)



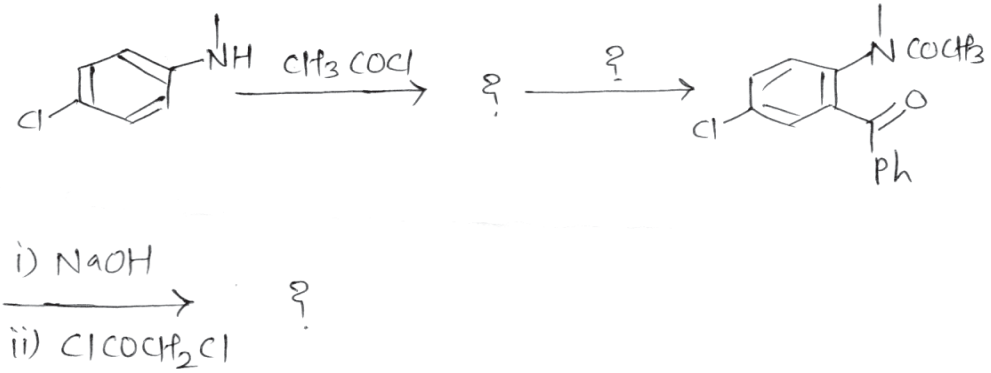

iii)




iv)

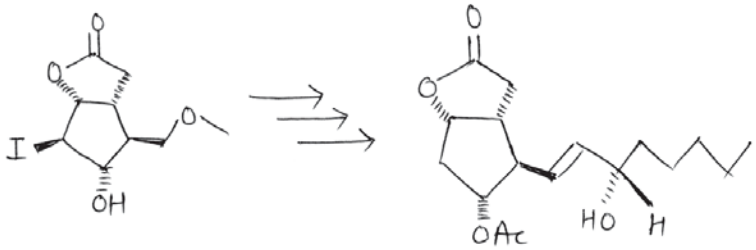


b) Insert the missing reagents/ products in the following sequence of reactions. Explain the steps with mechanism. **[3]**




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

I) i)

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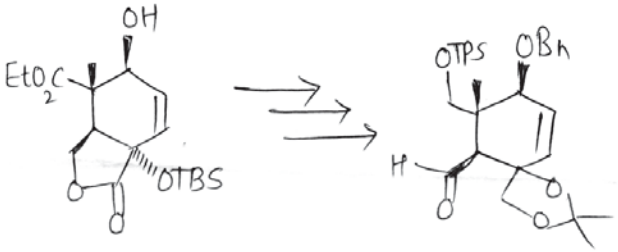
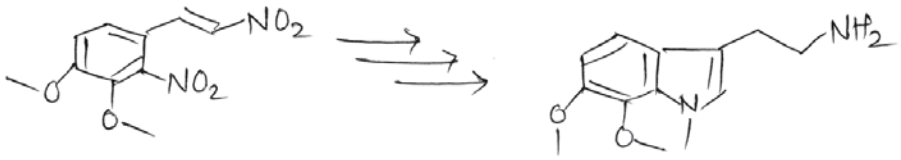
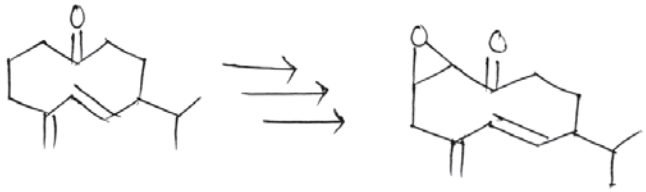



II) i)

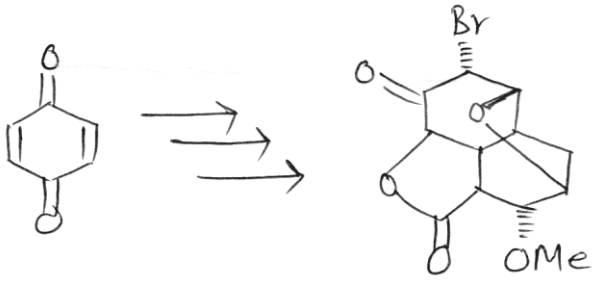



ii)

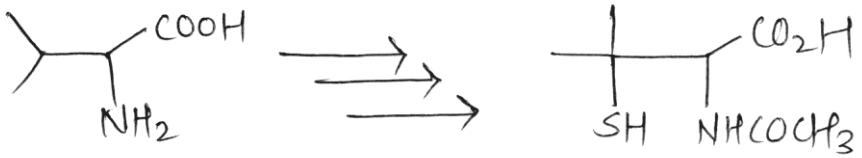


b) Discuss the steps involved in the synthesis of the following molecules. Explain the stereochemistry and mechanism involved (any two) **[6]**

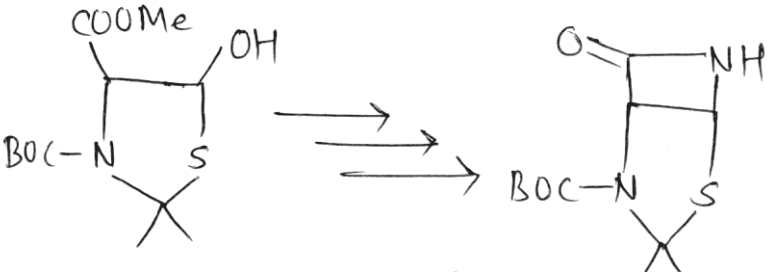
i)




ii)



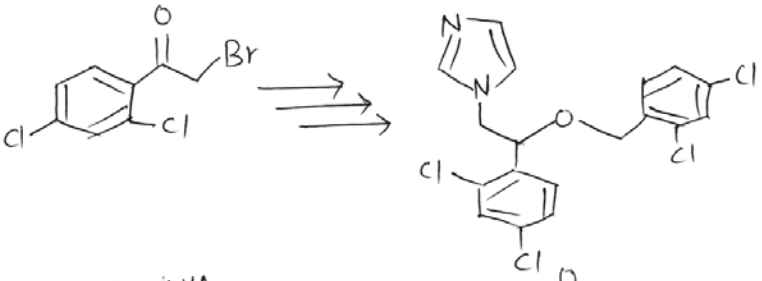

iii)



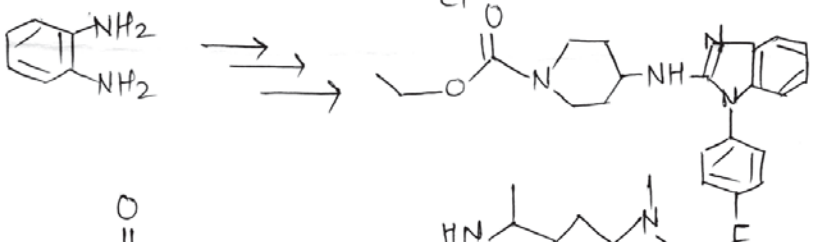

***Q6)*** a) Describe the steps involved in the synthesis of following drug molecules. Explain the mechanism involved. (any one) **[6]**

I) i)

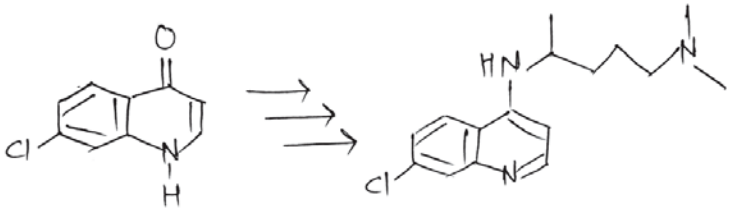

ii)




II) i)



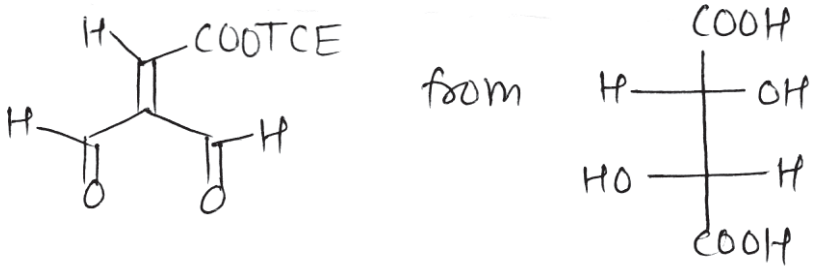

ii)



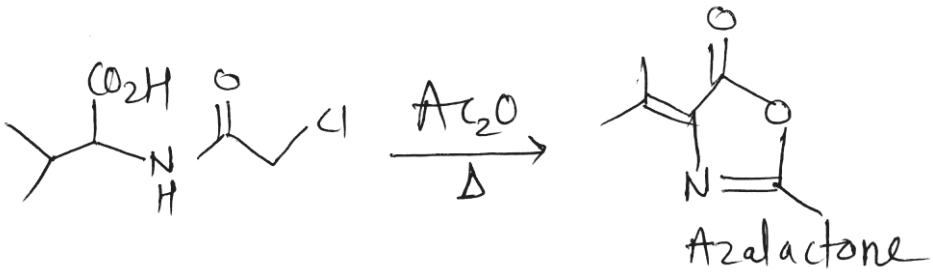
b) Answer any two of the following. **[6]**

i) Explain McMurray Pinacol coupling with example.

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




iii) Explain the mechanism

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Total No. of Questions : 9]

SEAT No. :

**P368**

[Total No. of Pages : 4

# [5832]-305
# M.Sc.
# DRUG CHEMISTRY
# CBOP-3, CHD-363 (B) :
# Section - I - Immunology and Microbiology
# Section - II - Bioinformatics, Biostatistics in Drug Discovery
# Section - III - Entrepreneurship Development
# (2019 Pattern) (Semester - III)

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

***Instructions to the candidates:***

1) ***Attempt any two of I, II and III Sections.***
2) ***Each section is for 35 marks.***
3) ***All questions are compulsory.***
4) ***Figures to the right indicate full marks.***
5) ***Answers to the two Sections should be written in separate answer books.***

## SECTION - I

### CBOP - 3 CHD - 363 (B) - Immunology and Microbiology

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

i) Explain the morphological characters of bacteria.

ii) Explain classification of immunity with suitable examples.

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

i) Explain the role of cytokines in immune response.

ii) Explain the structure of $I_gM$ molecule.

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

a) What is antimicrobial assay? How it is performed?

b) Discuss in brief bacterial strain improvement.

c) Explain the following.

i) Immunogen ii) Antibodies

d) Give classification of hypersensitivity. Explain type. I hypersensitivity.

***P.T.O.***

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

a) How will you screen the soil samples for antibiotic producers?

b) What are different methods for treatment of industrial effluent? Discuss any one of these.

c) Discuss the following :

i) Designing Fermentation media

ii) Role of baffles and agitators in fermentation vessel.

d) Explain the principle of agglutination technique, giving its application.

e) Give Gell - Coomb's classification of immunity

## SECTION - II

### CBOP - 3 CHD - 363 (B) Bioinformatics, Biostatistics

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

i) Describe the types of biological databases

ii) Explain in brief - proteomics

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

i) Metabolomics

ii) Significance of standard deviation

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

a) Explain the terms

i) Median

ii) Chi-square Test

iii) Coefficient of variance

b) Write short notes on 'Gene Prediction Programs'.

c) Give the use and significance of Canonical representations in chemoinformatics.

d) Explain the application of chembioinformatics in drug design.

e) Write a short note on - Proteome analysis of an organism.

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

a) Explain the following terms :

i) Multivariate analysis

ii) Class width

iii) Open end class

iv) Inclusive method of classification

b) Explain the term variance. Calculate variance for the following frequency distribution.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| No. of Germinated seeds | - | 0 | 1 | 2 | 3 | 3 | 2 |
| Total No. of seeds | - | 2 | 4 | 6 | 5 | 4 | 5 |

c) Define correlation and state the types of correlation. Compute Karl Pearson coefficient of correlation for the following data.

| | | | | | |
|---|---|---|---|---|---|
| Age (X) | 52 | 48 | 60 | 65 | 70 |
| Systolic B.P. (Y) | 147 | 138 | 130 | 149 | 152 |

d) What is mean, median, mode. Compute the same for the following data.

| | | | | | |
|---|---|---|---|---|---|
| Class | 0 –10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 |
| Frequency | 5 | 8 | 13 | 6 | 3 |

## SECTION - III

### CBOP - 3, CHD - 363 (B) Entrepreneurship Development

***Q7)*** a) Answer the following : **[6]**

i) Explain the process of Entrepreneurship Development.

ii) Give brief overview on creativity and Innovation.

b) Write short notes on **[5]**

i) Women Entrepreneur

ii) Intrapreneur.

***Q8)*** Answer any three of the following : **[12]**

a) Explain in brief enterpreneural search and Identification.

b) Give a brief account of Schumpeter theory of entrepreneurship.

c) Discuss in brief factors affecting entrepreneural growth.

d) Give a brief account of McClelland's theory.

***Q9)*** Answer any four of the following : **[12]**

a) Explain formulation of business plan.

b) Profit is the reward of Entrepreneur comment on the statement.

c) Write a short note on Organization and Management.

d) Discuss in brief corporate Entrepreneurship.

e) Differentiate between manager and Entrepreneur.

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**Total No. of Questions : 6]** **SEAT No. :**

**P369** **[Total No. of Pages : 3**

# [5832]-401
# M.Sc.
# DRUG CHEMISTRY
## CCTP - 10 CHD - 460 Advanced Medicinal Chemistry
## (2019 Pattern) (Semester - IV)

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

***Instructions to the candidates:***

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

## SECTION - I

***Q1)*** a) Discuss the uses and mode of action of the following. **[6]**

i) Taxol ii) Acyclovir

iii) Methotrexate

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

i) Discuss macrolide antibiotics. Explain their mechanism of action.

ii) Write a short note on bacterial drug resistance.

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

a) Discuss the selective toxicity associated with

i) β-Lactam antibiotics

ii) Sulphonamides

ii) Fluoroquinolones

b) What are common fungal disorders. Explain how antifungal agents Nystatin, flucytosine and clotrimazole affect fungal biochemical processes.

c) Discuss how the following diseases are managed by current drugs.

i) Tuberculosis ii) AIDS

d) Give a brief commentory on Malaria, its symptoms, causative agent and treatment.

e) Folate pathway is a very important target for variety of drugs. Explain.

***P.T.O.***

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

a) Explain the mechanism of action of

i) Alkylating agents

ii) DNA - Intercalators.

iii) Transition metal complexes

iv) Plant products in cancer treatment

b) Discuss the protein synthesis inhibitors as drugs and their use in cancer and leprosy.

c) Discuss in brief development of cephalosporins give an example from each generation and their benefits.

d) Discuss in brief the role of following classes of drugs in disease management.

i) Antimitotics

ii) Topoisomerase poisons

iii) Protease inhibitor

iv) Nucleoside analogs

## SECTION - II

***Q4)*** a) Discuss the following classes of drugs giving their mode of actions. **[6]**

i) Selective cox-2 Inhibitors

ii) Proton pump Inhibitors

iii) Cardiac glycosides

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

i) Explain the effects of following drugs on CNS. Discuss their uses

1) Diazepam 2) Imipramine

ii) Discuss various neurotransmitters and their role in maintaining healthy state.

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

a) Explain pain and pain pathway. Discuss how morphine and aspirin exhibit their effect.

b) Discuss current strategies to treat diabetis with suitable examples.

c) Explain the treatment of

i) Emesis ii) Constipation

d) Explain in brief biochemical basis of inflammation. How indomethacin, ibuprofen exhibit their effect.

e) Discuss various causes of hypertension. How blood pressure is regulated. Discuss the use of diuretics in management of hypertension.

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

a) Discuss in brief the following CVS disorders with their treatment.

i) Angina ii) Cogestive Heart Failure

b) Discuss the following group of drugs and their uses.

i) Angiotensin receptor blockers

ii) $Ca^{2+}$ channel blockers

c) Discuss the various steps involved in nerve conduction. Explain how it is affected in convulsion, Discuss at least one class of anticonvulsants.

d) Explain negative feedback mechanism. Discuss the role of thyroid hormones. How is their deficiency rectified.

**Total No. of Questions : 6]** **SEAT No. :**

**P370** **[Total No. of Pages : 3**

# [5832]-402

## M.Sc. (Part - II)

## DRUG CHEMISTRY

## CCTP - 11 : CHD - 461 : Drug Design

## (2019 Pattern) (Semester - IV)

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

***Instructions to the candidates:***

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

## SECTION - I

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

i) Agonist.

ii) Antagonist.

iii) Partial agonist.

iv) Full agonist.

b) Discuss the types of receptors. **[3]**

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

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

ii) Discuss the steps involved in signal transduction mechanism involved in GPCR.

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

i) Equation of Best Fit.

ii) Pharmacophore identification.

iii) COMSIA.

***P.T.O.***

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

i) Explain the structure of 4-TM and 3-TM (Ion Channel) receptor with well labelled diagram.

ii) Discuss the various Drug-receptor interactions theories.

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

i) Sensitization and desensitization.

ii) COMFA.

iii) Enzyme inhibitors as drug.

## SECTION - II

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

i) Drug target.

ii) CADD.

iii) Gene.

iv) Microfluidics.

b) What is Docking? Explain it's types. **[3]**

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

i) Enlist the various Recombinant DNA produced medicinal agents or products.

1) Enzymes.

2) Vaccines.

3) Tissue plasminogen activator.

ii) Explain Mix and Split method used in Combinatorial Chemistry.

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

i) Antisense technology.

ii) Biologicals used as a drugs.

iii) Database handling.

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

i) Explain the following computational methods

1) Molecular mechanics.

2) Quantum mechanics.

ii) Explain Hybridoma technology with well labelled diagram.

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

i) Applications of parallel synthesis.

ii) Molecular dynamics.

iii) Human gene therapy.

**Total No. of Questions : 6]**

**SEAT No. :**

**P371**

**[Total No. of Pages : 5**

# [5832] - 403

## M.Sc (Drug Chemistry)

## CHD - 462(A) : ADVANCED SYNTHETIC METHODS IN CHEMISTRY

## (2019 Pattern) (Semester - IV)

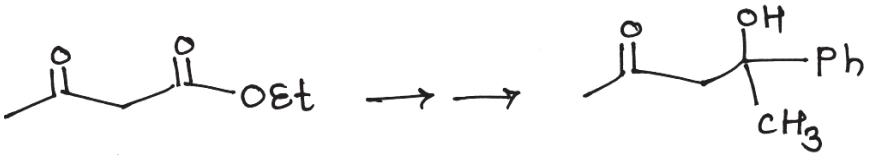
***Time : 3 Hours]*** ***[Max. Marks : 70***

***Instructions to the candidates :***

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

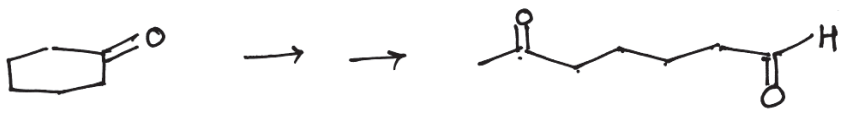
**SECTION - I**

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

i) 


ii) 


iii) 

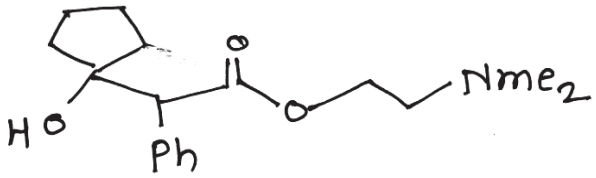

iv) 


b) Explain why enamine approach is better than the base catalysed alkylation of ketone. **[3]**

***P.T.O.***

***Q2)*** a) Using retrosynthetic analysis, suggest a suitable method to synthesize any one of the following. **[6]**

i) 1)

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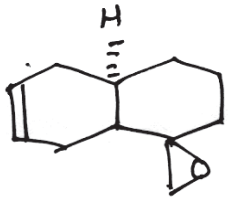
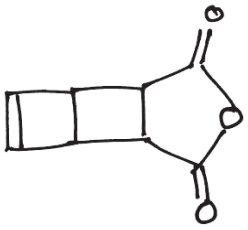



ii) 1)




2)


b) Answer the following questions [Any two] **[6]**

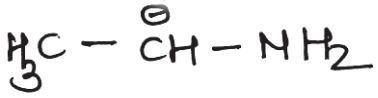
i) How will you synthesize 1,5 di - carbonyl compounds?

ii) Explain the role of protection in organic synthesis.

iii) Explain the convergent synthesis with example.

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

i) Give one reaction with a reagent for each synthon given below:

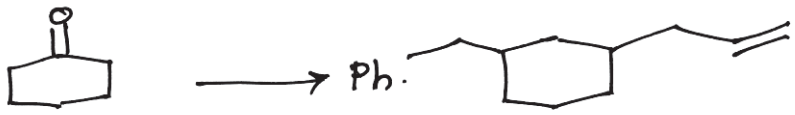
1) 


2) 

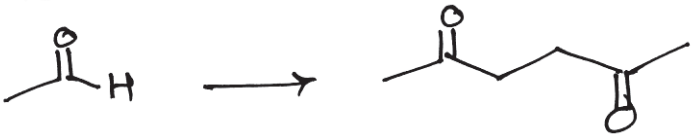

3) 


4) 

ii) 1) Carry out following transformation by enamine approach.



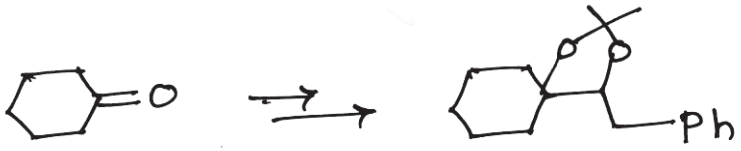

2) Synthesize the following using umpolung method.




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

i) Benzyloxycarbonyl group is preferred protection. Than benzyl group for amino protection during peptide synthesis. Explain.

ii) How will you carry out the following transformation.




iii) Explain the role of following reagents in organic synthesis

1) TBDMSCI 2) 1, 3 dithiane

## SECTION - II

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

i) Thexyl boranes is used in synthesis of cycloketone, Explain.

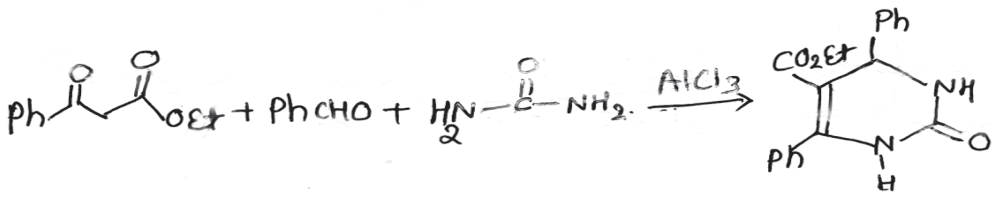
ii) Use of mannich reaction in preparation of exomethylene ketones.

iii) Addition of an organolithium species to an alkene gives cyclization.

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

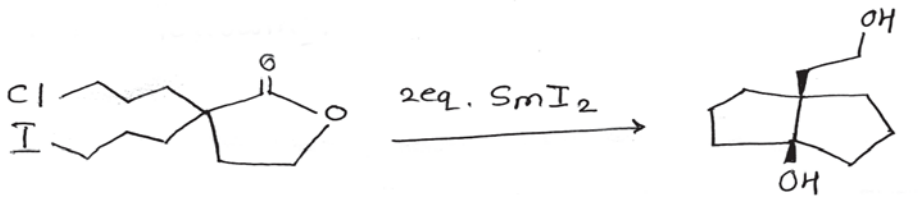
v) Enlist the green principles involved in multicomponent reactions.

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

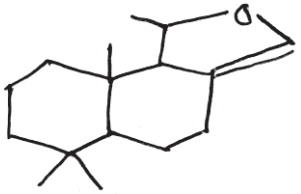


***Q5)*** a) Answer the following (any two) : **[6]**

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



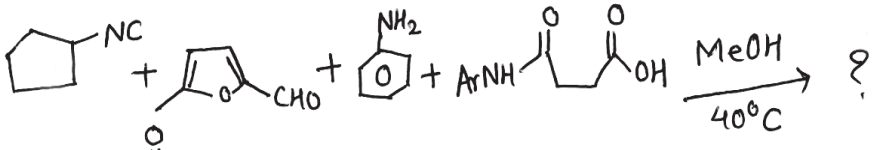

ii) Explain the biomimetic approach to the retrosynthesis is of the following.




iii) Carryout the following conversion using organoborane chemistry.


b) Predict the product of any three of the following : **[6]**

i)

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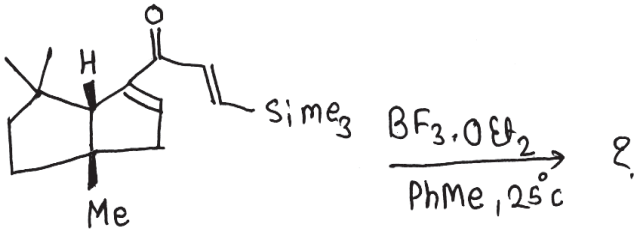


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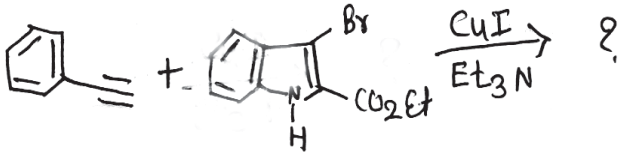


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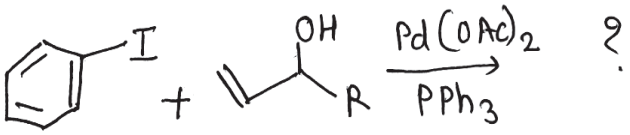


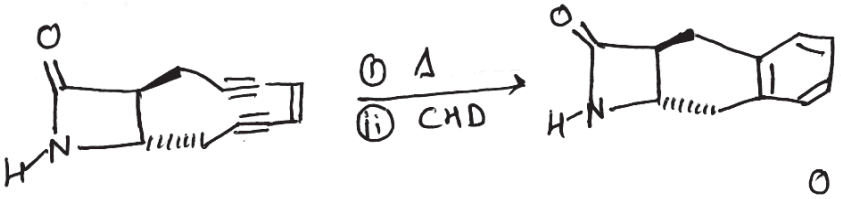
***Q6)*** a) Write short notes on the following (any two) : **[6]**

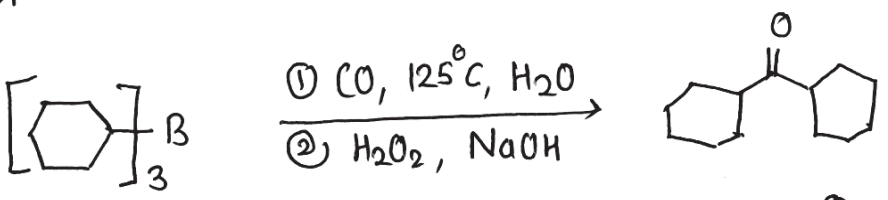
i) Oxo Process

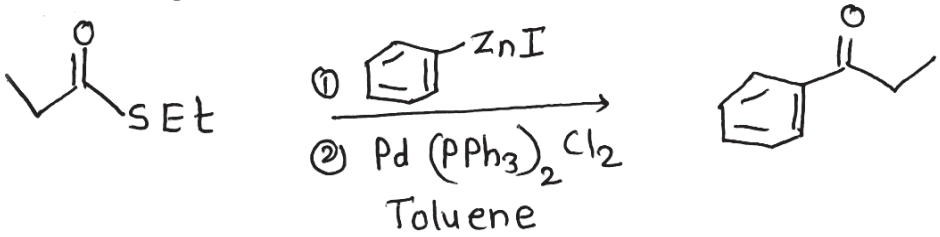
ii) Suzuki coupling

iii) Click chemistry

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

i) 


ii) 


iii) 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**Total No. of Questions : 6]** **SEAT No. :**

**P372** **[Total No. of Pages : 3**

# [5832]-404

## M.Sc. - II

## DRUG CHEMISTRY

## CBOP-4-CHD-462(B): Supramolecular, Green Chemistry and Forensic Chemistry

## (2019 Pattern) (Semester - IV)

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

***Instructions to the candidates:***

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

### SECTION - I

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

i) Discuss in brief intermolecular forces and their role in supramolecular catalysis.

ii) Give a brief account of solvent free reactions.

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

i) Principles of green chemistry.

ii) Various bond properties.

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

a) Explain the design principles of molecular receptors.

b) Write a note on molecular devices.

c) Discuss the applications of biocatalysts in organic synthesis.

d) Give brief overview of use of ultra-sound technique in organic synthesis.

e) Discuss solid phase Michael addition reaction with suitable example.

***P.T.O.***

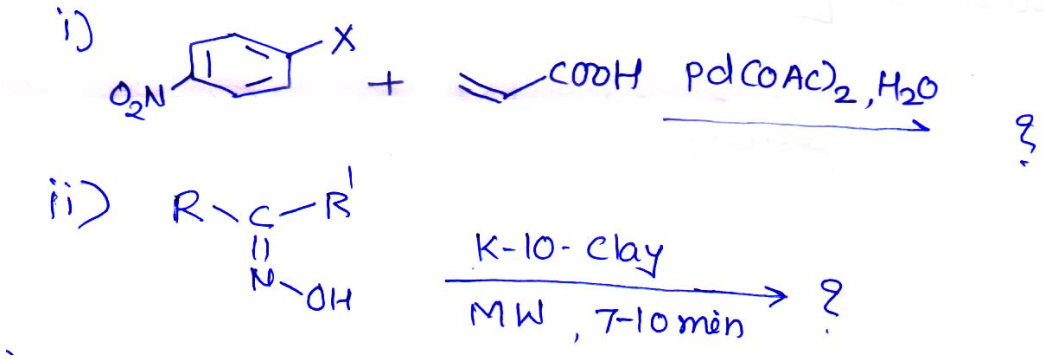
***Q3)*** Answer any four of the following : **[12]**

a) Explain in brief molecular channel and transport processes.

b) Explain the role of green chemistry in day to day life.

c) Discuss green chemical pathway for aziridine synthesis. What are the benefits achieved.

d) Identify the products in following reactions.




e) Explain in brief :

i) Supramolecular reactivity

ii) Molecular Recognition

## SECTION - II

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

i) Applications of chromatographic techniques in forensic analysis.

ii) Discuss different spot tests for opioid drugs.

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

i) Designer Drugs.

ii) Clandestine laboratory investigation.

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

a) Write a short note on types and importance of fingerprints in forensic science.

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

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

d) Explain in brief how fingerprints can be preserved and identified.

e) Write a short note on Illict Drugs.

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

a) Discuss following classes of drugs. Explain problems associated with their use.

   i) Narcotics

   ii) Stimulants

b) Explain urine analysis with suitable example for forensic investigation.

c) Explain the importance of footprints in forensic analysis. Explain how footprints can be preserved.

d) Discuss in brief Chieloscopy.

e) Write short notes on :

   i) Poroscopy

   ii) Edgeoscopy

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