MBV-003-010305 Seat No. _____

M. Sc. (Sem. III) (CBCS) Examination

December – 2016

C(OP) - 303 : Organo-pharmaceutical Chemistry

(Heterocyclic chemistry) (Elective - II)

(Old Course)

Faculty Code : 003

Subject Code : 010305

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) All questions carry equal marks.

1 Answer the followings : (any **seven**) **14**

(a) Discuss the synthesis of Diaziridine (any one).

(b) Write the synthesis of Oxocine,

(c) Give the synthesis of 2-Pyrones.

(d) Write the structure of following :

(i) 1H,5H, Pyrazolo[1,2,*a*]pyrazole

(ii) 2,Aza spiro [4,4] nonane

(iii) 8-Azabicyclo[3,2,1]octane

(iv) Seleno[3,2,*b*]furan

(e) Explain: Pyrrole is weak base as compared to aniline,

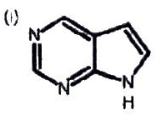
(f) Discuss the cyclo addition reaction of Benzo[c]furan.

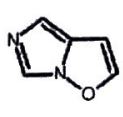
(g) Oxirane has a highest dipole moment than thirane. Justify the answer.

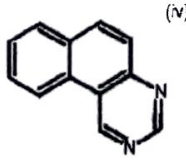
(h) Explain: Pyridine is soluble in water but not in benzene,

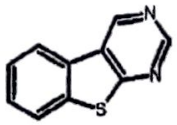
(i) Explain any one method for the synthesis of isothiazole.

(j) Give the names of following:

(i) 

(ii) 

(iii) 

(iv) 

2 Give at least two synthetic methods for the following and draw their resonating structures : (any **three**) **14**

(i) Quinoline

(ii) Thiazine

(iii) Oxepine

(iv) Pyridazine

3 Answer the following : (any **two**) **14**

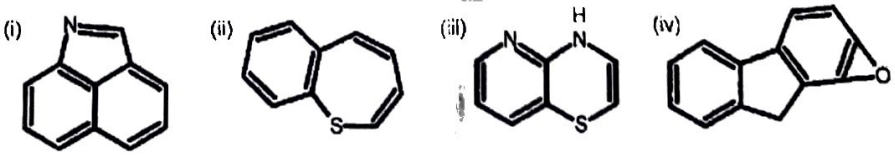
(a) Discuss at least two methods for the synthesis of Imidazoles and their resonating structures,

(b) Draw the resonating structures of Indole and discuss their electrophilic substitution reactions.

(c) Explain the synthesis of 1,2,4-Triazole(any three).

4 Answer the following : (any **two**) **14**

(a) (i) Write the names of



(ii) Write the structures of

(i) Thio $[2,3-h]$ Thiophene

(ii) Imidazo $[2,1a]$ Phthalazine

(iii) Pyrano $[3,2-b]$ indole

(iv) 1,2,3Triazole $[4,3-b]$ pyridazine

(b) Discuss the chemical properties of quinaxoline.

(c) Discuss the synthesis of Indolizine.

5 Discuss the chemical properties of following : (Any-2) **14**

(i) Tetrazole

(ii) Oxazole

(iii) Thiocine.

BBI-003-010305 Seat No. _____

M. Sc. (Sem. III) Examination

December – 2015

C-OP-303 : Organo-pharmaceutical Chemistry

(Heterocyclic Chemistry) (New Course)

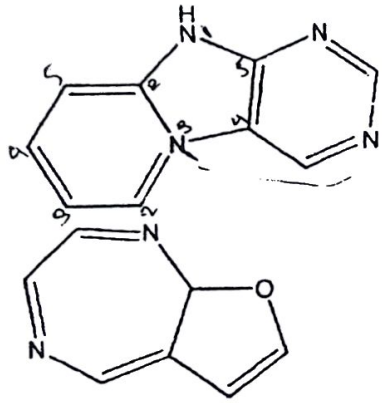
Faculty Code : 003
Subject Code : 010305

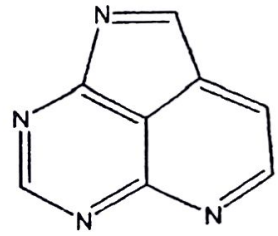
Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

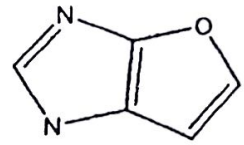
Instructions : (1) All questions are compulsory.
(2) All Questions carry equal marks.

1 Answer the followings (Any seven). 14

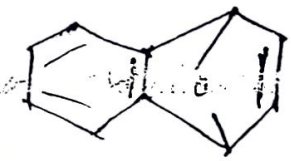
a. Give the name of followings:







b. Discuss the synthesis of Benzo[c]furan.



c. Write the synthesis of Trizole.

d. Discuss cycloaddition reaction of Isobenzothiophene.

e. Give any one synthesis of Azetines.

f. Discuss the preparation of Diaziridines.

g. Give the synthesis of Oxepines.

h. Write the synthesis of Dioxane.

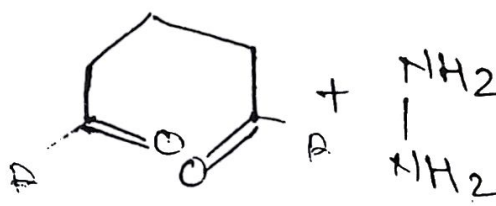
i. Give the synthesis of Azocine.

j. Write the structure of followings:

(i) Thieno[3,2-h]cinnoline

(ii) Imidazo[2,1-a]phthalazine

(iii) 1,2,4-Triazolo[4,3-b]1,2,4,5-tetrazine



(iv) 1H-Thieno[3,4-c]pyrazole.

2 Answer the following (any two). 14

a. Discuss at least three methods for the synthesis of Indole.

b. Draw the resonating structure of Benzofuran and discuss their electrophilic substitution reactions.

c. Explain any two synthesis of Tetrazole.

3 Give at least two synthesis methods for the of followings (any three) 14

(i) Oxazine 6

(ii) Pyrazole

(iii) 2-Pyrones

(iv) Thiepins

(v) Pyrimidines 6

4 Discuss the chemical properties of followings: 14

(i) Benzo[b]thiphene

(ii) Thiazole

(iii) Azepines.

5 Answer the followings: (Any two) 14

a. Discuss any three methods for the preparation of Isoquinnoline and gives its electrophilic and nucleophilic reactions in detail.

b. Discuss the chemical properties of Pyridines.

c. Discuss the synthesis of Pyrazine by

(1) α-diketones

(2) α-amino carbonyl compound

KEN'S

WN-134

003-010305

M.Sc. (CHE) (CBCS) (Sem.-III) Examination
December-2014
C-OP-303 : Organo-Pharmaceutical Chemistry
Heterocyclic Chemistry

Faculty Code : 003
Subject Code : 010305

Time : 2½ Hours] **[Total Marks : 70**

Instructions : (1) **All** questions are compulsory.
(2) **All** questions carry equal marks.

1. Answer the following : (any **seven**) **14**

(a) Explain briefly Aziridine is relatively basic than methyl- or dimethyl amine.

(b) How thiepin is synthesized ? Give suitable examples.

(c) Pyridine dissolves in water but not in benzene, explain.

(d) Why 2-azirine, oxirene and thiirene are called anti-aromatic ? Justify your answer.

(e) Explain briefly 4-aminoacridine (pKa 8.04) is more basic than the 3-isomer (pKa 4.40).

(f) Isoindole is more reactive than indole itself. Explain.

(g) Pyridazine has a high dipole moment whereas pyrazine has a value of zero.

(h) Benzofuran is more stable than furan towards acids.

(i) The Bischler-Napieralski synthesis of isoquinoline works best if electron donating groups are present on the ring

(j) Write all tautomeric forms of azepines. What is stability order of these tautomers ?

(k) From the following which one is more basic: Oxaridine or Diaziridine.

2. Answer any **two** of the following :

(a) Discuss at least two methods of synthesis of Oxiranes. Discuss their ring opening reactions and reaction with organo-metallic. 7

OR

Discuss at least two methods of synthesis of Azerines. Explain their ring opening reactions and reaction with acids.

(b) Give at least two methods of synthesis of Diaziridines and their reduction as well as oxidation reaction. 7

OR

Describe at least two methods of synthesis of acridines. Discuss their electrophilic and necleophilic substitution reactions with their resonance structures.

OR

2. Answer the following.

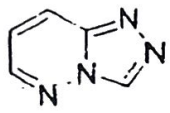
(a) Discuss the synthesis of pyridines by (i) Hantzsch synthesis (ii) Gaureschi-thorpe synthesis and describe their electrophilic and necleophilic substitution reactions with their resonance structures. 7

OR

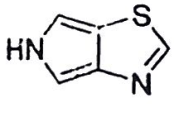
Discuss the synthesis of pyrimidines by (i) Pinner synthesis (ii) Biginelli synthesis and explain their electrophilic and necleophilic substitution reactions with their resonance structures.

(b) Answer the following : 7

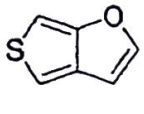
(1) Give the names of the following (any seven).



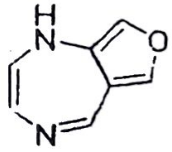
(a)



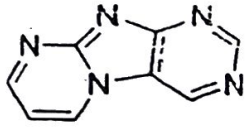
(b)



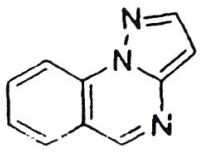
(c)



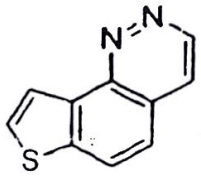
(d)



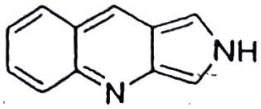
(e)



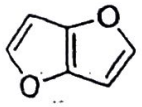
(f)



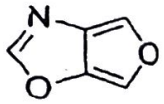
(g)



(h)



(i)



(j)

(2) Give the structures of the following (any **seven**) :

(a) 5H-Thieno[3,4-b]carbazole

(b) Pyrano[2,3-c]pyrrole

(c) Furo[2,3-b]furan

(d) Octahydropyrrolo[3,4-c]pyrrole

(e) Thieno[3,2-h]cinnoline

(f) 2H-Naphtho[1,2-b]thiete

(g) Pyridazino[4,5-b]-1,4-oxazepine

(h) Pyrido[2,3-c] pyridazine

(i) Pyrazolo[5,1-c] 1,2,4 triazine

(j) 1H,5H-Pyrazolo[1,2-a]pyrazole

3. Answer the following :

(a) Answer the following : (Any two)

(1) Discuss the synthesis of Indolizine from α-picoline with active methylene carbonyl compound and α-bromoacetophenone. 5

(2) Write Robinson-Gabriel synthesis and Gabriel synthesis of Oxazole and thiazole respectively. 5

(3) Explain the synthesis of 1,2,3-triazole by reaction of acetylene with hydrazoic acid and sodium azide. 5

(b) Answer the following : (Any one)

(1) Discuss the chemical properties of Indole. 4

(2) Write the electrophilic substitution reaction of benzo[b]thiophine. 4

4. Answer the following :

(a) Answer the following :

(i) Discuss the methods of synthesis of pyridazine by (i) (4+2) condensation, (ii) Diels-Alder reaction: between 1,3-diene and azidocarboxylic ester and describe their electrophilic and necleophilic substitution reactions with their resonance structures. 7

OR

Discuss the methods of synthesis of pyrazine from (i) phenyl azirine, (ii) α-diketones : (4+2) condensation and describe their electrophilic and necleophilic substitution reactions with their resonance structures. 7

(b) Give the synthesis of (i) 2,3-dimethyl-4-phenylquinoline and 2-ethyl-4-phenylquinoline by Friedlander synthesis, (ii) 2-methyl-4-quinolone and 4-methyl-2-quinolone by Conrad-Limpach synthesis and discuss their electrophilic and necleophilic substitution reactions with their resonance structures. 7

OR

Discuss the synthesis of isoquinolines by (i) Pomeranz-Fritsch synthesis, (ii) Pictet-Spengler synthesis and discuss their electrophilic and necleophilic substitution reactions with their resonance structures. 7

P.T.O.

3. Answer the following :

(a) Answer the following : (Any two)

(1) Discuss the synthesis of Indolizine from α-picoline with active methylene carbonyl compound and α-bromoacetophenone. 5

(2) Write Robinson-Gabriel synthesis and Gabriel synthesis of Oxazole and thiazole respectively. 5

(3) Explain the synthesis of 1,2,3-triazole by reaction of acetylene with hydrazoic acid and sodium azide. 5

(b) Answer the following : (Any one)

(1) Discuss the chemical properties of Indole. 4

(2) Write the electrophilic substitution reaction of benzo[b]thiophine. 4

4. Answer the following :

(a) Answer the following :

(i) Discuss the methods of synthesis of pyridazine by (i) (4+2) condensation, (ii) Diels-Alder reaction: between 1,3-diene and azidocarboxylic ester and describe their electrophilic and necleophilic substitution reactions with their resonance structures. 7

OR

Discuss the methods of synthesis of pyrazine from (i) phenyl azirine, (ii) α-diketones : (4+2) condensation and describe their electrophilic and necleophilic substitution reactions with their resonance structures. 7

(b) Give the synthesis of (i) 2,3-dimethyl-4-phenylquinoline and 2-ethyl-4-phenylquinoline by Friedlander synthesis, (ii) 2-methyl-4-quinolone and 4-methyl-2-quinolone by Conrad-Limpach synthesis and discuss their electrophilic and necleophilic substitution reactions with their resonance structures. 7

OR

Discuss the synthesis of isoquinolines by (i) Pomeranz-Fritsch synthesis, (ii) Pictet-Spengler synthesis and discuss their electrophilic and necleophilic substitution reactions with their resonance structures. 7

P.T.O.

5. Answer the following :

(a) Answer the following : (any two)

(1) Give two synthetic methods for preparing azepine derivatives. 5

(2) Explain chemical reactivity of azepines with suitable examples. 5

(3) Give an account of chemical reaction of oxepines. 5

(b) Answer the following : (Any one)

(1) Discuss any two synthetic methods for oxepine derivaives. 4

(2) Give at least two methods of synthesis of Oxaziridines and discuss their thermal and photochemical reactions. 4

(3) Give at least two method of synthesis of dioxane, oxazine and thiazine. 4

Rerth Patel

KEN'S

139/C

003-010305

M.Sc. (Che) (CBCS) (Sem.-III) Examination
November-2013
Organopharmaceutical Chemistry
Paper No.-C(OP)-303 : Heterocyclic Chemistry

Faculty Code : 003
Subject Code : 010305

Time : 2½ Hours] **[Total Marks : 70**

Instructions : (1) All questions carry equal marks.
(2) All the questions are compulsory.

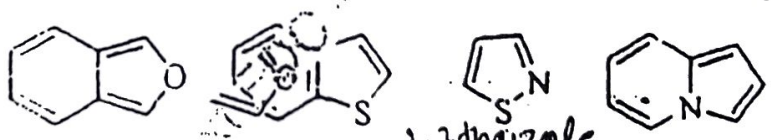
1. Answer any seven of the following. 14

(a) Explain Pyridine is nitrated at 3 position but its N-oxide at 4 position.

(b) Explain the diazines are more resistant to electrophilic attack ther pyridine.

(c) Discuss the necleophilic chemical reaction of acridines.

(d) (i) Give the nomenclature of any two of the following :



(a) (a') (b) (c) (d)

Benzofuran Benzo[b]Thiophene 1,2-Thiazole Isothiazole Indolizine

(ii) Give the structure of any two of the following :

(a) Isoquinoline
(b) Indole
(c) Isoindole
(d) Oxirane and oxirene

(e) State explanation that pyrazole is more basic as compared to pyrrole.

(f) Which heterocyclic ring is more readily broken- Aziridine or Azetidine ?

(g) How many tautomeric forms of Azepines exist? Give structures of all forms.

(h) 4-Aminoacridine (pKa 8.04) is more basic than the 3-isomer (pKa 4.40). Explain.

(i) Explain : Quinoline is more easily reduced than naphthalene.

(j) Explain briefly that the acrolein itself is not used in the Skraup synthesis of quinoline.

2. Answer any three of the following :

(i) Give any two synthesis of the following.

(a) Give synthesis of Cinnoline by

(i) Von-Richter synthesis: From 2-aminophenylpropiolic acid

(ii) Widman-Stoemer synthesis: From o-amino styrene derivatives. 5

(b) Give synthesis of Pyrimidine by

(i) Remfry-Hull synthesis: by the reaction of α-butylmalondiamide and ethyl formate

(ii) Biginelli reaction. 5

(c) Give the synthesis of Phthalazine by

(i) the reaction of o-phthaladehyde with hydrazine

(ii) the reaction of dibromo o-xylene with hydrazine. 5

(ii) Give any one synthesis of the following :

(d) Give synthesis of Aziridine by

(i) Grabriel method: From 2-chloro or 2-bromoethanolamine

(ii) Hassner method: by the reaction of alkenes with iodoisocyanate. 4

(e) Give synthesis of Thiirane

(i) from 2-mercaptochlorocyclopantane

(ii) by the reaction of oxirane with thiourea. 4

3. Answer any three of the following :

(i) Give any two synthesis of the following.

(a) Give synthesis of Indolizines by

(i) the reaction of α-picoline with an active methylene carbonyl compound

(ii) the condensation of 2-pyridyllithium with epichlorhydrin. 5

(b) Give synthesis of Furan :

(i) from carbohydrate

(ii) Feist-Benary cyclization: by the cyclization of α-halo aldehyde or ketone with β-keto ester. 5

(c) Give synthesis of Thiophene by

(i) Gewald synthesis

(ii) Hinsberg synthesis. 5

(ii) Give any one synthesis of the following :

(d) Give synthesis of Indole by : 4

(i) Grandberg synthesis

(ii) Bischler-Mohlau synthesis.

(e) Give synthesis of Pyrazole by : 4

(i) the reaction of acetylene with diazomethane

(ii) the reaction of propargly aldehyde with hydrazine.

(f) Discuss the synthesis 1, 4-diazepines. 4

4. Answer any **three** of the following :

(i) Give any **two** synthesis of the following :

(a) Give synthesis of Imidazole by

(i) Wallach synthesis: by the reaction of glyoxal, α-keto aldehyde or α-diketo with aldehyde

(ii) Marckwald synthesis. 5

(b) Give synthesis of

(i) Oxazole by Robinson-Gabriel synthesis

(ii) Isothiazole by cyclization of β-chlorovinyl aldehyde with ammonium thiocyanate. 5

(c) Give synthesis of Tetrazole by

(i) the reaction of hydrocyanic acid or nitrile with sodium azide

(ii) by the reaction of benzaldehyde and toluene p-sulphonylhydrazone with aromatic diazonium salt. 5

(ii) Give any **one** synthesis of the following.

(d) Give synthesis of Isoindole

(i) by vapour phase pyrolysis of N-methoxy carbonyloxyisoindoline

(ii) from N-methylisoindoline. 4

(e) Give synthesis of Thiazole by

(i) Hantzsch's synthesis

(ii) Cook-Heilbron's synthesis. 4

5. Answer the following :

(i) Answer any **four** of the following.

(a) Discuss at least two electrophilic or necleophilic chemical reactions of oxirane by drawing resonating structure. 2

(b) Discuss at least two ring opening or necleophilic chemical reactions of oxetane by drawing resonating structure. 2

(c) Discuss at least two electrophilic or necleophilic chemical reactions of pyrrole or indole by drawing resonating structure. 2

(d) Discuss at least two electrophilic or necleophilic chemical reactions of thiophene or benzothiophene by drawing resonating structure. 2

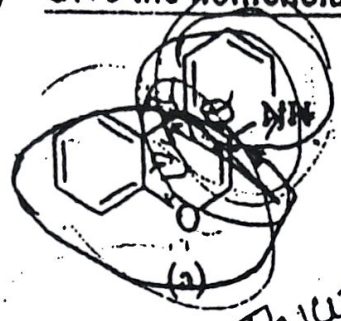
(e) Discuss at least two electrophilic or necleophilic chemical reactions of imidazole or pyrazole by drawing resonating structure. 2

(f) Discuss at least two electrophilic or necleophilic chemical reactions of isothiazole or thiazole by drawing resonating structure. 2

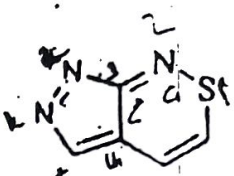
(g) Discuss at least two electrophilic or necleophilic chemical reactions of triazole by drawing resonating structure. 2

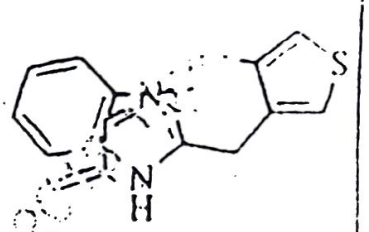
(ii) Answer the following.

(h) Give the nomenclature of any three of the following. 3

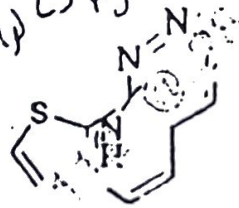


(a)





(c)



(d)

(e)

(i) Draw the structure of any three of the following : 3

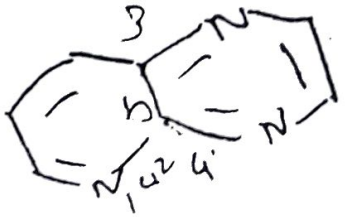
(i) Azireno [2,3-b] Indole

(ii) Benzo [d] Imidazole

(iii) 1H-Pyrazolo [4,3-d] Oxazole

(iv) Pyrido [2,3-b] Pyrazine

(v) Thio [2,3-h] Thiophene



OR

5. Answer the following.

(a) Discuss synthesis and reactivity of any two seven membered heterocycles. 7

(b) Discuss synthesis and chemical properties of eight member system you studied. 7