

[113]

SERIAL No. _____

No. of printed pages: 04

SARDAR PATEL UNIVERSITY

M.Sc. (Chemistry), Semester – III

November 22, 2019: Friday

Time: 02:00 P.M. – 05:00 P.M.

Heterocyclic Chemistry [PS03CORC03] (Old Course)

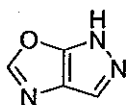
Note: Figures to the right indicate full marks.

Total marks: 70

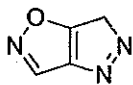
Q-1 Select the correct answer and mention only the code of correct answer against their question numbers. [08]

a. Which of the following is the correct structure of 1H-pyrazolo[4,3-d]oxazole?

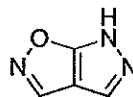
(i)



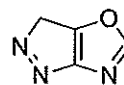
(ii)



(iii)



(iv)



b. Addition of dichlorocarbene to indole produces.....

(i) 2-chloroquinoline

(ii) 3-chloroquinoline

(iii) 4-chloroquinoline

(iv) 3-formyl indole

c. Which substrate is used as one of the starting material in Pfitzinger synthesis of quinoline?

(i) Aniline

(ii) Crotonaldehyde

(iii) 2-amino acetophenone

(iv) Isatin

d. Quinoxaline is.....benzodiazine.

(i) 1,2-

(ii) 1,3-

(iii) 1,4-

(iv) 2,3-

e. Which one of the following is not a triazine derivative?

(i) Nicotine

(ii) Cyanuric chloride

(iii) Melamine

(iv) Cyanuric acid

f. Bromination of 2-Amino pyridine occurs at position-.....

(i) 3

(ii) 4

(iii) 5

(iv) 6

g. Which one of the following combination is the starting material for the synthesis of 2,4,6-trimethyl pyrylium salt?

(i) Benzaldehyde + 2 mole of Acetone

(ii) Acetaldehyde + 2 mole of Acetone

(iii) Acetaldehyde + 2 mole of Acetophenone

(iv) Formaldehyde + 2 mole of Acetone

h. In presence of excess $AlCl_3$, coumarin undergoes bromination at position-.....

(i) 3

(ii) 4

(iii) 5

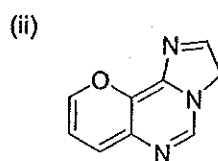
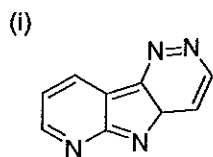
(iv) 6

(P.T.O.)

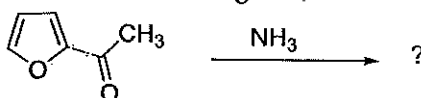
Q-2 Answer ANY SEVEN of the following.

[14]

- a. Assign the correct names of the following heterocyclic structures by using Hantzsch-Widman method.



- b. Explain: The electrophilic aromatic substitution in Benzo[b]furan occurs at position-3.
c. Explain: Imidazole is stronger base than Pyrrole.
d. Write the ANRORC reaction of Isoquinoline.
e. Explain the formation of isomeric quinolones by Conard-Limpach and Knorr method.
f. Explain: The reaction of 3,4,6-trichloropyridazine with sodium methoxide in methanol gives 3,6-dichloro-4-methoxypyridazine as the major product.
g. Give the product and mechanism of following reaction.



- h. Write the mechanism for the conversion of 4-pyrone to 1-phenyl-4-pyridone by reaction with aniline.
i. Write the synthesis of 2,4,6-triphenyl pyrylium salt from acetophenone.

Q-3 [A] Answer the following questions.

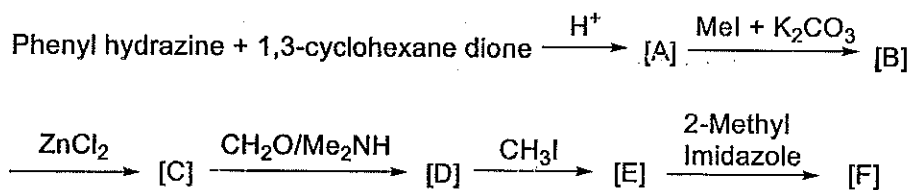
[06]

- (1) Write a note on Fischer Indole synthesis.
(2) Write the synthesis of Benzo[b]furan from coumarin.

Q-3 [B] Answer the following questions.

[06]

- (1) Write the reaction of Benzo[b]thiophene with (i) MeMgBr, (ii) Na/liq. NH₃ and (iii) Na/EtOH.
(2) Deduce the structures of A to F in following conversions:



OR

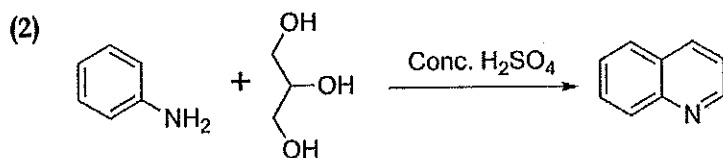
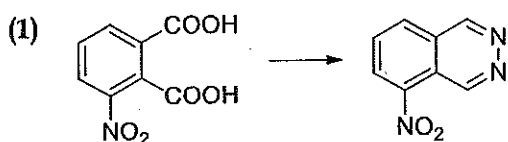
Q-3 [B] Answer the following questions.

[06]

- (1) Explain reactivity of 1,2-azoles and write the Robinson-Gabriel synthesis of 2,4-diphenyloxazole.
(2) Write the synthesis of 2-phenyl indole from aniline by giving appropriate mechanism.

Q-4 [A] Give the mechanism of following transformation.

[06]



Q-4 [B] Answer the following questions.

[06]

- (1) Write the Nitration, sulphonation and bromination reactions of Quinoline and Isoquinoline.
- (2) Give at least one synthesis of Cinnoline, Quinazoline and Quinoxaline.

OR

Q-4 [B] Answer the following questions.

[06]

- (1) Explain: In Friedlander synthesis, with unsymmetrical ketone the formation of product depends on the conditions/catalyst used.
- (2) Write the ISAY synthesis for 6-methylpteridine and 7-methylpteridine.

Q-5 [A] Do as directed.

[06]

- (1) Explain in detail: Hantzsch pyridine synthesis.
- (2) Attempt the following reactions by giving suitable mechanism.
 - (i) *s*-triazine + Hydrazine \rightarrow ?
 - (ii) Reactions of 3,6-dimethyl-1,2,4,5-tetrazine with (a) Benzene and (b) Perbenzoic acid

Q-5 [B] Answer the following questions.

[06]

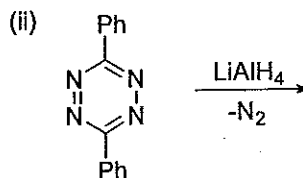
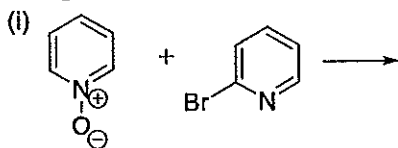
- (1) Write any three deoxygenation reactions of Pyridine-N-oxide *via* suitable mechanism for each.
- (2) Give the synthesis of barbituric acid and write the reactions of Uracil.

OR

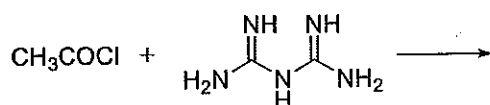
Q-5 [B] Do as directed.

[06]

- (1) Explain: Electrophilic aromatic substitution reactions in pyridine occurs only at position-3.
- (2) Complete the following reactions:



(iii)



(P.T.O.)

Q-6 [A] Write the synthesis of coumarin and chromone. Give their reactions with electrophilic reagents. [06]

Q-6 [B] Answer the following questions. [06]

- (1) Write synthesis of Azulene from Pirylium salt.
- (2) Write any two cycloaddition reactions of α -Pyrone.

OR

Q-6 [B] Answer the following questions. [06]

- (1) Describe the Pechmann condensation by giving appropriate mechanism.
- (2) Discuss the reactions of pyrilium salt with (i) Base, (ii) Wittig reagent and (iii) H_2O_2 .

.....X.....