

C38J

SARDAR PATEL UNIVERSITY

M.Sc. Chemistry (Semester-III) Examination

January 04, 2021 Monday

Heterocyclic Chemistry [PS03CORC03] [Old Course]

Time: 10:00 am to 12:00 pm

Total Marks: 70

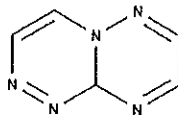
N.B. (1) Figures to the right indicate Marks.

(2) Attempt all Questions.

Q-1 [A] Choose the correct answer from the options given below.

[08]

1. Which is the correct name of following heterocyclic compound?



- a) 9aH-[1,2,4]triazino[4,3-b][1,2,4]triazine
 b) 9aH-[1,2,4]triazino[5,4-c][1,2,4]triazine
 c) 4a,8a-dihydropyridazino[4,5-e][1,2,4]triazine
 d) 4aH-[1,2,4]triazino[4,5-c][1,2,3]triazine

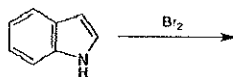
2. Nitration of quinazoline gives _____ as product.

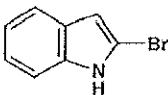
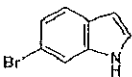
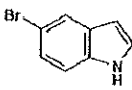
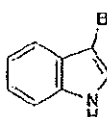
- a) 2-nitroquinazoline
 b) 6-nitroquinazoline
 c) 7-nitroquinazoline
 d) 5-nitroquinazoline

3. Pteridine is composed of fused _____ and _____ rings.

- a) Pyrazine, Thiazole
 b) Pyrimidine, Pyrazine
 c) Pyrazolidine, Pyrimidine
 d) Thiazole, Pyrazolidine

4. Which is the most probable main product of the following reaction?



- a)  b)  c)  d) 

5. Bromination of pyridine-N-oxide occurs at position _____.

- a) 3
 b) 2
 c) 4
 d) 6

6. 3, 6-diphenyl-1, 2, 4, 5-tetrazine reacts with
- LiAlH_4
- to give _____ as a main product.

- a) Dibenzylidene hydrazine
 b) Dibenzyl acetone
 c) Diphenyl hydrazine
 d) Diphenyl pyrazole

7. Nitration of
- α
- pyrone give _____ as product.

- a) 4-nitro-2H-pyran-2-one
 b) 5-nitro-2H-pyran-2-one
 c) 3-nitro-2H-pyran-2-one
 d) 6-nitro-2H-pyran-2-one

8. Bromination of coumarin in presence of excess
- AlCl_3
- take place at _____ position.

- a) 7
 b) 4
 c) 5
 d) 6

Q-1[B] Do as directed

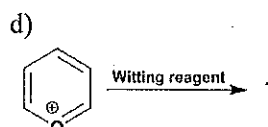
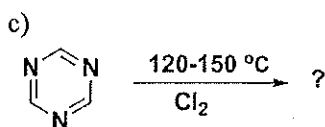
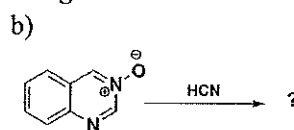
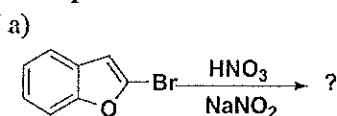
[16]
[08]

I. State which sentence is true or false

- Benzo[b]thiophene undergoes diazotisation reaction at position-3.
- Imidazole is a much weaker base than pyrrole.
- In 3,4,6-trichloropyridazine chlorine atom at C-6 is more reactive and can easily be replaced by nucleophiles.
- γ -pyrone is stronger base than α -pyrone.
- Thiamine is natural occurring diazines.
- Electrophilic substitution in pyridine occurs at C₄ position.
- 2-benzopyrylium salt convert in to isoquinoline or isoquinolinium salt by reaction with NH₃.
- Reaction of 2,4,6-trimethyl pyrylium salt with Zn metal in water give dienone as product.

II. Give product name and structure of following reaction.

[04]



III. Match the following

[04]

Reaction name

- Reissert method
- Grangberg Synthesis
- Pfizinger synthesis
- Picket – Gams synthesis

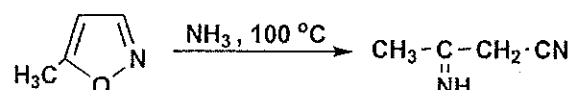
Product

- Quinoline
- Isoquinoline
- Indole
- Tryptamine

Q-2 Answer the following questions. (Any seven)

[14]

I. Suggest the mechanism for the following



- Write the synthesis of benzofuran using 2-allylphenol as starting material.
- Give the mechanism for transformation of quinazoline-4-carbonitrile from quinazoline 3-oxide.

IV. Give the products of following reaction.

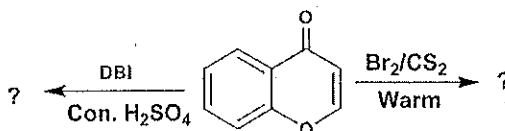


V. 2,4,6-trichloro-1,3,5-triazine $\xrightarrow[\text{R.T.}]{\text{Excess CH}_3\text{NH}_2}$?

- What is the structure of the product?
 - What is the structure of product when one equivalent of methyl amine react with 2,4,6-trichloro-1,3,5-triazine?
- VI. Explain: The reaction of 1-(octoxymethyl)pyridin-1-ium with HCN gives isonicotinonitrile as major product.

VII. Draw the structure of indole dimer and trimer.

VIII. Give the product of the following reaction.



IX. Draw four possible isomers of benzopyranone

Q-3

Do as directed

a) Discuss 'Fischer indole synthesis'

[04]

b) Describe the electrophilic substitution reaction of Benzo[*b*]furan.

[04]

OR

Q-3

Do as directed

a) Describe the nucleophilic substitution reaction of Benzo[*b*]thiophenes

[04]

b) Discuss four methods for synthesizing 'Isoxazole'

[04]

Q-4

Do as directed

a) Give the synthesis of quinazoline starting from anthranilic acid and formamide.

[04]

b) Describe mechanism of skraup synthesis.

[04]

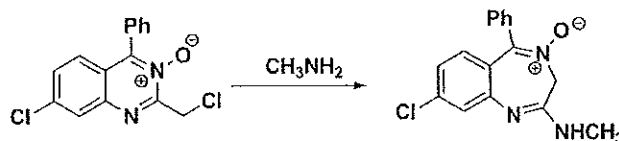
OR

Q-4

Do as directed

a) Give the mechanism of following reaction.

[04]



b) Give any two synthesis of isoquinoline.

[04]

Q-5

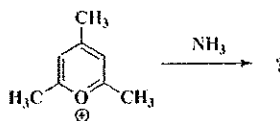
Do as directed

a) Write the mechanism for the synthesis of collidine using Hantzsch pyridine synthesis.

[04]

b) Suggest the product with proper mechanism.

[04]



OR

Q-5

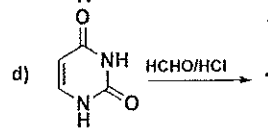
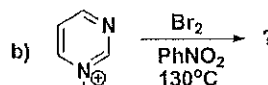
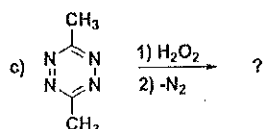
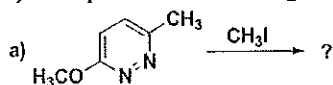
Do as directed

a) Give one synthesis and three electrophilic substitution reaction of pyridine N-Oxide.

[04]

b) Complete the following reaction.

[04]



- Q-6 Do as directed**
- a) Write two synthesis of each 2-pyrone and 4-pyrone. [04]
- b) Write a mechanism for the conversion of [04]
- i) 2,4,6-triphenylpyrylium salt in to 3,5,7-triphenyl-1*H*-1,2-diazepine by reaction with hydrazine.
- ii) 2-methylpyridine 1-oxide in to pyridin-2-ylmethyl acetate by reaction with acetic anhydride.

OR

- Q-6 Do as directed**
- a) Give the synthesis of following [04]
- i) 2-hydroxy chromene from salicylic acid
- ii) Flavone from 2-Acetylphenol and benzaldehyde
- b) Give reaction of flavylum salt with H_2 /metal, $LiAlH_4$, $PhMgBr$ and $Con.HNO_3/H_2SO_4$ [04]

~~_____X_____~~