

2025

(FYUGP)

(5th Semester)

CHEMISTRY

(MINOR)

Paper Code : CHEM.M-5 (T)

**(Organic Chemistry III : Heterocyclic
Chemistry)**

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 50)

*The figures in the margin indicate full marks
for the questions*

1. (a) How will you distinguish 1°-, 2°- and 3°-amines with Hinsberg reagent? 4
- (b) Describe Gabriel phthalimide reaction. 3
- (c) Describe the important factors which influence the basic strength of alkylamines and arylamines. 3

OR

2. (a) Describe Mannich reaction. 3
- (b) Describe any two synthetic applications of diazonium salts. 4
- (c) Write the reactions of aniline—
- (i) with bromine water;
- (ii) with CHCl_3 and KOH. 3
3. (a) Explain the structure elucidation of naphthalene. 4
- (b) Describe the similarities and differences of naphthols and phenols. 4
- (c) "Benzene is less reactive than naphthalene." Explain. 2

OR

4. (a) Describe Haworth synthesis for the preparation of naphthalene. 4
- (b) Write the following electrophilic substitution reactions of anthracene : 3
- (i) Chlorination
- (ii) Sulphonation
- (iii) Nitration

- (c) How would you convert the following? 3

- (i) Naphthalene into decalin
- (ii) Anthracene into 9,10-anthraquinone

5. (a) Describe Fischer indole synthesis. 4
- (b) Describe MO structure of furan. 4
- (c) "Pyridine is less basic than tertiary amines." Explain. 2

OR

6. (a) Pyrrole undergoes electrophilic substitution preferably at 2 or 5 position but not in 3 or 4 position. Explain. 3
- (b) Write the following reactions of furan : 3
- (i) Friedel-Crafts (alkylation) reaction
- (ii) Coupling reaction
- (c) Describe the preparation of pyridine by Hantzsch synthesis. 4

7. (a) What are alkaloid reagents? Discuss how alkaloids are isolated by Manske's process. 1+3=4
- (b) Explain the occurrence, properties and medicinal uses of cocaine. 3
- (c) Describe the classification of terpenoids. 3

OR

8. (a) Write the occurrence, structure and medicinal uses of the following : 2×2=4
- (i) Nicotine
- (ii) Reserpine
- (b) Describe the following : 2×2=4
- (i) Chichibabin reaction
- (ii) Citral-a and Citral-b
- (c) Differentiate terpenes and terpenoids. 2
9. (a) Describe Hoffmann's exhaustive methylation. 4
- (b) Write Diels-Alder reaction of furan. 3
- (c) Describe the MO structure of naphthalene. 3

OR

10. (a) Describe the physiological action of alkaloids. 3
- (b) Describe Skraup synthesis. 4
- (c) Explain oxidation and reduction reaction of naphthalene. 3

Subject Code : Bs/CHEM.M-5 (T)

To be filled in by the Candidate

BA / BSc / BCom / BBA / BCA
5th Semester End Term
Examination, 2025 (FYUGP)

Subject

Paper

INSTRUCTIONS TO CANDIDATES

1. The Booklet No. of this script should be quoted in the answer script meant for descriptive type questions and vice versa.
2. This paper should be ANSWERED FIRST and submitted within 1 (one) Hour of the commencement of the Examination.
3. While answering the questions of this booklet, any cutting, erasing, overwriting or furnishing more than one answer is prohibited. Any rough work, if required, should be done only on the main Answer Book. Instructions given in each question should be followed for answering that question only.

Signature of
Scrutiniser(s)

Signature of
Examiner(s)

Booklet No. A

87

Date Stamp

.....

To be filled in by the
Candidate

BA / BSc / BCom / BBA / BCA
5th Semester End Term
Examination, 2025 (FYUGP)

Roll No.

Regn. No.

Subject

Paper

DESCRIPTIVE TYPE

Booklet No. B

Signature of
Invigilator(s)

2025

(FYUGP)

(5th Semester)

CHEMISTRY

(MINOR)

Paper Code : CHEM.M-5 (T)

(Organic Chemistry III : Heterocyclic Chemistry)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(Marks : 15)

Put a Tick (✓) mark against the correct answer in the brackets provided :

1×15=15

1. Which one of the following is the least basic?

(a) Cyclohexyl amine ()

(b) Triethyl amine ()

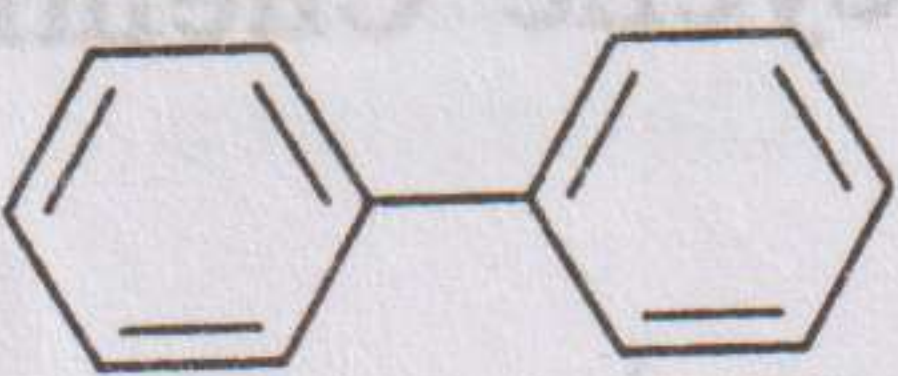
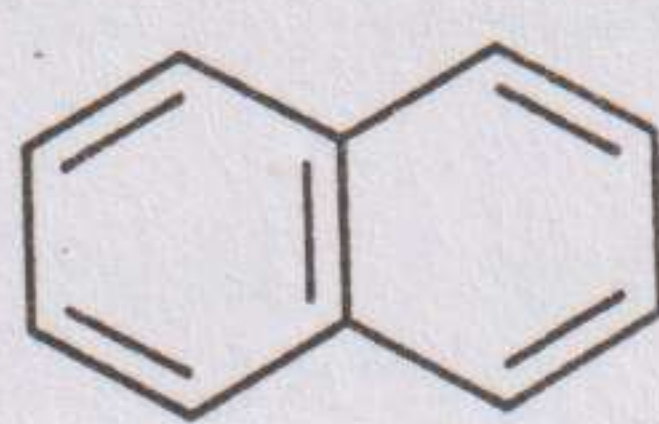
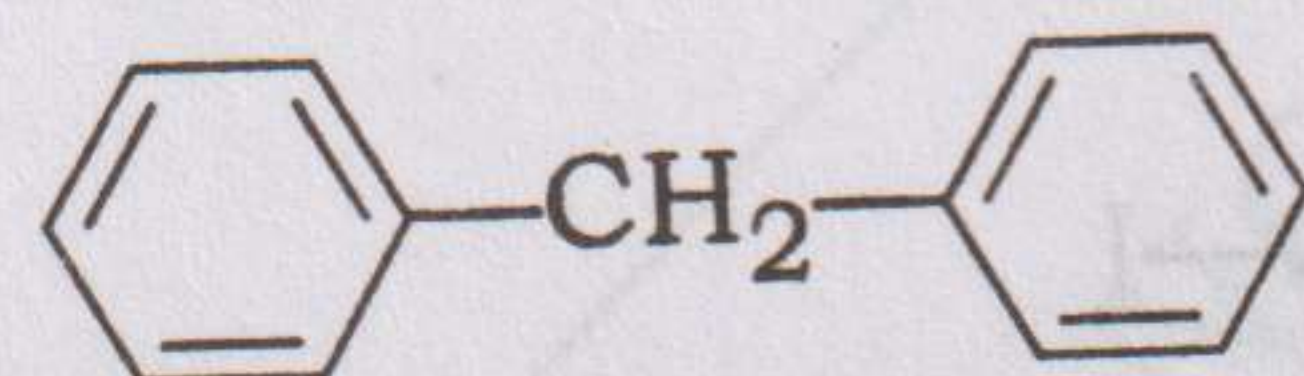
(c) Dimethyl amine ()

(d) Triphenyl amine ()

2. Aniline reacts with bromine water to give

- (a) 3-bromoaniline ()
- (b) 2-bromoaniline ()
- (c) 2,4,6-tribromoaniline ()
- (d) 2,4-dibromoaniline ()

3. Which one of the following is a condensed polynuclear hydrocarbon?

- (a)  ()
- (b)  ()
- (c)  ()
- (d) All of the above ()

4. Which one of the following is the most aromatic?

- (a) Benzene ()
- (b) Naphthalene ()
- (c) Anthracene ()
- (d) Phenanthrene ()

5. The IUPAC name of pyrimidine is

- (a) azolidine ()
- (b) azine ()
- (c) 1,3-diazine ()
- (d) triazine ()

6. In pyridine, electrophilic substitution takes place preferably at

- (a) 2-position ()
- (b) 1-position ()
- (c) 3-position ()
- (d) All of the above ()

7. In pyrrole, electrophilic substitution takes place preferably at

- (a) 2-position ()
- (b) 3-position ()
- (c) 4-position ()
- (d) All of the above ()

8. Paal-Knorr synthesis is used to prepare derivative of

- (a) furan ()
- (b) pyrrole ()
- (c) thiophene ()
- (d) All of the above ()

9. Bishler-Napieralski synthesis is used to prepare

- (a) indole ()
- (b) quinoline ()
- (c) pyridine ()
- (d) isoquinoline ()

10. Which one of the following is used as local anaesthetic?

- (a) Quinine ()
- (b) Cocaine ()
- (c) Morphine ()
- (d) Reserpine ()

11. Quinine is used as drug for the treatment of

- (a) typhoid ()
- (b) tuberculosis ()
- (c) malaria ()
- (d) leprosy ()

12. Which one of the following heterocyclic compounds is an isomer of pyrimidine?

- (a) Indole ()
- (b) Quinoline ()
- (c) Pyridazine ()
- (d) Pyridine ()

13. Which one of the following is the main constituent of synthetic lemon?

(a) Citral ()

(b) Myrcene ()

(c) Camphor ()

(d) Geraniol ()

14. Citral-A is known as

(a) neral ()

(b) geranial ()

(c) terpineol ()

(d) nerol ()

15. The fundamental unit of terpene is

(a) 1,3-butadiene ()

(b) allene ()

(c) 1,2-butadiene ()

(d) 2-methyl-1,3-butadiene ()

SECTION—II

(Marks : 10)

Answer the following questions in brief :

2×5=10

1. Describe condensed heterocyclic compound.

10. Which one of the following is used as an anesthetic?

(a) Quinine

(b) Cocaine

(c) Morphine

(d) Reserpine

11. Quinine is used as drug for the treatment of

(a) typhoid

(b) tuberculosis

(c) malaria

(d) leprosy

12. The fundamental unit of terpene is

13. Which one of the following is a substituted benzene?

(a) 1,3-butadiene

(b) allene

(c) 1,2-butadiene

(d) 2-methyl-1,3-butadiene

2. Write a short note on the preparation of nitriles.

3. Explain coupling reactions. 2. Write a short note on the following.

(Marks : 10)

Answer the following questions in brief : 2×5=10

1. Describe condensed heterocyclic compound.

4. Give the general characteristics of alkaloid. 3

Date Stamp

Filled in by the Candidate

BSc / BCom / BBA / BCA
Semester End Term
Examination, 2023 (P.T.O.)

INSTRUCTIONS TO CANDIDATES

Booklet No. of this script should be
indicated in the answer script must be
written type questions and vice

papers should be ANSWERED FIRST
indicated while a label along
the commencement of the
question.

On attempting the questions of this
script, any writing, erasing, over-
writing or scribbling more than one
time is prohibited. Any rough work,
required, should be done only on
a separate sheet. Instructions
on the back of the question should be
followed for answering that question.

To be filled in by the
Candidate

BSc / BCom / BBA / BCA
5th Semester End Term
Examination, 2023 (P.T.O.)

Roll No.

Regd. No.

Subject

Paper

DESCRIPTIVE TYPE

Booklet No. B

Bs/CHEM.M-5 (T)/148

[11]

Signature of
P.T.O. [P.T.O.]

5. Explain the isoprene rule with an example.

★ ★ ★