(7 pages) **Reg. No. :**.....

Code No. : 20372 E **Sub. Code : EMCH 51**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2025.

Fifth Semester

Chemistry — Core

ORGANIC CHEMISTRY – I

(For those who joined in July 2023 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which among the following is optically active?
   (a) Succinic acid
   (b) Meso-Tartaric acid
   (c) Lactic acid
   (d) Chloroacetic acid

2. The process of separating enantiomers from a racemic mixture is called ————.
   (a) Racemization
   (b) Resolution
   (c) Inversion
   (d) Isomerization

3. Pseudo acid character of nitroalkanes is due to ————.
   (a) α-hydrogen attached to nitro group being acidic
   (b) Presence of nitroso linkage
   (c) Hydrogen bonding with water
   (d) Electrophilic substitution

4. TNT stands for ————.
   (a) Tri-nitromethane
   (b) Tri-nitrotoluene
   (c) Tri-nitrotriazine
   (d) Tri-nitrobenzene

5. Which of the following reagents is commonly used to reduce nitrobenzene to aniline?

(a) HNO_3 (b) $KMnO_4$

(c) Br_2/Fe (d) Sn/HCl

6. Martius yellow is obtained by nitration of _____.

(a) Phenol (b) Aniline

(c) Naphthol (d) Benzene

7. Pyrrole can be prepared from succinimide using _____.

(a) Zn/NaOH (b) P_2S_5

(c) H_2SO_4 (d) $KMnO_4$

8. Electrophilic substitution reaction in furan takes place at position _____.

(a) 1 and 2 (b) 2 and 3

(c) 2 and 4 (d) 2 and 5

9. Basicity order is _____.

(a) Pyridine > Quinoline > Isoquinoline

(b) Quinoline > Pyridine > Isoquinoline

(c) Isoquinoline > Pyridine > Quinoline

(d) Pyridine > Isoquinoline > Quinoline

10. Isoquinoline can be prepared by the Bischler–Napieralski reaction starting from _____.

(a) Aniline + glycerol

(b) β -Phenylethylamine derivatives

(c) o-Aminobenzaldehyde

(d) Pyridine

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Discuss the Fischer and Newmann projections formulae with examples.

Or

(b) Explain the optical activity of allenes.

12. (a) Write a note on Reduction and Halogenation reaction of nitro alkanes.

Or

(b) Describe the alkylation and acylation reaction of aliphatic amines.

13. (a) Discuss the electrophilic substitution reactions of aniline.

Or

(b) Explain the preparation of benzene diazonium chloride. Discuss its synthetic applications.

14. (a) Write a note on Paal-Knorr synthesis of furan.

Or

(b) (i) Describe the synthesis of thiophene from acetylene.

(ii) Write a note on the oxidation reaction of thiophene.

15. (a) Explain the Friedländer synthesis of quinoline.

Or

(b) Write the following reactions of aniline :

(i) Amination

(ii) n-Butyl Lithium.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) (i) Write a note on cis-trans isomerism with suitable examples.

(ii) Describe the Cahn-Ingold-Prelog rules for R and S notation.

Or

(b) Describe the conformation analysis of n-butane with energy level diagram.

17. (a) Explain the nomenclature, isomerism, and preparation of nitroalkanes.

Or

(b) Explain the following :

(i) Gabriel's phthalimide synthesis

(ii) Curtius rearrangement.

18. (a) Write the preparation of aromatic amines from the following :

(i) Reduction of nitro compounds

(ii) Hofmann's method.

Or

(b) Describe the classification of dyes based on method of application.

19. (a) Discuss the nomenclature and classification of heterocyclic compounds.

Or

(b) Establish how pyrrole undergoes the following reactions.

(i) Nitration

(ii) Halogenation

(iii) Sulphonation

(iv) Coupling reaction.

20. (a) Describe the electrophilic substitution reactions of pyridine and the positions at which substitution occurs.

Or

(b) (i) Describe the oxidation and reduction reaction of isoquinoline.

(ii) Explain the synthesis of pyridine from acetylene.
