

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (AI&DS / AI&ML / Block chain / CE / IOT / CSDn / DS / ECS / CSE
/ EE / ECE / EEE / FT / IT / ME / Cyber Security / Industry Integrated/
Internet of Things and Cyber Security including Block Chain
Technology) (Sem.–1,2)**

CHEMISTRY-I

Subject Code : BTCH-101-23

M.Code : 93800

Date of Examination : 08-01-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION - B & C** have **FOUR** questions each.
3. Attempt any **FIVE** questions from **SECTION B & C** carrying **EIGHT** marks each.
4. Select at least **TWO** questions from **SECTION - B & C**.

SECTION - A

1. Write briefly :

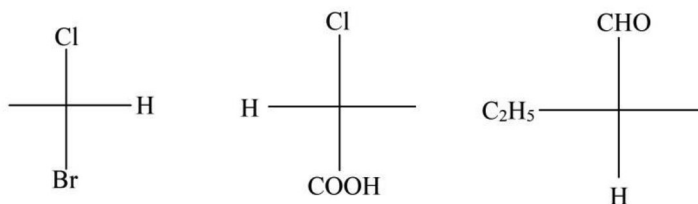
- a) What is linear combination of atomic orbital?
- b) What are Auxochromes?
- c) What is Cell potential?
- d) What are dipolar interactions?
- e) Explain the trend of ionization potential across the periodic table.
- f) What are Enantiomers?
- g) What is Friedel craft alkylation reaction?
- h) How many signals are present in Proton NMR of ethylbenzene?
- i) What is Polarizability?
- j) Differentiate between temporary and permanent hardness of water.

SECTION - B

2. a) Describe the Schrodinger's wave equation for particle in one dimensional box.
b) Draw the molecular orbital energy level diagram of N_2 molecule.
3. a) Discuss in detail Crystal field splitting in tetrahedral complexes.
b) What is role of doping on band structure of solid?
4. a) What are the factors affecting the value of $\lambda_{\max}$ and intensity of spectral line in UV-spectroscopy?
b) Differentiate stretching and bending mode of molecular vibrations.
5. a) Derive the Vander Waals equation of state.
b) Discuss the potential energy surface diagram of H_3 .

SECTION - C

6. a) Discuss the lime soda process for softening of hard water.
b) What is electrochemical corrosion? Discuss its mechanism.
7. a) What is electron affinity? How it shows variation along the period and down the group?
b) Write short notes on HSAB principle.
8. a) Describe the conformational analysis of ethane.
b) Write the R and S system of nomenclature.



9. a) What are free radical reaction? Discuss in detail.
b) Write the synthesis of aspirin.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.