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Total No. of Pages : 03

Total No. of Questions : 09

**B.Tech. (EEE / AI&ML / AI&DS / DS / CE / CSE / EE / ECE / IT / ME
/ Internet of Things and Cyber Security including Block Chain
Technology) (Sem.-1, 2)**

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

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. Answer briefly :

- a) What is Crystal field splitting energy?
- b) What is Huckel's rule?
- c) Differentiate between diffraction and scattering.
- d) What are Bronsted acids and bases? Give Examples.
- e) What type of molecules possesses IR spectra?
- f) Calculate the bond order of O_2 and O_2^+ .
- g) Why Be has high ionization energy than B? Explain.
- h) What are enantiomers? Give their characteristics.
- i) What are Electrophiles and Nucleophiles? Give examples.
- j) What is HSAB Principle?

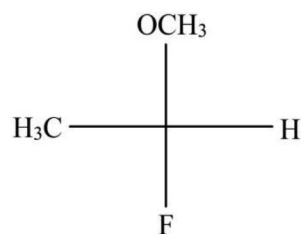
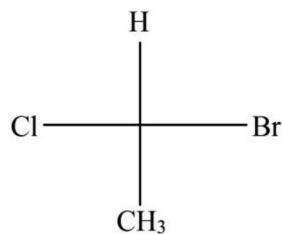
SECTION - B

2. Draw the Molecular orbital energy level diagram of N_2^+ molecule. Also, calculate its bond order and determine its magnetic behaviour.
3.
 - a) What is Fluorescence? Discuss its application in medicine.
 - b) What are molecular vibrations? Discuss its types.
4.
 - a) Derive Vander Waal's equation of state for real gases.
 - b) What are critical constant? Explain.
5.
 - a) What is hardness of water? How can we remove permanent hardness of water?
 - b) What is electro negativity? How does it vary in the periodic table?

SECTION - C

6.
 - a) Explain why electron affinity of halogen are very high?
 - b) In each of the following pairs, which will provide greater conduction of electricity and why?
 - i) Copper wire at $30^\circ C$ or same copper wire at $100^\circ C$.
 - ii) KCl solution at $25^\circ C$ or same KCl solution at $50^\circ C$.
 - iii) 0×1 M NH_4OH at $25^\circ C$ or 2 M NH_4OH at $25^\circ C$.
7. **Explain the following :**
 - a) Electronegativity of elements increase on moving from left to right in the periodic table.
 - b) Ionization enthalpy decrease in a group from top to bottom.

8. a) What is optical activity and specific rotation?
b) Assign RS configuration of the following :



9. a) Describe the synthesis of any drug molecule.
b) What are elimination reactions? Explain with examples.

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