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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Agriculture Engineering/Artificial Intelligence & Machine Learning/Artificial Intelligence (AI) and Data Science/Artificial Intelligence/Automation & Robotics/Automobile Engineering/Bio Technology/Civil Engineering/Computer Engineering/Computer Science & Engineering/Computer Science & Engineering (Artificial Intelligence & Machine Learning)/ Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering/Computer Science & Engineering (IOT) (Data Science)/Data Science/Electrical & Electronics Engineering/Electrical Engineering/Electronics & Communication Engineering/Electronics & Electrical Engineering/Food Technology/Information Technology/Mechanical EngineeringCSE (Internet of Things and Cyber Security including Block Chain Technology)/Computer Engg./CSE/ECE (PIT) (Sem.–1,2)

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

Date of Examination : 06-07-22

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 atleast TWO** questions from **SECTION - B & C.**

SECTION-A

1. Answer briefly :

- a) Discuss the types of the hardness of water and suggest a method for its removal.
- b) Define Isobestic Point and give its significance
- c) Distinguish between Meso and Racemic mixtures.
- d) How does entropy of a solid vary on fusion.
- e) Write a note on vander-Waal forces.
- f) Discuss HSAB principle and give its one application.
- g) Give Fazan's rules for polarizability.
- h) What are electrophilic reagents?
- i) Compare bond order and stability of oxide and superoxide ion.
- j) Discuss the role of dopant in semi-conductor chemistry.

SECTION-B

2. a) Give the physical significance of wave function. Discuss the origin of quantum numbers from Schrodinger wave equation. (6)
b) Differentiate between extrinsic and intrinsic semi-conductors. (2)
3. a) Draw the energy level diagram for NO molecule also determine their bond order and magnetic behaviour. (5)
b) Give factors affecting CFSE in transition metal complexes. (3)
4. a) Draw a well labelled Jablonski diagram and explain : (6)
(i) Intersystem Crossing.
(ii) Phosphorescence
b) Explain the importance of finger print region in IR spectroscopy. (2)
5. a) Derive van der Waal's equation for real gases. Give units and significance of van der Waal's constants. (6)
b) What are Potential Energy Surfaces. Give their application. (2)

SECTION-C

6. a) Derive Nernst Equation for the calculation of cell E.M.F. (4)
b) Using Ellingham diagram to explain carbon monoxide is a suitable reducing agent for oxide ore. (4)
7. a) Why Electron affinity of halogens is very high. (2)
b) Which is smaller and Why (Cl or Cl⁻)? (2)
c) Apply VSEPR theory to explain the shape of molecules : (4)
i) PCl₃
ii) Ammonium ion.
8. a) Discuss in detail conformational analysis of n-Butane. (5)
b) Write a note on optical isomerism. (3)
9. a) Discuss the Friedel Craft Alkylation reaction of Benzene with mechanism. (4)
b) How the nature of solvent affects rate of nucleophilic substitution reactions. (4)

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.