(DCHE01)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

GENERAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write about the types of molecular spectroscopy and explain the sources of different radiations.

2. Write the important components of Nuclear Magnetic Resonance Spectroscopy (NMR) and explain the basic principles of NMR Spectroscopy.

3. Discuss the rotational fine structure of electronic vibration transitions.

4. Explain the vibrational structure of an electronic transitions with suitable examples.

5. Write about the theory of sampling for Analysis. How do you collect different types of liquid samples?

6. Explain the student 't' test and its significance.

(DCHE01)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

GENERAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write the basic component of computers. Make a comparison between micro and super computers.

2. Write and Explain GO TO and DO statements.

3. (a) Discuss the rotational spectra of diatomic moleculus in Microwave spectroscopy by giving suitable examples.

   (b) Write and explain the important components of (ESR) Electron Spin Resonance Spectroscopy, working principle and its applications.

4. (a) Discuss the vibrational and rotational spectra of diatomic molecules in Infra Red (IR) spectroscopy with examples.

   (b) Write about the classification of bands of molecules invisible and ultra violet spectroscopy (UV)

5. (a) What are control charts? Discuss the applications of control charts.

   (b) Write about the types of errors in Analysis and minimization of errors in Analytical experiments. Explain Rules for the expression of significant figures.

6. (a) Write the Fortran programme for the determination of rate constant for the first order reaction.

   (b) Write the Fortran programme for solving Vanderwaals equation.

(DCHE02)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

INORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write about photo electric effect and compton effect.
2. Explain wave function and its physical properties.
3. Write the postulates of Molecular Orbital (MO) theory and explain the M-O diagrams of H_2 molecule.
4. What is hybridization and different types of hybridization with one example each.
5. Write about the crystal field splitting of 'd' orbitales in octahedral complex with an example.
6. Explain spectro chemical series and write its applications.

(DCHE02)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

INORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write the synthesis and properties of Carboranes.

2. Explain the classification of labile and inert complexes based on Valence band theory with one example.

3. (a) Explain variation method and its application for the determination of ground state energy of hydrogen atom.

   (b) Discuss term symbols and spectro chemical states and their applications.

4. (a) Define lattice energy and explain Born Haber cycle.

   (b) Discuss the structures of NaCl and CaF_2 based on the concept of radius ratio.

5. (a) How do you determine the stability constants of complexes by pH metric method?

   (b) Explain John-Teller effect and its effect on genetics of oh complexes.

6. (a) Write the synthesis, properties and structure of silicones.

   (b) Discuss the electron transfer reactions with examples by taking complimentary reactions.

(DCHE03)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

ORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Define the terms cross conjugation and hyper conjugation. Explain the bonding in fullerenes.

2. Write the principle of stereo specific and stereo-selective synthesis with one example each.

3. Write about the methods of determining mechanisms of isotopic effects in organic reactions with examples.

4. Write about the generation, structure and reactivity of carbocations with examples.

5. Explain the mechanism SN_1 reaction with examples.

6. Explain Diazonium coupling and Gatter mann-koch reaction.

(DCHE03)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

ORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Discuss the mechanism of Aldol condensation.

2. What are elimination reactions? Write and explain the mechanism of E_2 reaction with an example.

3. (a) Define Aromaticity and explain Aromaticity in Benzenoid and non-Benzenoids compounds by taking examples.

   (b) Discuss the conformations of cyclohexane and mono substituted derivatives and explain the effect of conformation in reactivity in cyclo-hexane derivatives.

4. (a) Explain the Hammett equation and linear free energy relationships on reaction constants.

   (b) Write about the neighbouring group mechanism and neighbouring group participation in Aliphatic nucleophilic reactions.

5. (a) Discuss the mechanistic and stereochemical aspects of addition reactions involving electrophiles.

   (b) Write and explain the mechanism of sandmayer. reaction and Hunsdiecker reaction.

6. (a) Discuss the mechanism of claisen condensation and Benzoin condensation.

   (b) Write and explain mechanism and orientation in pyrolytic elimination reactions giving suitable examples.

(DCHE04)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

PHYSICAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Derive Clasius-Clapeyron Equation.

2. Write and explain Vant Hoff equation terms. Draw and explain Vant-Hoff's reaction isotherm.

3. Write about Gamma decay process.

4. Write the principle and applications of scintillation counters.

5. Define Transport number and its determination.

6. Define the terms specific and equivalent conductance. Explain the relation between electrical and chemical energies.

(DCHE04)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, MAY/JUNE 2025.

First Year

Chemistry

PHYSICAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write and explain the terms involved in BET equation. How do you determine surface area of solids using BET method?

2. Explain the Homogeneous catalysis reaction with suitable example.

3. (a) Write the thermodynamic derivation of phase rule and explain the terms involved in phase.

   (b) Define the term 'Entropy'. Discuss the entropy changes in a reversible process.

4. (a) Write the applications of radioactive isotopes in agriculture, medicine and industry.

   (b) Explain Lattice energy. Write about the Schottky and Frenkel crystal defects in solids.

5. (a) How do you determine concentration of a cell with transference?

   (b) Define EMF of a cell and its measurement.

6. (a) Discuss the collision theory of reaction rates.

   (b) Define Quantum yield of a photochemical reaction. How do you determine high quantum yield a photo chemical reaction? Give examples.

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