

**(DCHE01)**

**ASSIGNMENT - 1**

M.Sc. DEGREE EXAMINATION, MARCH, 2023.

First Year

Chemistry

GENERAL CHEMISTRY

**MAXIMUM : 30 MARKS**

**ANSWER ALL QUESTIONS**

1. Write about the Isotopic effect in rotation spectra by giving example.
2. Explain the selection rules for allowed transitions in Microwave spectroscopy.
3. Explain the electronic spectra of diatomic molecules with examples.
4. What do you understand by quantization of vibrational motion in Infra Red spectroscopy.
5. Write about the steps involved in the collection of solid samples and their storage.
6. Explain the types of errors and minimization of errors in scientific experiments.

**(DCHE01)**

**ASSIGNMENT - 2**  
M.Sc. DEGREE EXAMINATION, MARCH, 2023.  
First Year  
Chemistry  
GENERAL CHEMISTRY  
**MAXIMUM : 30 MARKS**  
**ANSWER ALL QUESTIONS**

1. Make a comparison between the features of Micro and Super computers.
2. What do you understand by Arithmetic expressions and Arithmetic statements?
3. (a) Describe the important components, working principle and applications of ESR spectroscopy.  
(b) Discuss the spectra of non-rigid rotor in Microwave spectroscopy with suitable examples.
4. (a) Discuss the vibrational spectra of Diatomic molecules in Infra Red Spectroscopy with examples.  
(b) Discuss the rotational fine structure of electronic vibrational transitions.

### UNIT III

5. (a) What are control charts? Explain its importance and applications.

Or

(b) Explain regression analysis and its applications.

### UNIT IV

6. (a) Write an MS-ForTran Program for the determination of rate constant for a first order reaction.

Or

(b) Explain Flow Charts and its applications in chemical analysis.

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**(DCHE02)**

**ASSIGNMENT - 1**  
M.Sc. DEGREE EXAMINATION, MARCH, 2023.  
First Year  
Chemistry  
INORGANIC CHEMISTRY  
**MAXIMUM : 30 MARKS**  
**ANSWER ALL QUESTIONS**

1. Explain Photo electric effect.
2. Discuss the atomic spectra of Alkali metals.
3. Write the postulates of Molecular orbital Theory.
4. Explain Born Haber Cycle.
5. Discuss crystal field splitting of 'd' orbitals in octahedral complexes.
6. Define stability constant of a complex compound. Write about the factors affecting stability constant.

**(DCHE02)**

**ASSIGNMENT - 2**  
M.Sc. DEGREE EXAMINATION, MARCH, 2023.  
First Year  
Chemistry  
INORGANIC CHEMISTRY  
**MAXIMUM : 30 MARKS**  
**ANSWER ALL QUESTIONS**

1. Write about Labile and Inert complexes with examples.
  2. Describe the synthesis and structure of boranes.
  3. (a) How do you interpret Schrodinger wave equation to hydrogen like atoms?  
(b) Explain Term symbols and spectroscopic states.
  4. (a) Write the postulates of LCAO approach and its application to hetero nuclear diatomic molecular.  
(b) Explain the structure of NaCl based on the concept of radius ratio.
  5. (a) How do you determine the stability constants of complexes by pH method?  
(b) Explain outer and inner orbital complexes by giving suitable examples.
  6. (a) Write the synthesis, properties and structure of silicones.  
(b) Discuss the mechanism of electron transfer reactions by taking suitable example.
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**(DCHE03)**

**ASSIGNMENT - 1**

M.Sc. DEGREE EXAMINATION, MARCH, 2023.

First Year

Chemistry

**ORGANIC CHEMISTRY  
MAXIMUM : 30 MARKS  
ANSWER ALL QUESTIONS**

1. Write a note on Tautomerism.
2. Write the resolution methods for threomers.
3. Write the methods of generation of Carbanions and explain its stability.
4. Explain the mechanism of  $\text{SN}^1$  reaction with examples.
5. Explain Gattermann-Koch reaction mechanism.
6. Explain the mechanism of Hunsdiecker reaction.

**(DCHE03)**

**ASSIGNMENT - 2**

M.Sc. DEGREE EXAMINATION, MARCH, 2023.

First Year

Chemistry

**ORGANIC CHEMISTRY  
MAXIMUM : 30 MARKS  
ANSWER ALL QUESTIONS**

1. Explain the mechanism of Perkin reaction.
  2. Explain the mechanism  $E_2$  reactions by taking suitable examples.
  3. (a) Write about asymmetric synthesis methods by taking suitable examples.  
(b) Write a note on aromaticity and homoaromaticity on organic molecules.
  4. (a) Discuss the Thermodynamic and kinetic requirements for organic reactions with examples.
  5. b) Write about the linear free energy relationships in organic reactions.
  6. (a) What are Aromatic electrophilic substitution reactions? Explain the Arenium ion mechanism.  
(b) Explain the mechanism of aldehydes to carboxylic acids giving examples.
  7. (a) Write the mechanism of the following  
(i) Claisen condensation; (ii) Hydrolysis of esters.  
(b) Explain the mechanism and orientation in pyrolytic elimination reactions with example.
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**(DCHE04)**

**ASSIGNMENT - 1**

M.Sc. DEGREE EXAMINATION, MARCH, 2023

First Year

Chemistry

PHYSICAL CHEMISTRY  
**MAXIMUM : 30 MARKS**  
**ANSWER ALL QUESTIONS**

1. Write the concept and significance of Helmholtz's Free energy functions.
2. Draw and explain Vant Hoff reaction isotherm.
3. Explain Secular and Transient radioactive equilibrium.
4. Write the applications of radio isotopes in medicine.
5. How do you determine Transport number?
6. Explain the mechanism of surface adsorption on solids.



**(DCHE04)**

**ASSIGNMENT - 2**

M.Sc. DEGREE EXAMINATION, MARCH, 2023

First Year

Chemistry

PHYSICAL CHEMISTRY  
**MAXIMUM : 30 MARKS**  
**ANSWER ALL QUESTIONS**

1. State and explain Laws of photochemistry.
  2. Explain the mechanism of homogeneous catalysis by taking suitable examples.
  3. (a) Derive Thermodynamic phase rule and explain the terms involved in phase rule.  
(b) Write the determination of partial molar quantities.
  4. (a) State and explain Bragg's equation. Explain Bravais Lattices and Miller Lattices.  
(b) Write about the detection of nuclear radiations using G-M counters and scintillation counters.
  5. (a) How do you determine the concentration of a cell with transference.  
(b) Write the determination of surface area of solids by BET method.
  6. (a) Derive rate equation for a second order reaction giving examples.  
(b) Write about Fluorescence emission and phosphorescence emission. Explain quantum yield of a photochemical reaction.
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