

**ASSIGNMENT 1**

**M.Sc. DEGREE EXAMINATION, MAY - 2020**

**(First Year)**

**CHEMISTRY**

**General Chemistry**

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1)* Explain the concept of Quantization of energy in Molecular spectroscopy.
- Q2)* Write about isotopic effect in rotation spectra by taking an example in micro wave spectroscopy.
- Q3)* Explain the energy bands in UV-Visible spectroscopy.
- Q4)* By taking an example, explain the vibrational spectrum of a diatomic molecule in IR spectroscopy.
- Q5)* Write about the criteria for the rejection of a data in experimental data.
- Q6)* Explain the types of errors in analysis and minimization of errors in experiments.
- Q7)* Write about the basic components and their functions of a super computer.
- Q8)* List out directed INPUT and OUTPUT statements.

**ASSIGNMENT 2**

**M.Sc. DEGREE EXAMINATION, MAY - 2020**

**(First Year)**

**CHEMISTRY**

**General Chemistry**

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1)* Describe the working principle and applications of NMR spectroscopy.
- Q2)* Discuss the nature of radiation and types of molecular spectroscopy.
- Q3)* Discuss the rotational fine structure of electronic vibrational transitions in UV-Visible spectroscopy giving examples.
- Q4)* Explain the vibrational spectra of anharmonic oscillator with examples of IR spectroscopy.
- Q5)* How do you collect gaseous and liquid samples for analysis? Write presentation methods for liquid samples for analysis.
- Q6)* Explain student 'F' test and mention its significance.
- Q7)* Write a Fortran program for rate constant for a first order reaction.
- Q8)* Write a Fortran Program for the application solving Van der Waal equation.



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**(First Year)**

**CHEMISTRY**

**Inorganic Chemistry**

**MAXIMUM MARKS :30**

**ANSWER ALL QUESTIONS**

- Q1)* Explain Compton effect.
- Q2)* Explain the atomic spectra of alkali metals.
- Q3)* Write the postulates of LCAO approach.
- Q4)* Write about valence bond approach to H<sub>2</sub> molecule.
- Q5)* Explain Jahn-Teller effect.
- Q6)* Define the stability of a complex and write about the factors affecting the stability of complexes.
- Q7)* Write the synthesis of Borane and explain its structure.
- Q8)* Explain the electron Transfer reaction mechanism with an example.

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

CHEMISTRY

Inorganic Chemistry

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1)* Write variation method and its application to determination of ground state energy of Hydrogen atom.
- Q2)* Explain L-S and J-J coupling schemes with examples.
- Q3)* Write the postulates of Molecular orbital Theory. Draw and explain the M.O. diagram of oxygen molecule.
- Q4)* Explain Lattice energy and Born Hayeber cycle.
- Q5)* How do you determine the stability constant of complexes by optical methods.
- Q6)* Explain the splitting of 'd' orbital in Tetrahedral complexes with an example.
- Q7)* Discuss inner and outersphere reaction mechanisms with one example each.
- Q8)* What are metal nitrosyls ? Discuss the structure and bonding in metal nitrosyls with examples.



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**CHEMISTRY**

**Organic Chemistry**

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1)* Write a note on cross conjugation and resonance with examples.
- Q2)* Explain the elements of symmetry.
- Q3)* Discuss the methods of determining mechanisms isotope effect.
- Q4)* Explain the nucleophilic substitution at an allylic carbon and vinylic carbon.
- Q5)* Write a note on Gattermann-Koch reaction with examples.
- Q6)* Discuss the Hydroboration with applications.
- Q7)* Explain hydrolysis of esters and amides with examples.
- Q8)* Discuss the mechanism and orientation in pyrolytic elimination.

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

CHEMISTRY

Organic Chemistry

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1*) Discuss about Aromaticity in benzenoid and non-benzenoid compounds.
- Q2*) Explain conformations of Ethane and butane.
- Q3*) Discuss the stability, generation and reactivity of carbocation, carbanion and carbenes.
- Q4*) Explain the mechanism of  $SN^1$  and  $SN^2$  reactions.
- Q5*) Explain
- i) Sandmeyer reaction.
  - ii) Hundsdicker reaction.
- Q6*) Discuss the hydrogenation of double, triple bonds and aromatic rings with examples.
- Q7*) Explain
- i) Knoevenagel.
  - ii) Perkin reactions.
- Q8*) Discuss the  $E_1$ ,  $E_2$  and  $E_{ICB}$  mechanism.



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**CHEMISTRY**

**Physical Chemistry**

**MAXIMUM MARKS :30**

**ANSWER ALL QUESTIONS**

- Q1)* Explain Van't Hoff equation.
- Q2)* Describe thermodynamic derivation of phase rule.
- Q3)* Discuss application of radio-isotopes.
- Q4)* Explain schottky and frenkel defects.
- Q5)* Discuss about concentration cells without transference.
- Q6)* Write a note on surface tension.
- Q7)* Explain Lindmann's theory.
- Q8)* Discuss the mechanism of homogeneous catalysis.

ASSIGNMENT 2

M.Sc. DEGREE EXAMINATION, MAY - 2020

(First Year)

CHEMISTRY

Physical Chemistry

MAXIMUM MARKS :30

ANSWER ALL QUESTIONS

- Q1)* Explain chemical potential Gibbs-Duhem equation and discuss about Raoult's law.
- Q2)* Discuss entropy changes in isolated systems in reversible and irreversible process.
- Q3)* Explain
- i) Bragg's equation
  - ii) Miller indices
  - iii) Bravais lattices.
- Q4)* Discuss types of radioactive decay.
- Q5)* Explain Nernst equation and explain relation between electrical and chemical energies.
- Q6)* Discuss BET equation and Gibbs absorption equation.
- Q7)* Discuss the types of rate of chemical reactions and explain the effect of temperature on reaction rates.
- Q8)* Explain laws of photochemistry and discuss the types of photo physical processes.

