(DCHE21)

ASSIGNMENT-1

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

Second Year

Chemistry

ANALYTICAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write the principle of turbidimetry and turbidimetric titrations and its applications.

2. Write the instrumentation, working principle and applications of UV visible spectroscopy for the determination of Manganese.

3. Write the theory of fluorescence and the factors influencing fluorescence.

4. Write about the instrumentation and working principle of flame photometry. What are the errors in flame photometry?

5. Write the principle and applications of conductometric analysis.

6. Write the principle and applications of coulometric analysis at controlled potential.

(DCHE21)

ASSIGNMENT-2

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

Second Year

Chemistry

ANALYTICAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write the principle and applications of paper chromatography. Explain development of components in paper chromatography.

2. Explain the action of ion-exchange resins and the applications of Ion-exchangers.

3. (a) State and explain Beer Lambert's law. What are its limitations? Write about the simultaneous determination of metals by UV visible spectrophotometry with specific examples.

   (b) Write the theory, instrumentation, working principle and applications of nephelometry.

4. (a) Write about the instrumentation and working principle of Atomic Absorption Spectroscopy (AAS). Write its applications.

   (b) Explain the theory of phosphorimetry. Write its working principle and applications.

5. (a) Write instrumentation, working principle and applications of polarography.

   (b) Discuss the theory, principle and applications of potentiometric titrations with examples.

6. (a) Write the principle of solvent extraction. What is the criteria for the selection of organic solvent in solvent extraction technique? Explain synergism.

   (b) Write the instrumentation, principle and applications of High Performance Liquid Chromatography (HPLC).

(DCHE22)

ASSIGNMENT-1

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

Second Year

Chemistry

INORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Explain Lanthanide contraction. Write the separation and occurrence of Lanthanides.

2. Write the synthesis of Transuranium elements.

3. Write about the basic instrumentation and working principle of Raman spectroscopy. Write its applications in the structure determination of Inorganic compounds.

4. Explain the nomenclature and assignment of transitions in electronic absorption spectroscopy.

5. Write about the determination of magnetic susceptibility of metal complexes by Guoy method.

6. Write the principle of mass spectroscopy. Explain the fragmentations in mass spectroscopy with examples.

(DCHE22)

ASSIGNMENT-2

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

Second Year

Chemistry

INORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write about the role of essential elements in biochemical process. Explain the significance of Na^+ and K^+.

2. What are the Natural antibiotics as ionophores. Explain chelation therapy with examples.

3. (a) Write the magnetic properties of Lanthanides. Explain their colour and chemical reactions with examples.

   (b) Discuss the magnetic properties of Actinides. Make a comparison between Lanthanides and Actinides. Write the applications of Actinides.

4. (a) Write the basic instrumentation, working principle and applications of Infra Red (IR) spectroscopy to inorganic compounds.

   (b) Discuss the basic instrumentation of X-ray Diffraction technique. How do you determine crystal structure of single crystal XRD?

5. (a) Write the basic instrumentation and principle of Nuclear Magnetic Resonance (NMR) spectroscopy. Write its applications in the structure of Inorganic compounds.

   (b) Write the instrumentation and applications of mass spectroscopy in the study of metal complexes.

6. (a) Discuss the structure and functions of myoglobin.

   (b) Discuss metal–DNA interactions in Biochemical processes with examples.

(DCHE23)

ASSIGNMENT-1

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

Second Year

Chemistry

ORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Explain various electronic transitions in UV-visible spectroscopy. Write about the Ultra violet bonds of carboxyl compounds with examples.

2. Write about the characteristics vibrational frequencies of alcohols and phenols in Infra Red (IR) spectroscopy.

3. Explain chemical shift and measurement of chemical shifts in NMR spectroscopy with examples.

4. Write about Mc-Lafferty rearrangement in mass spectroscopy and nitrogen rule.

5. Explain the photochemical processes of olefins and conjugated olefins.

6. What are pericyclic reactions? Write and explain the mechanism of electrocyclic reactions.

(DCHE23)

ASSIGNMENT-2

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

Second Year

Chemistry

ORGANIC CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Discuss the stereochemistry of menthol.

2. Write an explain the mechanism of Pinacol – Pinacolone rearrangement.

3. (a) Explain the IR spectra of Lactones. Discuss the effect of hydrogen bonding and solvent effect on vibrational frequencies.

   (b) Write the Fieser – Woodward rules for conjugated dienes and carboxyl compounds.

4. (a) Write about the formation of fragmentations in mass spectroscopy in organic compounds. Draw and explain the mass spectra with respect to their structure determination.

   (b) Explain Fourier transformation NMR spectroscopy technique and Nuclear Over Hauser effect (NOE).

5. (a) Discuss the interaction to matter with electromagnetic radiation with various processes.

   (b) Explain sigmatropic rearrangement. Write about the method of analysis of pericyclic reactions with examples.

6. (a) Write the occurrence and structure elucidation of citral.

   (b) Write about the stereochemistry and synthesis of Nicotine.

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(DCHE24)

ASSIGNMENT-1

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

Second Year

Chemistry

ENVIRONMENTAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. Write the principles of Weathering.
2. How do you determine the moisture content in soil?
3. Explain the causes for acid rains and their effects.
4. Write the analysis of SO_2 in air samples.
5. Write about the composition of sea water and unique parameters and properties of water.
6. Explain the health effects of pollutants like Lead and Arsenic.

(DCHE24)

ASSIGNMENT-2

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

Second Year

Chemistry

ENVIRONMENTAL CHEMISTRY

MAXIMUM MARKS:30

ANSWER ALL QUESTIONS

1. How do you determine, Dissolved Oxygen (DO) in water samples?

2. Write the principle and applications of reverse osmosis.

3. (a) Write the factors affecting soil formation and functions of soil. Explain the ion-exchange properties of soil.

   (b) Discuss the effect of temperature, plants and animals on weathering.

4. (a) Write the analysis of oxides of Nitrogen in Air.

   (b) Explain the analysis of ozone and aromatic hydrocarbons in air samples.

5. (a) Discuss the sources of industrial wastes and thermal wastes for the pollution of domestic water.

   (b) Discuss the sources and effects of water pollution due to radioactive wastes.

6. (a) Explain the principles of electro dialysis and flash distillation technique for the treatment of water pollution.

   (b) Discuss the process of continuous monitoring water pollutants. Write the principle of use of monitoring instruments for SO_2.