

**Master of Science (Chemistry)**  
**Third Semester Main Examination, December 2021**  
**Bio-Inorganic Chemistry [MSC303T]**

**Time: 3:00 Hrs**

**Max Marks 85**

- **Note: Attempt all questions. Each question has two parts. Part A is 10 marks and B is 7 marks.**

- Q.1 (a) What is the process of biological nitrogen fixation.  
(b) Write nitrogenase complex structure and mechanism of nitrogenase.  
OR  
(a) What are the three types of nitrogen fixation?  
(b) What is cytochrome in electron transport chain?
- Q.2 (a) What is myoglobin structure and function.  
(b) Write difference between myoglobin and hemoglobin?  
OR  
(a) How thermodynamics is related to kinetics.  
(b) Write definition of thermodynamics and their formula.
- Q.3 (a) Which enzyme helps in absorption of Vitamin B<sub>12</sub> ?  
(b) Write difference between hemocyanin and Hemerithrin.  
OR  
(a) What are the two enzymes that contain copper.  
(b) Does vitamin B function as a Co-Enzyme?
- Q.4 (a) What is the difference between trace metal and heavy metals?  
(b) Define the bulk metals with example.  
OR  
(a) What is the difference between the sodium potassium pump and the sodium channel ?  
(b) What is meant by essential and non-essential metal ions in biological system?
- Q.5 (a) What type of bonding exist in Supramolecules and what is host molecules?  
(b) What is Cryptates and explain with example.  
OR  
(a) What is the difference between practical and chiral?  
(b) What are host guest interactions.

## Master of Science (Chemistry)

Third Semester Main Examination, December 2021

## Diffraction Method and Photoelectron Spectroscopy [MSC304T]

Time: 3:00 Hrs

Max Marks 85

Note: Attempt all questions. Each question has two parts.

Part A is 10 marks and B is 7 marks.

- Q.1 (a) What is Moseley law of diffraction?  
(b) What is Bragg's law in case of X-Ray diffraction.  
OR  
(a) What is Bragg's law with example.  
(b) What is miller indices and how do you calculate miller indices.
- Q.2 (a) How to calculate the density of the crystal and structures of crystal.  
(b) What is the absolute configuration of this compound?  
OR  
(a) What is the process of X-ray crystallography?  
(b) What is absolute configuration and relative configuration.
- Q.3 (a) What is the resolution of an electron microscope in micrometers?  
(b) What is the resolution of TEM (transmission electron microscope) and SEM Scanning electron microscope.  
OR  
(a) Write the differences between electron diffraction and X - Ray diffraction.  
(b) Write type of electron microscope.
- Q.4 (a) What is the ferromagnetic and examples?  
(b) What is electron and neutron diffraction?  
OR  
(a) What is anti-ferromagnetic material and example of anti-ferromagnetic.  
(b) Write the application of neutron diffraction.
- Q.5 (a) What is phot electric effect explain.  
(b) What is ionization with example.  
OR  
(a) What is the principle of XPS and used?  
(b) What is the purpose of photoelectron spectroscopy?

**Master of Science (Chemistry)**  
**Third Semester Main Examination, December 2021**  
**Molecular Spectroscopy [MSC301T]**

**Time: 3:00 Hrs**

**Max Marks 85**

**Note: Attempt all questions.**

**Part A is 10 marks and part B is 7 marks.**

- Q.1 (a) What is chromophore and auxochrome.  
(b) Explain the fundamentals effect of solvent in ultraviolet spectroscopy.

OR

- (a) What is biphenyl and used for ?  
(b) What is fieser kunn rules with example.

- Q.2 (a) Explain the nuclear spin and nuclear resonance of the protonated organ compound within example.  
(b) Discuss the factors in influencing the chemical shift.

OR

- (a) Explain the first order and second order spectra.  
(b) What is nuclear overhauser effect in NMR?

- Q.3 (a) What is C/3 NMR. Spectroscopy and their used in NMR.  
(b) What is the difference between cosy and NO ESY?

OR

- (a) Write short note on HETCOR and NOES?  
(b) Discuss the C<sup>13</sup> NMR spectral signals of ethoxy methane.

- Q.4 (a) What exactcy is UV and used for?  
(b) What is the basic principal of mass spectroscopy and used.

OR

- (a) What are the type of infrared spectroscopy and principle of IR Spectroscopy.  
(b) The Nitrogen rule in mass what is spectrometry?

- Q.5 (a) Explain the symmetric and asymmetric parametric in Mossbauer spectroscopy.  
(b) What is the principle of Mossbauer spectroscopy?

OR

- (a) What is chemical shift in Mossbauer spectroscopy.  
(b) What is Co-ordination number explain with example.

**Master of Science (Chemistry)**  
**Third Semester Main Examination, December 2021**  
**Polymer [MSC306T]**

**Time: 3:00 Hrs**

**Max Marks 85**

**Note: Attempt all questions. Each question has two parts.  
Part A is 10 marks and B is 7 marks.**

- Q.1 (a) What do you understand by monomers and explain the degree of polymerization process.  
(b) Explain some special characteristics of polymers.

OR

- (a) Explain the homo-hetero polymer with suitable example.  
(b) Describe the linear branched and network polymer with example.

- Q.2 (a) Explain the homogenous and heterogeneous system.  
(b) What is the condensation and poly merisation with examples.

OR

- (a) What is the free radical reaction mechanism for the formation of polymer.  
(b) What is the difference between polymerization and copolymerization.

- Q.3 (a) Write notes on chemical analysis of polymers.  
(b) What is the relationship between viscosity and molecular weight ?

OR

- (a) What are the two units associated with molecular weight ?  
(b) Why molecular weight and its distribution of polymer is important.

- Q.4 (a) What is the difference between fibers and polymers.  
(b) What is plastic and its types.

OR

- (a) What is injection blow molding explain with example.  
(b) Describe the extrusion moulding with process?

- Q.5 (a) Which polymer is used in polymers?  
(b) What are fire resistant polymers?

OR

- (a) What are Biomedical polymers and their application.  
(b) Write synthesis and properties of biomedical polymers.

**Master of Science (Chemistry)**  
**Third Semester Main Examination, December 2021**  
**Photochemistry [MSC302T]**

**Time: 3:00 Hrs**

**Max Marks 85**

**Note: 1) Attempt all questions. Each question has two part's.**  
**2) Part A is 10 marks and part B is 7 marks.**

Q.1 Write short note on.

- a) Photo chemical reaction and Types of excitations.
- b) Explain transfer of excitation energy

OR

- (a) What is Quantum field explain with example.
- (b) What is excitation energy and formula of excitation energy.

Q.2 (a) Explain the photochemistry of alkenes.

- (b) Discuss with example of additions and substitution of aromatic compounds.

OR

Write short note on –

- a) Determination of rate constant of reaction.
- b) Gas phase photolysis.

Q.3 (a) What is  $\alpha - \beta$  unsaturated compounds.

- (b) What is difference between cis and trans isomers?

OR

(a) Explain the effect of light intensity on the role of photo chemical reaction.

- (b) What is cyclisation reaction with example.

- Q.4 (a) How can you prepare oxetane ring photo chemical reaction.  
(b) What are alpha ( $\alpha$ ) to beta ( $\beta$ ) carbonyl compounds and their synthesis.

OR

- (a) What is a cyclohexadiene and cyclohexadiene an aromatic compound explain it.  
(b) Describe the photochemistry of carbonyl compounds?

- Q.5 (a) What is Barton reaction with example.  
(b) What is photochemical smog how is it formed and how does it effect?

OR

- (a) What is meant by photo degradation and type of photo degradation occurs in plastic?  
(b) What is Fries rearrangement with example?