

M.Sc.(Chem.) Semester - 2 (CBCS) Examination**August/September -2020 [NEW COURSE]****Inorganic Chemistry (CORE)****Time: 2:00 Hours****Marks: 56****Instructions:**

1. Figure to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any four of the following questions.
-

- Q.1 (a) Answer the following. 4 Marks**
- (1) Discuss the spin-orbit interaction in atom. 4
- Q.1 (b) Answer any two question out of three. 10 Marks**
- (1) Derive the equation for multiple width large compared to kT and calculate μ_J for Pm^{+3} . 5
- (2) Derive Van Vleck equation for susceptibility. 5
- (3) Discuss the magnetic properties of actinides. 5
- Q.2 (a) Answer the following. 4 Marks**
- (1) Discuss hydride and dihydrogen ligand containing complexes. 4
- Q.2 (b) Answer any two question out of three. 10 Marks**
- (1) Give reaction and mechanism of Monsanto process. 5
- (2) Explain insertion reaction of CO in organometallic chemistry. 5
- (3) Discuss the oxidative addition and C-H bond activation in organometallic chemistry. 5
- Q.3 (a) Answer the following. 4 Marks**
- (1) Explain the toxicity and its effects on biological system. Discuss the toxic effect of Cd. 4
- Q.3 (b) Answer any two question out of three. 10 Marks**
- (1) What is importance and deficiency of metal ion? Explain with the help of Mg and Fe. 5
- (2) Discuss in detail: Iron-Sulphur protein. 5
- (3) Explain metalloporphyrin with its importance and characterization. 5
- Q.4 (a) Answer the following. 4 Marks**
- (1) Discuss the preparation of phosphazene with its physical properties. 4
- Q.4 (b) Answer any two question out of three. 10 Marks**
- (1) Discuss the synthesis of silicone polymers. 5
- (2) Explain the preparation, properties and application of borazine. 5
- (3) Give the classification of silicates in detail. 5
- Q.5 (a) Answer the following. 4 Marks**
- (1) Give the types and classification of nanomaterials. 4
- Q.5 (b) Answer any two question out of three. 10 Marks**
- (1) Explain the cause of interest in nanomaterials. 5
- (2) Discuss the methods of synthesis of inorganic nanomaterials. 5
- (3) Explain the characterization of nanoparticles by TEM and AFM. 5