

**M.Sc.(Chem.) Semester - 1 (CBCS) Examination**  
**Nov/Dec-2023 (SYLLABUS YEAR JUNE-2023)**  
**Inorganic Chemistry (Core)**

**Time: 2:30 Hours****Marks: 70****Instructions:**

1. Figures to the right indicate marks.
  2. All questions are compulsory.
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- Que.1(A) Answer the following. (04)  
1) Derive the stability of  $O_2^+$ ,  $O_2^{+2}$  and  $O_2^{-2}$  according to MOT.
- Que.1(B) Answer any two questions out of three. (10)  
1) Discuss the types of overlapping of electrons in molecular orbitals.  
2) What is hybridization? Discuss the rules of hybridization.  
3) Draw the structure of  $I_3^-$  molecule and explain according to VBT and VSEPR.
- Que.2(A) Answer the following. (04)  
1) What is the ionization energy of alkali earth metal? How it effect the oxidation state of alkali earth metals.
- Que.2(B) Answer any two questions out of three. (10)  
1) Briefly discuss physical properties of alkaline earth metals.  
2) Write a note on oxide, hydroxide, peroxides and superoxide of 1<sup>st</sup> group.  
3) Discuss the hydrides and halides of alkaline earth metals.
- Que.3(A) Answer the following. (04)  
1) Give the IUPAC name of following.  
(A)  $[Pt(NH_3)BrCl(CH_3NH_2)]$   
(B)  $[Au(CN)_2]$   
(C)  $[PtCl_2(NH_3)_2]$   
(D)  $[(NH_3)_2Pt(Cl)_2Pt(NH_3)_2]^{4+}$
- Que.3(B) Answer any two questions out of three. (10)  
1) What is electronic spectra? Explain electronic spectra of any one transition metal complex.  
2) Explain the structural isomerism in co-ordination compounds.  
3) Discuss the optical isomerism in 6 co-ordination compounds.
- Que.4(A) Answer the following. (04)  
1) Write a note on reactions of metal salts with amine salts.
- Que.4(B) Answer any two questions out of three. (10)  
1) Write a note on oxidation-reduction reaction of metal complexes.  
2) Discuss reaction of metal salt with ligand and ligand replacement reaction.  
3) Explain the factor effecting substitution reaction in metal complex.
- Que.5(A) Answer the following. (04)  
1) Briefly discuss the optical properties of inorganic nanomaterials.
- Que.5(B) Answer any two questions out of three. (10)  
1) Discuss characterization of nanomaterials with SEM and TEM.  
2) Discuss the types and classification of nanomaterials.  
3) Explain synthesis of inorganic nanomaterials in solution based method.

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