

M.Sc.(Chem.) Semester - 1 (CBCS) Examination
OCT/NOV-2024 (AS PER SYLLABUS YEAR JUNE-2023)
Inorganic Chemistry (Core (New-23))

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Q.1 (A) Answer the following (04)**
(1) Draw the MOT diagram of N_2^+ and find its B.O., magnetism.
- Q.1 (B) Answer any two questions out of three. (10)**
(1) Discuss valance bond theory in detail.
(2) Explain overlapping with suitable examples.
(3) Draw the structure of ClO_4^{2-} and explain according to VBT and VSEPR.
- Q.2 (A) Answer the following. (04)**
(1) Write a short note on size of atom and density of 1st group.
- Q.2 (B) Answer any two questions out of three. (10)**
(1) Briefly discuss hydride and halides of 2nd group.
(2) Write a note carbides of alkaline earth metals.
(3) Discuss any three physical properties of alkaline earth metals.
- Q.3 (A) Answer the following. (04)**
(1) Give IUPAC name:
(a) $[\text{Au}(\text{CN})_2]^-$
(b) $[\text{CoCl}_2(\text{NH}_3)_4]^+$
(c) $[(\text{NH}_3)_2\text{Pt}(\text{Cl})_2\text{Pt}(\text{NH}_3)_2]^{+4}$
(d) $[\text{Co}(\text{en})_2\text{Cl}_2]^+$
- Q.3 (B) Answer any two questions out of three. (10)**
(1) Differentiate between ligand and linkage isomerism with suitable example.
(2) Explain the geometrical isomerism in 6 C.N. metal complexes.
(3) Explain the shape of $[\text{Co}(\text{H}_2\text{O})_6]^{+3}$ and $[\text{Ir}(\text{CN})_6]^{-3}$ according to VBT theory.
- Q.4 (A) Answer the following. (04)**
(1) Write a note reactions of metal salts with amine salts.
- Q.4 (B) Answer any two questions out of three. (10)**
(1) Explain the trans effect and theory of trans effect in square planner complexes.
(2) Discuss labile and inert metal complexes.
(3) Explain the substitution reaction in 6-coordinated complexes.
- Q.5 (A) Answer the following (04)**
(1) Briefly explain the chemical properties of inorganic nanomaterials.
- Q.5 (B) Answer any two questions out of three. (10)**
(1) Discuss selected application of nanomaterials.
(2) Write a note synthesis pathway of inorganic nanomaterials via radiation-based method.
(3) Explain SEM and TEM techniques for characterization of nanomaterials.
