647510 **23MSC1InoC101x** **Seat No :_____**

M.Sc.(Chem.) Semester - 1 (*CBCS*) Examination
OCT/NOV-2025 (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.

Q.1 (A) **Answer the following** **(04)**

(1) Give the MOT Diagram and Explanation of N_2^{+2}.

Q.1 (B) **Answer any two questions out of three.** **(10)**

(1) Explain the O_2 molecule based on MOT.

(2) Justify the shape of AB6 type molecule according to VSEPR theory and suitable example.

(3) Explain the shape of AB3 type molecule having two L.P. according to VSEPR theory and suitable example.

Q.2 (A) **Answer the following.** **(04)**

(1) Write a note on color of alkali earth metals.

Q.2 (B) **Answer any two questions out of three.** **(10)**

(1) Discuss oxide, peroxide and superoxide of group-I elements.

(2) Explain the size of atom and ionization energy of group-II elements.

(3) Discuss the sulphates of alkaline earth metals.

Q.3 (A) **Answer the following.** **(04)**

(1) What is hydration and ionization isomerism.

Q.3 (B) **Answer any two questions out of three.** **(10)**

(1) Explain the shape of $[Ni(Cl)_4]^{-2}$ and $[Ni(CN)_4]^{-2}$ type molecule according to VBT theory.

(2) Explain the geometrical isomerism in 4 Co-ordination number compounds.

(3) Calculate the term symbol for spectroscopic terms for d3 system.

Q.4 (A) **Answer the following.** **(04)**

(1) Write a note on reaction of metal salt with a ligand.

Q.4 (B) **Answer any two questions out of three.** **(10)**

(1) Explain reactions of metal salts with amine salts.

(2) Discuss the substitution reaction in octahedral complexes.

(3) Explain the trans effect in square planner complexes.

Q.5 (A) **Answer the following** **(04)**

(1) What is nanomaterials? Give brief history of nanomaterials.

Q.5 (B) **Answer any two questions out of three.** **(10)**

(1) Write a Note on inorganic nanomaterial.

(2) Explain the optical properties of metal oxide nanoparticles.

(3) Discuss the synthesis of chromium oxide nanoparticles.

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