



M.Sc. II Semester Degree Examination, Sept./Oct. - 2024

CHEMISTRY

Chemistry of Co-ordination Compounds

(NEP)

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with question No.1 (Q1) is **Compulsory**.
Each question carries **equal** marks.

1. (a) Describe the Jahn-Teller distortion in metal complexes, with an illustrative example. **5**
- (b) Analyze the different factors that influence the crystal field stabilization energy (CFSE). **5**
- (c) Outline the key characteristics of Valence Bond Theory and illustrate these principles using relevant examples. **4**

2. (a) Draw a Tanabe-Sugano diagram of a complex and explain its features and illustrate its application. **5**
- (b) Provide a concise explanation of selection rules, highlighting their role and significance in spectroscopic transitions. **5**
- (c) Describe the importance and applications of term symbols in the context of spectroscopy. **4**

3. (a) Explain the concept of classical magnetism in metal complexes, providing a pertinent example. **5**
- (b) Enumerate the phenomena of geometrical and optical isomerism in metal complexes. **5**
- (c) Describe the process of measuring magnetic susceptibility using the Gouy method. **4**

4. (a) Briefly explain the procedure for determining the binary formation constant using the polarography method. **5**
- (b) Discuss the various factors that influence the stability of metal complexes. **5**
- (c) Explain the differences between step-wise and overall formation constants, detailing their relationship and significance in complex formation processes. **4**



5. (a) Explain the concepts of complementary and non-complementary electron-transfer reactions, providing examples to elucidate each type. 5
- (b) Analyze different types of substitution reactions in square planar complexes with relevant examples. 5
- (c) Define the trans effect and provide an overview of its significance in substitution reactions occurring in square planar complexes. 4
6. (a) Explain the mechanism of molecular rearrangement in six Co-ordinated complexes with an example. 5
- (b) Provide a concise explanation of the nephelauxetic parameter, in Co-ordination chemistry. 5
- (c) Analyze the impact of spin-orbit coupling on the electronic structure and properties of atoms and molecules. 4
7. (a) Discuss how the chelate effect and the macrocyclic effect contribute to the stability of metal complexes. 5
- (b) Provide a brief explanation of the trans effect in metal complexes. 5
- (c) Analyze the various factors that influence the stability of metal complexes. 4
8. (a) Write a short note on Racah Parameters. 5
- (b) Explain Ferro and Anti-Ferro Magnetism with suitable examples. 5
- (c) With suitable example, explain the applications of Orgel diagrams. 4

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