

AU-317

M.Sc. (Part—I) Semester—II (CBCS Scheme) Examination

CHEMISTRY (NEW)

(Coordination Chemistry)

Paper—V

Time : Three Hours]

[Maximum Marks : 80

N.B. :— (1) ALL questions are compulsory and carry equal marks.

(2) Use of scientific calculator is allowed.

1. (a) Determine the number of microstates, ground terms and excited terms for d^3 configuration. 5
- (b) What is high spin and low spin cross over of the complexes ? Explain with examples. 6
- (c) The complex $[\text{FeF}_6]^{3-}$ is colourless whereas $[\text{CoF}_6]^{3-}$ is coloured with single transition in visible region. Explain. 5

OR

- (p) Write note on ferromagnetism. What is the effect of temperature on ferromagnetism ? 5
- (q) Explain quenching of orbital angular momentum with suitable example. 5
- (r) Explain the absorption spectrum of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ on the basis of Orgel diagram. 6
2. (a) Explain on the basis of CFT, the cause of lability and inertness of octahedral complexes. 5
- (b) Explain SN^1CB mechanism of hydrolysis reaction of six coordinated Co (III) aminine complexes. 6

- (c) Write a note on substitution reaction without metal-ligand breaking in octahedral complexes. Write its mechanism. 5

OR

- (p) Discuss various factors affecting the rate of reaction of base hydrolysis. 5
- (q) Discuss SN^1 and SN^2 reaction mechanism for octahedral complexes with an example of each. 6
- (r) Discuss the anation reaction in octahedral complex with an example. 5
3. (a) Discuss the salient features of electron transfer reactions occurring through outer sphere mechanism. 5
- (b) Discuss the effect of leaving group and solvent effect on the rates of substitution reaction in $Pt(II)$ square planar complexes with suitable examples. 6
- (c) Explain two electrons transfer reaction with examples. 5

OR

- (p) Discuss the π -bonding theory of trans effect with diagrammatic representation. 5
- (q) What are complementary and non-complementary two electron transfer reactions ? Explain with suitable examples. 6
- (r) Discuss Marcus-Hush theory of electron transfer. 5
4. (a) Discuss the method of preparation and bonding in following metal carbonyls :
- (i) $Co(CO)_8$ and
- (ii) $Fe_2(CO)_9$. 6
- (b) Discuss the mechanism of hydroformylation reaction in alkene with Wilkinson's catalyst. 5

- (c) What are the fluxional molecules ? Explain the structure of any one molecule. 5

OR

- (p) Discuss the structure and bonding in metal nitrosyls. How will you identify linear and bent M-N-O bonds ? 6
- (q) Discuss the structure and bonding in metal dinitrogen complexes. 5
- (r) What is synergic effect ? Explain it with respect to bonding in metal carbonyls. 5
5. (a) What are the functions of different alkali metal ions ? Explain their deficiency effects also. 6
- (b) Explain the mechanism of action of Vitamin B₁₂. 5
- (c) Differentiate between haemoglobin and myoglobin. 5

OR

- (p) Briefly give an account on electron transfer protein. Explain any one in detail. 6
- (q) Explain the trigger mechanism. 5
- (r) What do you mean by Hill equation ? Explain. 5

