

AU-286

M.Sc. (Part—I) Semester—I (C.B.C.S. Scheme) Examination

PHARMACEUTICAL CHEMISTRY

(Inorganic Chemistry)

Paper—ISA1

Time : Three Hours]

[Maximum Marks : 80

Note :— All questions are compulsory and carry equal marks.**UNIT—I**

1. (a) Construct multiplication table for C_2V point group. 4
- (b) Define with suitable example :
 - (i) Symmetry element
 - (ii) Symmetry operation. 4
- (c) Calculate magnetic moment for :
 - (i) Sc^{2+}
 - (ii) Ti^{3+}
 - (iii) V^{2+}
 - (iv) Cr^{2+} . 4
- (d) Explain which ion should exhibit larger magnetic moment—either Mn^{2+} or V^{2+} . 4

OR

- (p) Construct multiplication table for C_3V point group. 4
- (q) What are the symmetry elements present in :
 - (i) HCl
 - (ii) Cyclopropane ? 4
- (r) Explain Cu^{2+} ions are coloured, paramagnetic while Zn^{2+} are colourless and diamagnetic. 4
- (s) Explain why does $Mn(II)$ ion show large magnetic moment amongst the divalent ions of first transition series elements. 4

UNIT—II

2. (a) Draw MO energy level diagram for O_2 molecule. 4
 (b) Explain the shape of PCl_5 and SF_6 on the basis of hybridization. 4
 (c) On the basis of VB theory explain why $[CoF_6]^{3-}$ is outer orbital while $[Co(NH_3)_6]^{3+}$ is inner orbital octahedral complex. 4
 (d) Explain MO representation for tetrahedral complex. 4

OR

- (p) Explain and draw MO representation for NO molecule. 4
 (q) Explain MO representation for octahedral complexes. 4
 (r) What are the postulates of valence bond theory ? 4
 (s) Explain the structure of $[NiCl_4]^{2-}$ ion on the basis of valence bond theory. 4

UNIT—III

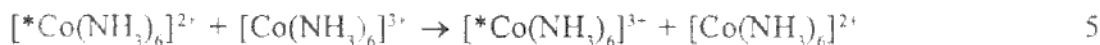
3. (a) What are postulates of crystal field theory ? 4
 (b) Draw splitting of 'd' orbital for tetrahedral and octahedral complexes. 4
 (c) What is CFSE ? Calculate CFSE for (i) d^1 (ii) d^2 (iii) d^4 in strong field octahedral complexes. 4
 (d) Explain electronic spectra for d^1 complexes. 4

OR

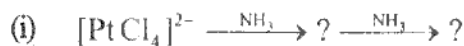
- (p) Explain electronic spectra for d^2 in octahedral field. 4
 (q) Determine term symbol for (i) d^1s^1 (ii) d^7s^1 . 4
 (r) What are limitations of CFT ? 4
 (s) Explain nephelauxetic effect with suitable example. 4

UNIT—IV

4. (a) Discuss photosubstitution reaction of Ruthenium complex. 5
 (b) Discuss outer sphere mechanism in for following reaction :



- (c) Predict product obtained in following reaction with explanation :



OR

- (p) Explain photochemical reaction in chromium complex. 5
- (q) Explain the terms :
- (i) Stepwise stability constant
- (ii) Overall stability constant. 6
- (r) Describe fluxionality of π -allyl metal complexes. 5

UNIT—V

5. (a) What is photosynthesis ? What are electron transport system that are used in photosynthesis ? Explain. 6
- (b) Explain the role of $[H Co(CO)_4]$ as catalyst in hydroformylation reaction. 5
- (c) Explain molecular mechanism of ion transport across the membrane. 5

OR

- (p) What are essential trace elements ? How do they work ? 5
- (q) Explain the mechanism of $Na^+ - K^+$ pump. 5
- (r) Discuss the structure of chlorophyll and explain the mechanism of photosynthesis. 6

