

V.P. & R. P. T. P. SCIENCE COLLEGE, VALLABH VIDYANAGAR

B. Sc. (Semester - V) Examination

3rd October 2013, Thursday

INORGANIC CHEMISTRY (US05CCHE03)

Time: 3.30 pm To 5.00 pm

Total Marks: 30

Q.1 Answer the following MCQs:

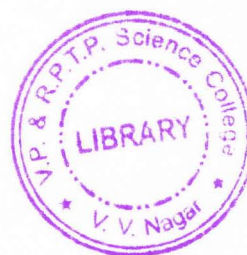
(06)

- i. Which of the following is the principle axis of rotation in NH_3 molecule?
(a) C_2 (b) C_3 (c) C_4 (d) C_1
- ii. Point group of CH_4 molecule is _____.
(a) O_h (b) T_d (c) D_{3h} (d) D_{6h}
- iii. Which is the best theory to understand coordinate bonding?
(a) M.O.Theory (b) LFT (c) CFT (d) VBT
- iv. Which type of substance or metal has higher susceptibility to magnetism?
(a) Metal ions (b) Ferromagnetic (c) Diamagnetic (d) Antiferromagnetic
- v. The term used for kinetic stability are _____.
(a) labile & inert (b) labile & stable (c) labile & unstable (d) inert & unstable
- vi. In aqueous solution, the concentration of water is _____.
(a) $[5.55M]$ (b) $[0.55M]$ (c) $[5.00M]$ (d) $[55.5M]$

Q.2 Answer the following short questions (Any three):

(06)

- i. Define the terms: (a) symmetry operation (b) symmetry element
- ii. Construct the multiplication table for C_{2v} point group.
- iii. What is crystal field splitting?
- iv. Explain in short high spin complex.
- v. Give factors affecting stability of complexes.
- vi. Define the terms: (a) substrate (b) Anation reaction



Q.3

- a) Give an account of D_n and D_{nh} groups. (03)
- b) Prove that $S_n^n = E$ giving proper example, where $n = \text{even number}$. (03)

OR

Q.3

- a) Prove that C_{3v} is a non-abelian group giving suitable example. (03)
- b) Give account of C_n and C_{nv} groups. (03)

Q.4

- a) Explain splitting of d-orbitals in octahedral complexes.
- b) Write note on Jahn Teller effect.

(03)

(03)

OR



Q.4

- a) Explain $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$ is purple or violet in color.
- b) Calculate in the unit of Δ_0 , the LFSE of Fe^{2+} ($Z=26$) high spin ion in octahedral complex. (Given : $\Delta_0 = 10,400 \text{ cm}^{-1}$, $P = 17,600 \text{ cm}^{-1}$)

(03)

(03)

OR

Q.5

- a) Discuss the $\text{S}_{\text{N}}1$ mechanism in ligand substitution reaction in octahedral complexes.
- b) Discuss the continuous variation method for the determination of composition of the complex.

(03)

(03)

OR

Q.5

- a) Discuss the acid hydrolysis reaction of six coordinated Co (III) ammine complexes.
- b) What is trans effect? Discuss the electrostatic polarization theory for trans effect.

(03)

(03)

