

(A-8) Seat No: _____

Printed pages: 2

SARDAR PATEL UNIVERSITY
T.Y. B.Sc. (CHEMISTRY), SEMESTER-5 (NC)
INORGANIC CHEMISTRY (US05CCHE03)
EXTERNAL THEORY EXAMINATION

Time: 3 Hrs. 10:30 am - 1:30 pm

Total Marks : 70

NB: Figures to the right indicate marks

Thursday, 12th May 2016

Q:1. Choose an appropriate answer for each of the following. [10]

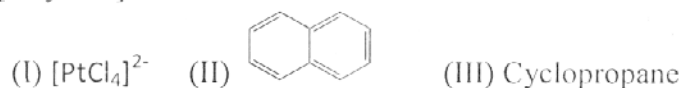
- The symbol σ_d used for _____?
(a) Vertical plane (b) horizontal plane (c) molecular plane (d) none of these
- The symbol of rotation reflection axis is _____?
(a) C_n (b) S_n (c) D_n (d) none of this
- The energy gap between t_2 & e -sets of orbital in tetrahedral complex is denoted by _____?
(a) $4/9 \Delta_0$ (b) Δ_t (c) both (a) & (b) (d) none of this
- The electronic distribution in $[\text{Co}(\text{NO}_2)_6]^{3-}$ complex is?
(a) $t_{2g}^6 e_g^0$ (b) $t_{2g}^6 e_g^2$ (c) $e_g^4 t_{2g}^2$ (d) $t_{2g}^3 e_g^3$
- The d-orbital split into _____ degenerate orbital.
(a) 2 (b) 3 (c) 5 (d) 10
- The magnetic quantum number has originated from _____
(a) θ equation (b) ϕ equation (c) R equation (d) none of this
- What will be the degeneracy of a state characterized by $n_x^2 + n_y^2 + n_z^2 = 19$?
(a) 6 (b) 19 (c) 9 (d) 3
- Generally, _____ co-ordinated complexes react faster than _____ co-ordinated complexes.
(a) 6, 4 (b) 4, 6 (c) Both (a) & (b) (d) none of these
- In hydrolysis reaction, ligand replaced by _____.
(a) H_2O (b) OH^- (c) Both (a) & (b) (d) none of these
- Which of the ligand have strongest trans effect?
(a) CO (b) PR_3 (c) NH_3 (d) H_2O

Q:2. Answer the following [Any Ten] [20]

- Define: Symmetry operation, Symmetry element
- Give the multiplication table for point group C_{2v} .
- Find the point group of H_2 molecule.
- Draw the diagram of splitting of d-orbital in Oh complex.
- Arrange the ligands in increasing order in series based on their capacity to cause the splitting of d-orbitals: CN^- , NH_3 , NO_2^- , F^- , H_2O , I^- .
- Find the term symbol of Fe ($Z=26$).
- State the fourth postulate of quantum mechanics.
- What is a linear operator?
- Write the Schrodinger equation in terms of polar co-ordinates.
- What is the relation between β_n and K_1, K_2, \dots, K_n ?
- Discuss the types of attacking reagent.
- What is Trans effect?

(P.T.O.)

- Q:3. (A) Explain the following by giving suitable illustrations: Rotation, Improper rotation. [04]
 (B) Identify the symmetry elements and detect the point groups of the following molecule [06]
 [Any two]



OR

- Q:3. (A) Explain: Two & Three fold rotational axis present in pyridine and ammonia molecule respectively. [04]

- (B) Give an account of C_{nv} point groups. Prove that C_{3v} point group is Non Abelian. [06]

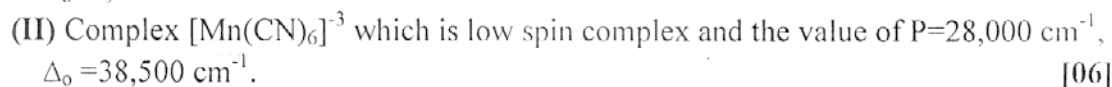
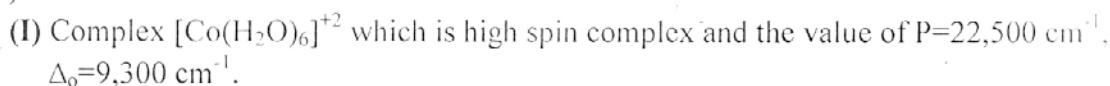
- Q:4. (A) Differentiate: Paramagnetism & Diamagnetism. [04]

- (B) Discuss about splitting of d-orbital in tetragonally distorted octahedral complex & square planar complexes. [06]

OR

- Q:4. (A) Write short note on 'Jahn Teller effect'. [04]

- (B) Calculate the LFSE of



- Q:5. (A) Derive a three dimensional wave equation for a wave travelling in Y-direction and describe as $Y(x,t)=f(x)\cdot\phi(t)$. [10]

OR

- Q:5. (A) Give an account of particle in one dimensional box. [10]

- Q:6. (A) Discuss: Factor affecting the stability of complexes depends on nature of central metal ion. [04]

- (B) Write about S_N1 & S_N2 mechanism. [06]

OR

- Q:6. (A) Write short note on 'Electrostatic polarization theory'. [04]

- (B) Discuss about base hydrolysis reactions of six-coordinated Co(III) Ammine complexes. [06]

