Assignment
CHE-308
Sem VI 2018
Unit Test I &II

UNIT -I :-

*** Questions for Long Answer**

(1) Drive the ground state term symbols for the following.
(1) Fe^{3+} (Z=26) (2) O (Z=8) (3) Ni^{2+} (Z=28)

(2) Derive the term symbol for all possible states arising from P^2 configuration and determine the ground term among them.

(3) Explain the Laport orbital selection rule for the electronic spectra of transition metal complexes.

(4) Write a note on "spectrochemical series.

***Questions for Short Answer:**

(1) Which are the value of quantum number 'J'?

(2) Calculate the orbital degeneracy corresponding to the following terms:
A. ^3P **B.** ^4G

(3) Give an example of a complex explained by "John Teller Effect".

(4) Define Term symbol

(5) Find the number of unpaired electrons if the term symbol is ^3P.

(6) How many spin allowed transition occurs in $[Ni(H_2O)_6]^{+2}$ complex.

UNIT- II:-

*** Questions for Long Answer**

(1) Show that; "Two different Eigen functions of a Hermitian operator Â with different Eigen values are orthogonal".

(2) Derive Schrödinger's equation in Polar coordinates.

(3) Write Schrödinger's equation in polar co-ordinates derives Φ-equation.

(4) Consider the equation $\hat{H}\boldsymbol{\psi} = \frac{\hat{L}^2}{2I}\boldsymbol{\psi}$ and explain the spectra of a diatomic AB type molecule.

*** Questions for Short Answer**

(a) Represent the equation of energy for Rigid Rotator system.

(b) Give an operator for linear momentum.

(c) Give the equation for energy E for the particle in a 3D(three Dimensional) box, where nx ≠ ny ≠ nz

(d) Give the equation for energy E for the particle in a 3D(three Dimensional) box, where nx = ny = nz

(e) Write the solution of function Φ for the equation, $\frac{\partial^2 \emptyset}{\partial \emptyset^2} + m^2 \emptyset = 0$

Unit-III:-

*** Questions for Long Answer**

(1) Prove that bond angle between SP hybrid orbital is 180°.

(2) Write the secular determinant for Ψ M.O = $C_1\phi_1 + C_2\phi_2$.

(3) Write the wave function for SP^3 and obtain the constants associated with it.

(4) Explain the H.M.O. for ethylene molecule.

*** Questions for Short Answer:**

(1)Write number of π-electron in allyl carb anion.

(2) Define Hybridization.

(3) The Eπ energy for Allyic cation is _____

(4) Write the types of allyl system.

Unit —IV

*** Questions for Long Answer**

(1) What is metal carbonyl compound? Explain it

(2) Explain the structure of :
Ni(CO)4, Cr(CO)6, Fe(CO)5, Fe2(CO)9.

(3) Explain the classification of metal carbonyl compounds.

(4) Explain E.A.N.

*** Questions for Short Answer:**