

Assignment
CHE-204
Sem IV 2018
Unit Test I & II

UNIT -I :-Wave Mechanics

*** Questions for Long Answer**

- (1) Show that Normal Mode of vibrations are stationary sine waves
- (2) Derive the operator for linear momentum P_x , P_y , P_z and total P
- (3) Derive eigen function & eigen value for particle in a linear box system.
- (4) Explain meaning of 'Average Value' with the help of 3rd postulate of quantum mechanics.
- (5) Represent Schrödinger's equation and derive time independent Schrödinger's equation.

*** Questions for Short Answer:**

- (a) Define 'quanta' and its value.
- (b) Represent 1st postulate of quantum mechanics.
- (c) Write Heisenberg's uncertainty principal.
- (d) If $\psi = \exp^{\pm ikx}$ then write expanded form for function ψ .
- (e) Give the example of a system with constant potential & kinetic energy.

UNIT- II:- Coordination Compounds

*** Questions for Long Answer**

- (1) Discuss the structure of M^{2+} metal complex according to Valance Bond theory.
- (2) Explain the structure, number of unpaired electrons, the value of CFSE and magnetic moment for $[Mn(Cl)_6]^{4-}$.
- (3) The value of $\mu_s = 3.87$ B.M. for $[Co(F)_6]^{4-}$, find out the number of unpaired electrons also explain the structure & properties of the complex.
- (4) "Crystal field theory is useful to explain the colour of the metal complexes."- Justify the statement with example.
- (5) Discuss "John Teller Effect" to explain the structure of Cu- complex.

*** Questions for Short Answer:**

- (a) Name the atomic orbital taking part in hybridization in outer field complex formation.
- (b) If $\mu = 1.71$ dq, then how many number of unpaired electrons present in metal complex?
- (c) Define 'High Spin' complex.
- (d) Write IUPAC name of the complex $[Co(en)_3]Cl_3$.
- (e) Draw the structure of $[Ni(CN)_4]^{-2}$.

Unit-III:- Chemical Bonding

* Questions for Long Answer

- (1) Draw M.O. energy level diagram for CO and calculate its bond order.
- (2) Distinguish between B.M.O. and A.B.M.O.
- (3) Discuss the M.O. theory of bonding in NH_3 .
- (4) Discuss the L.C.A.O. principle of Molecular orbital theory.

* Questions for Short Answer:

- (a) What is bond order?
- (b) Explain the magnetic property of $[\text{CoF}_6]^{3-}$ on the basis of M.O. theory.
- (c) State and explain Aufbau's principle.
- (d) Define non-bonding molecular orbital.
- (e) State the bond order of NO molecule on the basis of M.O. theory.

Unit —IV

* Questions for Long Answer

- (1) Explain the physico chemical principal of liq. SO_2 and liq. HF.
- (2) Write preparation, chemical and physical properties and uses of NaHCO_3 and NaOH.

* Questions for Short Answer: