* S - 2 6 0 1 / 5 0 0 *

S-2601

M. Sc. (Sem. I) (Regular & Evening) Examination

March / April – 2011

Inorganic Chemistry : Paper - I

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **M. Sc. (Sem. 1) (Regular & Evening)**

Name of the Subject :

☛ **Inorganic Chemistry : Paper - 1**

☛Subject Code No. : **2 6 0 1** ☛Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all the **four** questions.
(3) Figures to the **right** indicate full marks.
(4) Answers of all questions to be written in same answer books.

1 Answer briefly any **three** of the following : **18**

(a) What is a linear harmonic oscillator? Derive expression $E=1/2\ KA^2$ for energy of a linear harmonic oscillator.

(b) What are ladder operators? Why the ladder can not be extended indefinitely? Give ladder of eigen state of $\hat{L}_z$.

(c) Define
  (i) Hermitian operator
  (ii) Spin orbit coupling
  (iii) Hamiltonian operator
  (iv) Wave function

(d) Two mass m_1 and m_2 connected by a massless rod to form a rigid rotator are restricted to rotate in a plane. Find the expressions for its eigen values and eigen functions.

2 Answer briefly any **three** of the following : **18**

(a) Define matrics and give various types of matrics?

(b) Construct character table for C_{2v} point group.

(c) Explain reducible and irreducible representations. Find out number of irreducible representation for NH_3 molecule.

(d) State great orthogonality theorem. Explain the term in it. Give its importance consequences.

3 Answer briefly any **three** of the following : **18**

(a) Explain how spectrophotometric method can be useful in determining rate of ligand substitution reaction.

(b) Justify : "There is no relationship between thermodynamic stability and liability of complexes."

(c) Explain substitution reaction without metal-ligand bond cleavage

(d) Explain the SN^1-CB mechanism for the base hydrolysis of $[Co(NH_3)_5Cl]^{+2}$ complex.

4 Answer briefly any **three** of the following : **16**

(a) Discuss the acid hydrolysis reaction in terms of the charge complex.

(b) What is angular momentum? Give operators for components of angular momentum in terms of r and p.

(c) What is character table? What information do you obtain from the character table?

(d) Define :

(i) Labile

(ii) Inert

(iii) Stable

(iv) Less stable metal complexes with proper illustrations.
