MP-120

December-2016

M.Sc., Sem.-I

401 : Chemistry

(Inorganic Chemistry)

Time : 3 Hours]

[Max. Marks : 70

Instruction : Character table is to be provided.

1. (a) Find out the commutator value of the operators Lx and Lz.   7

    OR

    For the simple harmonic oscillator find out the value of total energy.

    (b) In the perturbation theory, prove that $E(1) = H'_{nn}$.   7

    OR

    By applying variation principle find out eigen value of Hydrogen atom.

2. (a) Differentiate between Identity matrix and Diagonal matrix with example.   7

    OR

    State the reduction formula and reduce the following representation into its irreducible components.

C3V	E	2C3	3σv
Γ_1	7	−2	1

    (b) Explain the significance of direct products and determine the irreducible representations which comprise them for the point group D6h : E1g × E2u.   7

    OR

    List five important rules about irreducible representations and their characters and use them for the construction of character table of C3V point group.

3. (a) Explain the following terms :   7
    (i)   Volume Magnetic Susceptibility
    (ii) Magnetic Induction
    (iii) Magnetic States of Matter
    (iv) Torque

    OR

    Distinguish between 'Curie temperature' and 'Neel Temperature'.

(b) What are Pascal's constants and constitutive correction and for what use can we put them into ? 7

OR

Discuss Intermolecular antiferromagnetism with examples.

4. (a) Discuss in detail cis-platin. 7

OR

Write a note on Zincmetalloenzymes.

(b) Write a note on biological nitrogen fixation. 7

OR

Write a note on (i) Gold compounds in arthritis and (ii) Metallocenes.

5. Answer the following in short : (one mark each) 14

(i) What is the eigen value of the operator L_z ?

(ii) What is the value of L_+L_- ?

(iii) What is the application of commutator relationship ?

(iv) What is the second postulate in the quantum mechanics ?

(v) What will be the character of the matrices of triply degenerate representation under identity operation ?

(vi) An energy integral $\int \psi_i H \psi_i \, dt$, may be non-zero only if _____.

(vii) What is transpose of a matrix ?

(viii) Define 'Permeability'.

(ix) Give equation for χ_{para}^{corr}.

(x) Give the relation between values of magnetic moment of ferromagnetic and antiferromagnetic compounds.

(xi) What is the biological function of manganese ?

(xii) What is doming ?

(xiii) Write the structure of Silver sulphadiazene.

(xiv) Write the mechanism of action of silver and mercury salt.

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