DK-117

December-2017

M.Sc., Sem.-I

401 : Inorganic Chemistry

Time : 3 Hours]

[Max. Marks : 70

1. (A) Write a note on step-up and step-down operators. 7

    OR

    Using variation method, calculate the eigen value for H-atom.

    (B) Give a full account of spherical harmonics. 7

    OR

    Calculate the first order correction term for the eigen function by using perturbation method.

2. (A) Explain the similarity transformations. 7

    OR

    Explain the Great Orthogonality theorem.

    (B) By using the wave functions as the bases for the irreducible representations, prepare the matrices for operations of NH_3 molecule. 7

    OR

    Write the characters of the representation of the following direct products and determine the irreducible representation which comprise them for the point group $D_{3h} : A'_2 \times E'$.

3. (A) Discuss Curie-Weiss Law. 7

    OR

    Explain the "Pascal's constants" with example.

    (B) Discuss Diamagnetism & Diamagnetic substance. 7

    OR

    Write a note on Intermolecular antiferromagnetism.

4. (A) Write a note on Nitrogenase and its mechanism. 7

    OR

    Write a note on discovery of Cisplatin, synthesis and mode of action.

    (B) Write a note on cytochromes. 7

    OR

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

5. Answer in short :

(i) When will you use the perturbation method ?

(ii) Define angular momentum.

(iii) What is a Hermitian operator ?

(iv) On which principle does the simple harmonic oscillator operate ?

(v) Define orthogonal matrix.

(vi) What is the value of contribution to the character of $\chi(C_4)$ per unshifted atoms in $\lceil_{3N}$?

(vii) Write the reducible representation $T1 + E$ in Td molecule.

(viii) Explain the term Permeability.

(ix) Give the characteristic properties of paramagnetism.

(x) Write Lenz's law.

(xi) Write the drawback of MRI.

(xii) Write the characteristic of radioisotopes used in diagnostic purpose.

(xiii) Explain the term Doming.

(xiv) Write the structure of Silver sulphadiazine.

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