Shree H.N.Shukla Group of Colleges

B . Sc. (Sem-IV) (CBCS) (Unit Test)

C-601: Inorganic & Industrial Chemistry

Time: 1.5 hours

Date: /04/2021 **Total Marks: 30**

Instructions

1. **All Questions are compulsory.**
2. **Figure to the right indicate the full marks of Questions.**

Q.1 (A) Answer the Following. **[01]**

(I) Define Multi electron system.
(II) What is resultant spin quantum number?
(III) What do you mean by spin multiplicity?
(IV) For the p^2 system what is order of energy for ^1D, ^3P and ^1S spectral terms.
(V) Give equation to calculate microstates.

(B) Answer the Following (any one). **[02]**

(I) Define following terms
(a) Spectral term symbol
(b) Microstates.
(II) Derive ground state spectral term **OR** derive Russll-Saunders term.
(a) d^2 (V^{+3}) system
(b) d^3 (Cr^{+3}) system

(C) Answer the Following (any one). **[03]**

(I) Write short note on l-l coupling.
(II) Explain Holepegion diagram for d1 state

(D) Answer the Following (any one). **[05]**

(I) Explain Hund's rule to decide ground state spectral term with example.
(II) Discuss Russll-saunders coupling scheme.

Q.2 (A) Answer the Following. **[01]**

(I) What is John-Teller stabilization energy?
(II) Give Hole-formalytic pair of orbitals
(III) Which type of splitting will be observed in ground term of a d^{10} and d^{10-n} in presence of similar field?
(IV) Give mathematical equation for laporte's spin selection rule.
(V) What is the main application of Orgel diagram?

(B) Answer the Following (any one). **[02]**

(I) Give reason $[CoCl_4]^{2-}$ is darken than $[Co(H_2O)_6]^{2+}$.
(II) Give only orgel diagram of ^2D state for d^1 system in Oh field.

(C) Answer the Following (any one). **[03]**

(I) Discuss orbital / Laporte / symmetry selection rule.
(II) Give the table of strong and weak JTD in octahedral and tetrahedral complexes.

(D) Answer the Following (any one). **[05]**

(I) Discuss about Relaxation or Violation about selection rule.
(II) Write short note on "Type of electronic transitions in metal complexes"

OR

Discuss the absorption spectra of transition elements.