647510 **BSCinoCC5010** **Seat No :_____**

B.Sc. Semester - 5 (Remedial) (*CBCS*) Examination
March/April-2023(Old Course)
INORGANIC AND INDUSTRIAL CHEMISTRY (CORE)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (A) Write electronic configurations for octahedral High Spin and Low Spin complexes. **[04]**

Q. 1 (B) Answer the following (Any Two) **[10]**

(1) Describe: d-orbital splitting in Oh complexes.

(2) Calculate total CFSE for $[Co(CN)_6]^{-3}$, Where, Δ_o=34800 cm^{-1} & P = 19000 cm^{-1}

(3) Explain: Factor affecting on d- orbital splitting energy (Δ_o).

Q. 2 (A) Answer the following: **[04]**

Calculate 18 electrons & EAN for following metal carbonyl:

(1) $Cr(CO)_6$, (2) $Ni(CO)_4$

Q. 2 (B) Answer the following (Any Two) **[10]**

(1) Draw the full structure; find the number of bridge CO & non-bridge CO in

(a) $Mn_2(CO)_{10}$, (b) $Fe_2(CO)_9$ & (c) $Fe_3(CO)_{12}$

(2) Discuss: Linear & bent NO with examples.

(3) Discuss: Structure & valence bond theory of $Mn_2(CO)_{10}$.

Q. 3 (A) Answer the following: **[04]**

Prove that $\psi = ASin\alpha x + BCos\alpha x$ is a solution for the equation $\frac{d^2\psi}{dx^2} + \alpha^2\psi = 0$.

Q. 3 (B) Answer the following (Any Two) **[10]**

(1) Write note on: Fused silica glass and photosensitive glass.

(2) Explain raw materials used in manufacture of glass.

(3) Derive equation of wave function for particle moving in one dimensional box and show quantization of energy from that.

Q. 4 (A) Answer the following: **[04]**

(1) Explain Sorel's cement and Acid resistant cement.

Q. 4 (B) Answer the following (Any Two) **[10]**

(1) Explain: Dry process and Wet process.

(2) Explain burning process with equation in manufacture of Portland cement.

(3) Explain: Mortar and Concrete.

Q. 5 (A) Answer the following. **[04]**

(1) Explain the function of primary and secondary plant nutrients.

Q. 5 (B) Answer the following (Any Two) **[10]**

(1) Explain manufacture of Urea by Sindri method and action of urea as a fertilizer.

(2) Explain manufacture of triple super phosphate with flow diagram.

(3) Explain the manufacture of calcium cyanamide with diagram.

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