647510 **BSc5CheC501x** **Seat No :_____**

B.Sc. Semester - 5 (Remedial) (*CBCS*) Examination
March/April-2023 (NEW 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) Calculate 18 electrons & EAN for following metal carbonyl: **[04]**

(1) $Cr(CO)_6$, (2) $Fe(CO)_5$

Q. 1 (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) Prove that $\psi = ASin\alpha x + BCos\alpha x$ is a solution for the equation $\frac{d^2\psi}{dx^2} + \alpha^2\psi = 0$.

(3) Derive the equation of wave function and equation of energy for particle in three dimensional box.

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

Explain Sorel's cement and Acid resistant cement.

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

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

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

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

(1) If CFSE of $[CoBr_6]^{-3}$ is -100 KJ/mol & pairing energy is 20,000 cm^{-1} then calculate splitting energy. (1KJ=83.6cm^{-1})

(2) Explain: Processes for hydrogenation of vegetable oil.

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

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

(1) Explain degeneracy with examples.

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

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

(2) Explain: Manufacture of Ammonium nitrate by Prilling method.

(3) Explain: Mortar and Concrete.

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

Explain: (a) Saponification value and (b) Iodine value

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

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

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

(3) Explain: Orbital rotation contribution in various crystal fields.

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