

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 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.

- Que-1(A) Calculate 18 electrons & EAN for following metal carbonyl: (04)
 (1) $\text{Cr}(\text{CO})_6$ (2) $\text{Fe}(\text{CO})_5$
- Que-1(B) Answer the following. (Any Two) (10)
1. Draw the full structure; find the number of bridge CO & non-bridge CO in
 (a) $\text{Mn}_2(\text{CO})_{10}$ (b) $\text{Fe}_2(\text{CO})_9$ (c) $\text{Fe}_3(\text{CO})_{12}$
 2. Prove that $\psi = A\sin ax + B\cos ax$ is a solution for the equation $\frac{d^2\psi}{dx^2} + a^2\psi = 0$.
 3. Derive the equation of wave function and equation of energy for particle in three-dimensional box.
- Que-2(A) Answer the following: (04)
 ❖ Explain Sorel's cement and Acid resistant cement.
- Que-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.
- Que-3(A) Answer the following: (04)
 ❖ Explain: Factor affecting on d- orbital splitting energy (Δ_o).
- Que-3(B) Answer the following. (Any Two) (10)
1. If CFSE of $[\text{CoBr}_6]^{3-}$ is -100 KJ/mol & pairing energy is 22,000 cm^{-1} then calculate splitting energy. ($1\text{KJ}=83.6\text{cm}^{-1}$)
 2. Explain: Processes for hydrogenation of vegetable oil.
 3. Write note on: Fused silica glass and photosensitive glass.
- Que-4(A) Answer the following: (04)
 ❖ Explain degeneracy with examples.
- Que-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.
- Que-5(A) Answer the following. (04)
 ❖ Explain:
 (a) Saponification value (b) Iodine value
- Que-5(B) Answer the following. (Any Two) (10)
1. Describe: d-orbital splitting in O_h complexes.
 2. Explain raw materials used in manufacture of glass.
 3. Explain: Orbital rotation contribution in various crystal fields.
