

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2024 (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. $[\text{Co}(\text{CO})_5]^+$
 2. $[\text{Mn}(\text{CO})_6]^+$
- 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) $\text{Fe}_3(\text{CO})_{12}$ (b) $\text{Co}_4(\text{CO})_{12}$ (c) $\text{Ir}_4(\text{CO})_{12}$
 2. Find the values of the normalized wave function for a particle moving in one dimensional box of length 'a' at $x=0$, $a/2$, $a/4$ and $3a/4$ for energy level $n=1$ and $n=2$.
 3. Derive the equation of wave function and equation of energy for particle in one dimensional box.
- Que.2(A) Answer the following: (04)
- Explain: Setting & Hardening of Portland Cement.
- Que.2(B) Answer the following: (Any Two) (10)
1. Write note on Manufacture of DAP.
 2. Explain: Manufacture of Ammonium sulphate from gypsum (Sindri Process).
 3. Explain: Manufacture of Portland Cement.
- Que.3(A) Answer the following: (04)
- If CFSE of $[\text{FeCl}_6]^{-4}$ is -80 KJ/mol & pairing energy is $20,000 \text{ cm}^{-1}$ then calculate splitting energy. ($1\text{KJ}=83.6 \text{ cm}^{-1}$)
- Que.3(B) Answer the following: (Any Two) (10)
1. Describe: d-orbital splitting in T_d complexes.
 2. Explain: Manufacture of cottonseed oil by solvent extraction method.
 3. Chemical reaction involved in manufacturing of glass.
- Que.4(A) Answer the following: (04)
- Explain Degeneracy with examples.
- Que.4(B) Answer the following: (Any Two) (10)
1. Explain: Preparation and chemical properties of Metal Carbonyls.
 2. Explain: Manufacture of Ammonium nitrate by Stengel Method.
 3. Explain: Mortar and Concrete.
- Que.5(A) Answer the following: (04)
- Explain:
1. Acid Value
 2. Iodine value
- Que.5(B) Answer the following: (Any Two) (10)
1. Explain: Factor affecting on d-orbital splitting energy (Δ_o).
 2. Give the name of different types of Glass and explain Optical glass and Borosilicate Glass.
 3. Explain: Orbital Rotation Contribution in various crystal fields.
