

**B.Sc. Semester - 5 (Remedial) (CBCS) Examination**  
**March/April-2024 (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.

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- Que-1(A) Answer the following question. (04)  
(1) Prove that  $[\text{NiCl}_4]^{-2}$  is paramagnetic while  $[\text{Ni}(\text{CN})_4]^{-2}$  is diamagnetic.
- Que-1(B) Answer the following questions. (Any two) (10)  
(1) Discuss splitting of d-orbital in octahedral field with CFSE.  
(2) Discuss factors affecting the crystal field splitting energy.  
(3) Explain high spin and low spin complex based on pairing energy.
- Que-2(A) Answer the following question. (04)  
(1) Give classification of metal carbonyls.
- Que-2(B) Answer the following questions. (Any two) (10)  
(1) Explain any five preparation methods of metal carbonyls.  
(2) Discuss structure of  $\text{Fe}(\text{CO})_5$ .  
(3) Explain the importance of IR spectra in study of metal carbonyls.
- Que-3(A) Answer the following question. (04)  
(1) Find out the degeneracy of a particle moving in a cubic box length at the energy level  $E = 9h^2/8ma^2$ .
- Que-3(B) Answer the following questions. (Any two) (10)  
(1) Derive the normalized wave function for a particle moving in one dimensional box.  
(2) Explain chemical reaction involved in manufacturing of glass.  
(3) Discuss raw materials used for manufacturing of glass (any ten).
- Que-4(A) Answer the following question. (04)  
(1) Write note on RCC.
- Que-4(B) Answer the following questions. (Any two) (10)  
(1) Explain manufacturing of Portland cement.  
(2) Discuss different types of cement.  
(3) Explain ISI specification of cement.
- Que-5(A) Answer the following question. (04)  
(1) Write note on NPK fertilizers.
- Que-5(B) Answer the following questions. (Any two) (10)  
(1) Explain Prilling method for production of ammonium nitrate.  
(2) Describe manufacture of triple super phosphate.  
(3) Explain Sindri method for the production of Urea.

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