

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

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- Que-1(A) Answer the following question. (04)
(1) Give classification of metal carbonyls.
- Que-1(B) Answer the following questions. (Any two) (10)
(1) Discuss structure of $\text{Fe}(\text{CO})_5$.
(2) Find out the degeneracy of a particle moving in a cubic box length at the energy level $E = 9h^2/8ma^2$.
(3) Derive the normalized wave function for a particle moving in one dimensional box.
- Que-2(A) Answer the following question. (04)
(1) Write note on NPK fertilizers.
- Que-2(B) Answer the following questions. (Any two) (10)
(1) Discuss manufacturing of Normal Super Phosphate in details.
(2) Discuss different types of cement (any ten).
(3) Explain properties of cement.
- Que-3(A) Answer the following question. (04)
(1) Write note on Iodine value.
- Que-3(B) Answer the following questions. (Any two) (10)
(1) Discuss different types of glass (any ten).
(2) Discuss manufacturing of cotton seed oil by solvent extraction method.
(3) Explain splitting of d-orbitals in octahedral field with CFSE
- Que-4(A) Answer the following question. (04)
(1) Draw the structure and write number of bridged and terminal CO group in $\text{Fe}_2(\text{CO})_9$ & $\text{Mn}_2(\text{CO})_{10}$.
- Que-4(B) Answer the following questions. (Any two) (10)
(1) Discuss application of IR spectroscopy in the study of metal carbonyls.
(2) Explain ISI specification of cement.
(3) Discuss factors affecting the crystal field splitting energy.
- Que-5(A) Answer the following question. (04)
(1) Differentiate: Low spin complexes and High spin complexes
- Que-5(B) Answer the following questions. (Any two) (10)
(1) Discuss different types of CO groups in metal carbonyl.
(2) Explain Sindri method for the production of Urea.
(3) Calculate total CFSE value and magnetic moment for $[\text{NiCl}_4]^{2-}$ where d-orbital splitting energy is 20000 cm^{-1} .
