

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2025 (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) Write note on Degeneracy.
- Que.1(B) Answer the following questions. (Any two) (10)
(1) Draw the full structure; find out the number of bridge and non-bridge CO in following
(a) $\text{Fe}_2(\text{CO})_9$ (b) $\text{Fe}_3(\text{CO})_{12}$ (c) $\text{Co}_2(\text{CO})_8$
(2) Discuss different types of CO groups in metal carbonyl.
(3) Derive the normalized wave function for a particle moving in one dimensional box.
- Que.2(A) Answer the following question. (04)
(1) Discuss RCC and Its advantages.
- Que.2(B) Answer the following questions. (Any two) (10)
(1) Discuss any three types of cement in details.
(2) Discuss manufacturing of Normal Super Phosphate in details.
(3) Explain manufacturing of Urea by Sindri process.
- Que.3(A) Answer the following question. (04)
(1) Differentiate High spin and Low spin complexes.
- Que.3(B) Answer the following questions. (Any two) (10)
(1) Discuss splitting of *d*-orbitals in tetrahedral field with CFSE.
(2) Discuss manufacturing of cotton seed oil by solvent extraction method.
(3) Explain any three types of glass in details.
- Que.4(A) Answer the following question. (04)
(1) Calculate 18 electron and EAN for (a) $\text{Ni}(\text{CO})_4$ and (b) $\text{Mn}_2(\text{CO})_{10}$.
- Que.4(B) Answer the following questions. (Any two) (10)
(1) Explain properties of cement.
(2) Discuss factors affecting the crystal field splitting energy.
(3) Discuss application of IR spectroscopy in the study of metal carbonyls.
- Que.5(A) Answer the following question. (04)
(1) Write note on Saponification value.
- Que.5(B) Answer the following questions. (Any two) (10)
(1) Explain Stengel method for manufacturing of Ammonium nitrate.
(2) Explain normalization and orthogonality of wave function of the particle in a one-dimensional box.
(3) Discuss main key points of crystal field theory.
