

B.Sc. Semester - 5 (CBCS) Examination

Oct/Nov. - 2022(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.

- Q.1(A) **Answer the following question.** (04)
Give arrangement of d^1 to d^{10} electrons in e and t_2 for tetrahedral high spin complex with CFSE in tabular form.
- Q.1(B) **Answer the following questions. (Any two)** (10)
A. Discuss splitting of d-orbital in octahedral field with CFSE.
B. Prove that $[\text{NiCl}_4]^{-2}$ is tetrahedral while $[\text{Ni}(\text{CN})_4]^{-2}$ is square planar.
C. Discuss factors affecting the crystal field splitting energy.
- Q.2(A) **Answer the following question.** (04)
Give any four preparation method for metal carbonyls.
- Q.2(B) **Answer the following questions. (Any two)** (10)
A. Explain the importance of IR spectra in study of metal carbonyls.
B. Discuss structure of $\text{Ni}(\text{CO})_4$.
C. Explain bonding in linear metal nitrosyl complexes.
- Q.3(A) **Answer the following question.** (04)
Give normalization wave function for a particle moving in one dimensional box.
- Q.3(B) **Answer the following questions. (Any two)** (10)
A. Derive the normalized wave function for a particle moving in three dimensional box.
B. Explain chemical reaction involved in manufacturing of glass.
C. Discuss different types of glass (any ten).
- Q.4(A) **Answer the following question.** (04)
Explain properties of cement.
- Q.4(B) **Answer the following questions. (Any two)** (10)
A. Discuss different types of cement.
B. Explain raw materials used for manufacture of cement.
C. Write note on RCC.
- Q.5(A) **Answer the following question.** (04)
Write note on Plant nutrients and its role.
- Q.5(B) **Answer the following questions. (Any two)** (10)
A. Explain Stangel process with process flow diagram for production of ammonium nitrate.
B. Describe manufacture of normal super phosphate by Den process.
C. Explain Sindri method for the production of Urea.
