647510 **BSc5CheC501x** **Seat No :_____**

B.Sc. Semester - 5 (*CBCS*) Examination
Oct/Nov - 2022 (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.

Q.1(A) **Answer the following question.** (04)

Give Normalization of wave function of the particle in one dimensional box.

Q.1(B) **Answer the following questions. (Any two)** (10)

A. Discuss application of IR spectroscopy in the study of metal carbonyls.

B. Write note on Degeneracy.

C. Discuss structure of $Mn_2(CO)_{10}$.

Q.2(A) **Answer the following question.** (04)

Write short note on RCC.

Q.2(B) **Answer the following questions. (Any two)** (10)

A. Discuss setting and hardening of Portland cement.

B. Discuss manufacturing of Normal Super Phosphate in details.

C. Explain Stangel process with process flow diagram for production of ammonium nitrate.

Q.3(A) **Answer the following question.** (04)

Differentiate: Strong Field Ligand and Weak Field Ligands

Q.3(B) **Answer the following questions. (Any two)** (10)

A. Explain splitting of d-orbitals in octahedral field with CFSE.

B. Discuss raw materials used for manufacturing of glass. (Any ten)

C. Discuss manufacturing of cotton seed oil by solvent extraction method.

Q.4(A) **Answer the following question.** (04)

Explain classification of metal carbonyls.

Q.4(B) **Answer the following questions. (Any two)** (10)

A. Draw the structure and write number of bridged and terminal CO group in $Fe_3(CO)_{12}$ & $Ir_4(CO)_{12}$.

B. Explain production of diammonium phosphate with flow diagram.

C. Calculate total CFSE value and magnetic moment for $[NiCl_4]^{-2}$ where d-orbital splitting energy is 20000 cm^{-1}.

Q.5(A) **Answer the following question.** (04)

Write note on Iodine Value.

Q.5(B) **Answer the following questions. (Any two)** (10)

A. Derive the normalized wave function for a particle moving in three dimensional box.

B. Discuss factors affecting the crystal field splitting energy

C. Discuss different types of cement (any ten).

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