



PAP-003-001505

Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

October / November - 2018

Chemistry : C-501

(Inorganic & Industrial Chemistry)

(Old Course)

Faculty Code : 003

Subject Code : 001505

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Questions one contains 20 short questions of one mark each. All are compulsory.
(2) Question - 2 and 3 carries 25 marks each with internal option.

1 Answer the following questions : 20

- (1) Give the condition for normalization.
- (2) $\nabla^2 = \dots\dots\dots$
- (3) Define operator.
- (4) Give the formula for calculate spin magnetic momentum.
- (5) Write full form of CFSE.
- (6) Write formula for zero point energy.
- (7) Which are three t_{2g} orbitals ?
- (8) Give point group of $[\text{Fe}(\text{CO})_5]$.
- (9) Draw the structure of $[\text{Ni}(\text{CO})_4]$.
- (10) Give examples of π -acid Ligand.
- (11) Write formula and name of C_3A .
- (12) Give the essential raw materials for cement.
- (13) Which metal oxide is used for grey colour cement ?
- (14) Write the formula for Gypsum.
- (15) Give any two names of natural organic fertilizers.
- (16) Write primary nutrients for plants.

- (17) Give any two examples of Potassium fertilizers.
- (18) Give the structure of Glycerol.
- (19) Which substance is used as fire extinguisher ?
- (20) Which substance is used as anesthetic ?

2 (a) Answer the following : (any **three**) **6**

- (1) What is Linear operator ?
- (2) Give name and draw five d-orbitals.
- (3) What Schrodinger equation is spherical co-ordinates ?
- (4) Give formula for CFSE in octahedral and tetrahedral complexes.
- (5) Define with examples : π -Acid ligands.
- (6) Draw only structure of $[\text{Mn}_2(\text{CO})_{10}]$ complex.

(b) Answer the following : (any **three**) **9**

- (1) Explain with example : Commutator operator.
- (2) Explain types of CO group in metal carbonyls.
- (3) Give preparation of Iron pentacarbonyl.
- (4) Explain any two factor affected on the splitting energy.
- (5) Write hybridization and shape of $[\text{Ni}(\text{CN})_4]^{-2}$ complex.
- (6) Write only equation of R, θ and ϕ .

(c) Answer the following : (any **two**) **10**

- (1) Derive the normalized wave function for a particle moving in one dimensional box.
- (2) Calculate the energy of 1s orbital.
- (3) Explain splitting of d-orbitals in tetrahedral ligand field with CFSE.
- (4) Discuss the nature of M-CO bond in metal carbonyls.
- (5) Discuss structure of $[\text{Fe}(\text{CO})_5]$ with hybridization.

- 3** (a) Answer the following : (any **three**) **6**
- (1) Explain Sorel's cement.
 - (2) Discuss colour cement.
 - (3) What are micro nutrients ?
 - (4) Write the formula of mono and di-ammonium phosphate.
 - (5) Give names of C₂ petrochemicals.
 - (6) Give uses of methyl chloride and methylene chloride.
- (b) Answer the following : (any **three**) **9**
- (1) Give uses of cement.
 - (2) Write a note on cement rock beneficiation.
 - (3) Write a short note on NPK fertilizers.
 - (4) Discuss the muriate of potash.
 - (5) Explain production of synthetic gas.
 - (6) Describe the manufacture of acrylonitrile from propylene.
- (c) Answer the following : (any **two**) **10**
- (1) Explain manufacture of portland cement with diagram.
 - (2) Describe the properties of cement.
 - (3) Describe the manufacture of normal super phosphate with diagram.
 - (4) Discuss the manufacture of urea with flow diagram.
 - (5) Describe catalytic hydration process of ethanol with reactions and diagram.
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