



Seat No. \_\_\_\_\_

**H-003-1016006**

**B. Sc. (Sem. VI) (CBCS) (W.E.F. 2016) Examination**

**April - 2023**

**Chemistry : C-601**

*(Inorganic Chemistry & Industrial Chemistry)*

**Faculty Code : 003**

**Subject Code : 1016006**

Time :  $2\frac{1}{2}$  / Total Marks : 70

**Instructions :**

- (1) All questions are compulsory.
- (2) All questions carry 14 marks.

- 1** (a) Answer the following questions : **4**
- (1) Define s-s coupling.
  - (2) Give the ground state spectral term for  $\text{Ni}^{+2}$ .
  - (3) How many microstates are possible for  $p^2$  case ?
  - (4) What is spin multiplicity ?
- (b) Answer the following questions : (any one) **2**
- (1) Discuss I-I coupling with suitable example.
  - (2) Calculate ground state spectral term for  $d^1$  and  $d^2$  case.
- (c) Answer the following questions : (any one) **3**
- (1) Explain Hole-Pigeon diagram for  $d^1$  case.
  - (2) Discuss Hund's rule to determine ground state spectral term with suitable example.
- (d) Answer the following questions : (any one) **5**
- (1) Calculate microstate for  $p^2$  case.
  - (2) Define L-S coupling and calculate spectral term for  $d^2$  case.

- 2 (a) Answer the following questions : 4
- (1) What is Orgel diagram ?
  - (2) Write any two Hole-Formalistic pair.
  - (3) What is d-d transition ?
  - (4) Draw the diagram showing splitting of d-orbital in square planar complexes.
- (b) Answer the following questions : (any one) 2
- (1) Discuss "Ligand to Metal charge transfer" transition.
  - (2) Discuss "Less electron system" in Hole formalism with suitable example.
- (c) Answer the following questions : (any one) 3
- (1) Draw the Orgel diagram for F-term.
  - (2) Discuss Laport selection rules.
- (d) Answer the following questions : (any one) 5
- (1) Explain absorption spectrum of  $\text{Ni}^{+2}$ .
  - (2) Explain Jahn-Teller effect on octahedral complexes.
- 3 (a) Answer the following questions : 4
- (1) Define Magnetic Induction.
  - (2) What is Acid Value of oil ?
  - (3) Which method is used to determine magnetic susceptibility ?
  - (4) Give the formula and source of Caproic acid.
- (b) Answer the following questions : (any one) 2
- (1) Write a note on Diamagnetic substances.
  - (2) Discuss Reichert-Meissl value.
- (c) Answer the following questions : (any one) 3
- (1) Explain dry process for the hydrogenation of oils.
  - (2) Discuss the effect of temperature on magnetic properties of substances.
- (d) Answer the following questions : (any one) 5
- (1) Derive the equation for total angular magnetic momentum for paramagnetic substances.
  - (2) Explain solvent extraction method for the manufacture of cotton seed oil.

- 4 (a) Answer the following questions : 4
- (1) Write the full form of BOD and COD.
  - (2) Give the names of four segments of environment.
  - (3) What is NO<sub>x</sub> and Sox ?
  - (4) Give the formula and use of freon 11.
- (b) Answer the following questions : (any one) 2
- (1) Write in brief : The Mesosphere.
  - (2) Write a note on physical pollution of water.
- (c) Answer the following questions : (any one) 3
- (1) Write a short note on Ozone depletion.
  - (2) Write a short note on Photochemical smog.
- (d) Answer the following questions : (any one) 5
- (1) Explain Chemical Oxygen Demand.
  - (2) Explain Green House Effect.
- 5 (a) Answer the following questions : 4
- (1) Define : Detergent.
  - (2) What is liquid soap ?
  - (3) What is fillers ?
  - (4) Name the chemical is used as binding material for ordinary soap.
- (b) Answer the following questions : (any one) 2
- (1) Write a short note on shampoo.
  - (2) Give the names of raw materials for manufacture of soap.
- (c) Answer the following questions : (any one) 3
- (1) Discuss the classification of surface active agents of detergents.
  - (2) Discuss any two types of soaps.
- (d) Answer the following questions : (any one) 5
- (1) Explain the batch process for manufacture of soap.
  - (2) Explain Anionic detergents.