

B.Sc. Semester - 6 (CBCS) Examination

March/April -2020

**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. (4)**

- (1) Calculate Microstates in detail for  $p^2$ -orbital.

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

- (1) Explain Hole-pigeon diagram for  $p^2$ -orbital.
- (2) Calculate the microstates and find Term Symbol for  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ .
- (3) Determine the allowed spectral terms for  $d^2$ -electronic configuration.

**Q. 2 (A) Answer the following question. (4)**

- (1) Explain the splitting of d-orbitals in  $[\text{Ni}(\text{CN})_4]^{2-}$ .

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

- (1) Discuss the absorption spectrum of aqueous solution of  $\text{Cu}^{2+}$  ion.
- (2) Discuss the Orgel diagram for  $d^2$  and  $d^8$  system in tetrahedral and octahedral ligand field.
- (3) What is Jahn Teller effect? Discuss in detail Jahn Teller in octahedral ligand field.

**Q. 3 (A) Answer the following question. (4)**

- (1) Derive equation for diamagnetic moment.

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

- (1) Explain manufacturing of cottonseed oil by solvent extraction method.
- (2) Explain Guoy's balance method with its limitations.
- (3) Explain Hydrogenation oil by wet process.

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

- (1) Explain classification of surfactants.

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

- (1) Give the name of methods for manufacturing of soap and explain continuous process in detail.
- (2) What is anionic detergent? Name methods of preparation of anionic detergent and discuss Welsh process in detail.
- (3) Discuss in detail various types of soap.

**Q. 5 (A) Answer the following question. (4)**

- (1) Explain chemically oxygen demand (COD) in detail with procedure.

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

- (1) Write note on Green House Effect.
- (2) Explain water pollution.
- (3) Explain BOD in detail with procedure involved in it.