

Duration: 3 Hours**Marks: 80**N.B. : (1) Question **No.1** is **compulsory**.(2) Attempt any **three** questions from remaining **five** questions.Q.1. Answer **any four** of the following.**20**

- A) Draw and explain structure of $\text{Fe}(\text{CO})_5$.
- B) Write IUPAC names of the following compounds
- $[\text{Zn}(\text{OH})_4]^{2-}$
 - $\text{K}_3[\text{Al}(\text{CO}_4)_3]$
- C) Write the mechanism of Michael reaction.
- D) Distinguish between SN^1 and SN^2 reactions.
- E) Explain kinetically controlled reactions w.r.t. nitration of chlorobenzene.
- F) Write a note on hydrogen bonding.

Q.2.A) Write the Chemical formulae of the following coordination compounds

05

- (i) Hexacyanocobaltate (III) ion.
- (ii) Pentaquaaluminum (III) ion.

- B) Explain electrophilic substitution reaction w.r.t. Friedel Craft alkylation. **05**
- C) Draw molecular orbital diagram of nitrogen molecule. Calculate its bond order and comment on its magnetic properties. **05**
- D) Distinguish between transition state and intermediates. **05**

Q.3.A) What is EAN? Calculate EAN of $[\text{PtCl}_6]^{2-}$ **05**

- B) Explain the role of Zn in biological reactions. **05**
- C) Differentiate between bonding and antibonding molecular orbitals. **05**
- D) Explain stability of carbon free radicals w.r.t. inductive effect and resonance effect. **05**

Q.4.A) Explain the structure of SF_4 on the basis of VSEPR theory.**05**

- B) Explain chemistry of cytochromes and their applications. **05**
- C) What is CFSE? Calculate CFSE of d^4 and d^7 in octahedral complexes. **05**
- D) Write short note on elimination reactions. **05**

Q.5.A) Write mechanism of Wohl – Ziegler allylic bromination.

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- B) Draw M.O. diagram of CO molecule & calculate its bond order. **05**
- C) Explain oxygen atom transfer biomolecular reaction containing iron. **05**
- D) Write limitations of CFT. **05**

Q.6.A) Explain with mechanism electrophilic substitution in monocyclic aromatic compound. **05**

- B) What is geometrical isomerism? Explain it in coordination compounds w.r.t. coordination number 6. **05**
- C) Write the drawbacks of VBT. **05**
- D) Explain the structure of singlet carbenes. Comment on the stability of carbenes. **05**