

[Time: Three Hours]

Chem - ECT

Please check whether you have got the right question paper.
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) Explain the structure of BrF_3 and Sf_4 on the basis of VSEPR theory? 3
 - b) Explain preparation, bonding and structure involved in $\text{Fe}_2(\text{CO})_9$. 3
 - c) Write the IUPAC names of the following co-ordination compounds-
 - i) $[\text{Pt}(\text{NH}_3)_4(\text{en})]\text{Cl}_4$ 3
 - ii) $[\text{CO}(\text{NH}_2)_2(\text{NH}_3)_4]\text{NO}_3$ 3
 - d) Explain thermodynamically and kinetically controlled reactions hence explain nitration of chlorobenzene 3
 - e) Explain with Suitable example Norrish type II reaction process.
 - f) Discuss the resonance and inductive effect with suitable examples to explain the stability of carbocation.
- Q.2. a) Write the chemical formula of the following co-ordination compounds 05
- i) Penta aqua hydroxoaluminium (III) ion.
 - ii) Pentaamine (dinitrogen) ruthenium (II) Chloride.
- b) Discuss the O_2 atom transfer of bimolecular reactions containing Fe. 05
- c) Explain an allowed and forbidden transitions by Jablonskis diagram. 05
- d) Draw molecular orbital diagram for NO molecule and comment on its bond order & magnetic properties. 05
- Q.3. a) Explain the geometrical isomerism in platinum complex with ammonia. 05
- b) Compare between VBT and MOT. 05
- c) Explain the formation and structure of carbanion. 05
- d) What is carbene? Write the mechanism involving formation of carbene. 05
- Q.4. a) What is EAN? Calculate the EAN of $\text{Pt}(\text{NH}_3)_4^{4+}$ and $[\text{Fe}(\text{H}_2\text{O})_4]^{2+}$ 05
- b) Distinguish between transition state and Intermediate 05
- c) Explain the sulphonation of Napthalene as thermodynamically and kinetically controlled reaction. 05
- d) On the basis of MOT explain why N_2 is more stable. 05
- Q.5. a) Distinguish between Thermal and photochemical reactions. 05
- b) Define and explain the terms-
 - i) Co- ordination no. 05
 - ii) Ligand 05
- c) Explain the applications of cytochromes. 05
- d) Write the reaction mechanism involving addition of carbanion to α - B double bond. 05
- Q.6. a) Explain the formation of carbenes and compare between singlet carbenes and triplet carbenes with structures. 05
- b) What is an octet rule? Explain the exceptions to octet rule with examples? 05
- c) Discuss the observations and application of Werners theory in cobalt (III) Ammines.. 05
- d) Give mechanism and applications of Wohl - Ziegler Bromination reaction. 05
