

SF-I sem III / P / 2014

SE (Chem) CBGS

Sub- EC-1

20 NOV 2014

Engineering Chemistry-I QP Code: 14556

(3 Hours)

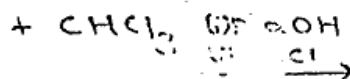
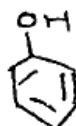
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[Total Marks : 80

N.B. : (1) Questions no. 1 is compulsory.

(2) Attempt any three questions from remaining five questions.

1. (a) Explain the structure of PCl_3 molecule on the basis of VSEPR theory. 20
 (b) Explain the preparation and structure of $\text{Fe}_2(\text{CO})_9$
 (c) Write the chemical formula of the following co-ordination compounds
 (i) Tris (Ethylene diamine) chromium (III) chloride
 (ii) Sodium tetra carbonyl cobaltate (-I)
 (d) What are carbocation & carbanion? Compare the structures of carbocation & carbanion.
 (e) What is SN^2 reaction? Explain with mechanism.
 (f) Explain thermodynamically & kinetically controlled reactions hence explain nitration of chlorobenzene.
2. (a) Write IUPAC names of the following co-ordination compounds. 5
 (i) $[\text{Cu}(\text{NH}_3)_4]^{2+}$
 (ii) $[\text{Pt}(\text{Cl})_2(\text{NH}_3)_2]$
 (b) What is an Elimination reaction? Explain E_2 reaction with Mechanism 5
 (c) Explain the applications of cytochromes. 5
 (d) Differentiate between Bonding & Anti bonding Molecular orbitals 5
3. (a) Draw Molecular orbital diagram for N_2 molecule and comment on its bond order & magnetic properties. 5
 (b) What is EAN? Calculate EAN of $[\text{Cr}(\text{NH}_3)_6]^{3+}$ 5
 (c) Explain the Biochemistry of enzyme containing copper. 5
 (d) Explain the structure of carbon free radicals. 5
4. (a) Complete the following reaction. State the name of the reaction and explain the mechanism of the same. 5



GN-Con: 6463-14.

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- (b) Compare MOT and VBT 5
- (c) What is CFSE? Calculate CFSE for d^4 and d^7 in octahedral complexes. 5
- (d) What is Friedel-Crafts alkylation reaction? Explain the Mechanism of the reaction. 5
5. (a) When Unsymmetrical pinacol (1,2 - diol) is treated with acid which hydroxyl group will protonate? Explain with suitable example. 5
- (b) Write a note on Hydrogen bonding 5
- (c) Discuss Werner's theory 5
- (d) Explain the terms transition state & intermediate 5
6. (a) Explain the formation of carbenes (any two methods) compare between structures of singlet & triplet carbenes. 5
- (b) On the basis of MOT explain energy level diagram of CO Molecule 5
- (c) What is geometrical isomerism? Explain the geometrical Isomerism in $[Pt Cl_2 (NH_3)_2]$ and $[Pt Br I (NH_3)_2]$ 5
- (d) Explain oxygen transfer bimolecular reaction containing Iron 5
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