SF-I sem III / R / 2014

SE (Chem) CBGS

Sub- EC-1

20 NOV 2014

Engineering Chemistry-I

QP Code : **14556**

(3 Hours) 26

[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 PCI_3 molecule on the basis of VSEPR theory. 20
(b) Explain the preparation and structure of $Fe_2(CO)_9$
(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? Compa e 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.

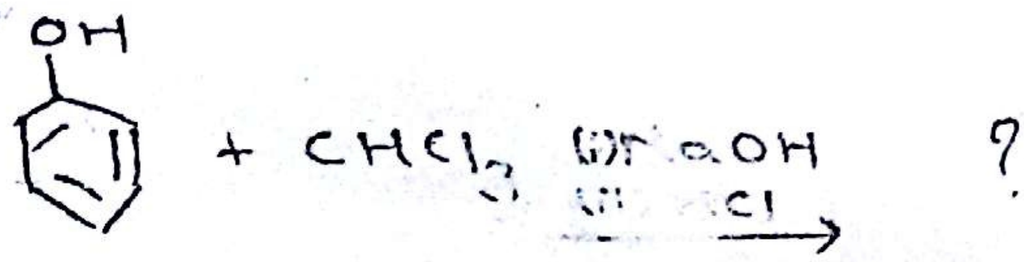
2. (a) Write IUPAC names of the following co-ordination compounds. 5
(i) $[Cu(NH_3)_4]^{2+}$
(ii) $[Pt(Cl)_2(NH_3)_2]$
(b) What is an Elimination reaction? Explain E_2 reaction with Mechanism 5
(c) Explain the applications of cytochromes. 5
(d) Differenciate between Bonding & Anti bonding Molecular orbitals 5

3. (a) Draw Molecular orbial diagram for N_2 molecule and comment on it's bond order & magnetic proporties. 5
(b) What is EAN? Calculate EAN of 5

$[Cr(NH_3)_6]^{3+}$

(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



(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 friedal craft alkylation reaction? Explain the Mechanism of the reaction. 5

5. (a) When Unsymmetrical pinacol (1,2 - diol) is treated with acid which hydrorly group will protonate? Explain wih 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 iso merism? 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
