2014

B.E. (Biotechnology), Second Semester
ASC-X01: Applied Chemistry
(Common with CSE, IT & Civil)

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. (a) Explain why π-σ^* and σ-π^* transition in electronic spectroscopy do not occur. [2]
    (b) Define catalytic promoter and catalytic inhibitor by giving one example each [2]
    (c) What is the difference between isotactic and syndiotactic polymer. [2]
    (d)) State the limitations of crystal field theory. [2]
    (e) Write different isomers of C_3H_6O considering it has a cyclic structure [2]

PART-A

2. (a) Calculate the bond order of N_2^- and CN^+ with MO diagram [4]

    (b) Calculate the CFSE and magnetic moment for $[Fe(H_2O)_6]^{3+}$, $[Ni(CN)_4]^{2-}$ [4]

    (c) Explain by taking at least one example to prove why valence bond theory is deemed to fail [2]

3. (a) Which of the following will show geometrical isomerism give reason. [3]

i)

ii)

iii)
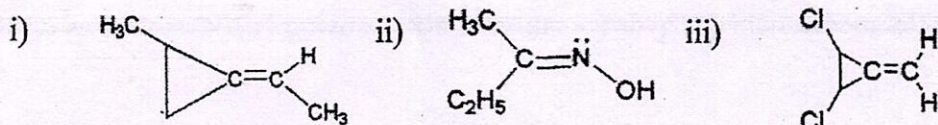
    (b) Define meso compounds [1]
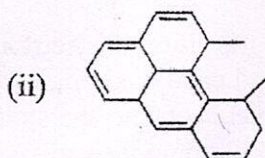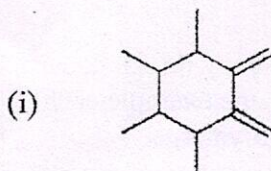   (c) Assign E, Z notation to the following compounds [4]

i)

ii)
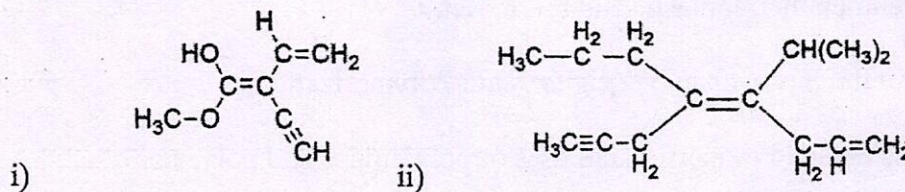
    (d) Draw the most stable conformer of the following compounds. [2]

(i)

(ii)
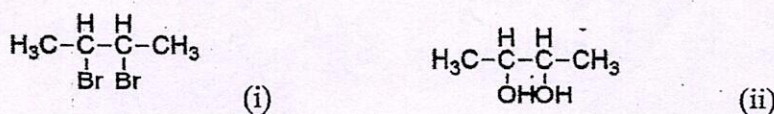
4. (a) Discuss the effect of the solvent on π-π^* and n-π^* transition.   [3]

(b) On the basis of IR spectroscopy, how can you distinguish between the following:
(i) Alkane, alkene and alkyne (ii) Aldehyde and ketone   [3]

(c) Calculate the λ_{max} for the following compounds

(i)   (ii)   [4]

PART-B

5. (a) The heat of solution of ammonia at 25 °C was found to be -11.04 kcal. Calculate the heat of solution at 348K. Given that the heat capacity of N_2, H_2 and NH_3 are 6.80,6.77 and 8.86 cal/degree/mol respectively.   [3]

(b) Explain the working of Carnot cycle. How it is used to calculate the efficiency of an heat engine.   [4]
(c) Derive Gibbs-Helmholtz equation w.r.t.to Gibb's free energy.   [3]

6. (a) Write the mechanism for hydrogenation of alkene using Ni/Pd as well as willinson's catalyst .   [5]

(b) Derive Michaelis-Menton's equation for enzyme catalysis. When the reaction rate is of first order ?   [5]

7. (a) Differentiate thermoplastic and thermoset.   [2]

(b) Explain the mechanism of Zeigler Natta Polymerization.   [3]

(c) Discuss detailed properties and uses of polyamides and polyester   [5]

x-x-x