

2031
B.E. (Mechanical) First Semester
ASC-X01: Applied Chemistry
(Common with ECE and EEE)

Time allowed: 3 Hours

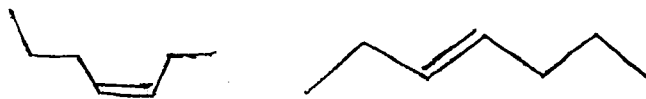
Max. Marks: 50

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

x-x-x

I. Answer the following briefly:-

- Write molecular orbital electronic configuration of N_2 molecule.
- Is $[-CH_2 = CH(C_6H_5)-]_n$ a homopolymer or copolymer?
- Write the function of catalytic promoter and catalytic poison in a chemical reaction.
- Write two applications of molecular spectroscopy.
- What is the relationship between absorbance and transmission?
- Stereoisomers which are not mirror image isomers are called.....
- Which isomerism is shown by following molecules



- State thermodynamic conditions for the process to occur spontaneously.
- Mention the most important condition for a process to be reversible in thermodynamics.
- Give the number of unpaired electrons in Fe^{3+} in a weak octahedral field. (1x10)

UNIT - I

- How does molecular orbital theory explain the diamagnetic character of N_2 ?
 - What is the difference between an inner orbital complex and outer orbital complex? Discuss with one example each. (7,3)
- How will you distinguish the following types of compounds with the help of IR spectroscopy?
 - Alcohols and Aldehydes
 - Alkane nitrile and benzonitrile (3)

P.T.O.

(2)

- b) Discuss the importance of IR region below 1500 cm^{-1} . (3)
- c) Discuss the various types of shifts possible in UV-Visible spectra. (4)
- IV. a) Draw the potential energy diagram for the various conformations of n-butane.
- b) How many asymmetric carbons are present in Ethyl-2,2,4-trimethylpentane? Indicate them. (7,3)

UNIT - II

- V. a) What is hydro formylation reaction and its main product. Name the catalyst for this reaction. Is there any difference between hydroformylation and oxo process?
- b) Explain the kinetics of enzyme catalysed reaction. (3,7)
- VI. a) Explain the mechanism of Ziegler Natta polymerization. Write its uses also.
- b) Discuss the structures of isotactic, syndiotactic and atactic polymers. (7,3)
- VII. a) The heat of reaction (ΔH) for the formation of NH_3 according to the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ at 27°C was found to be -91.94 kJ . What will be ΔH at 50°C . The average molar heat capacities at constant pressure and between 27°C and 50°C for N_2 , H_2 and NH_3 are 28.45 , 28.32 and 37.07 J , respectively.
- b) Calculate the entropy change in the melting of 1 kg of ice at 0°C . Heat of fusion of ice is 334.72 J/g . (7,3)

x-x-x