Roll No. | | | | | | | | | | | | | Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (AE/AI&ML/AI&DS/DS/AR/AE/CE/CSE/IOT/EEE/EE/ECE/ FT/IT/ME/ Robotics & AI/Internet of Things and Cyber Security including Block Chain Technology) (Sem–1,2)

CHEMISTRY-I

Subject Code : BTCH-101-18

M.Code : 75343

Date of Examination : 12-06-2023

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

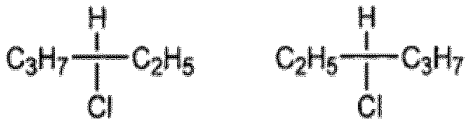
SECTION-A

1. Answer briefly :

a) Enlist the important features of crystal field theory.

b) Why ionisation energy of Nitrogen is higher than that of Oxygen?

c) Assign R/S configuration to the following :



d) Discuss Diel-Alder Reaction.

e) Calculate the number of signals for the following compounds:

i) CH_3-CH_2-O-CH_3

ii) CH_3-CH_2-CH_2-OH.

f) Name the various types of intermolecular forces with an example of each.

g) What type of molecules show IR Spectra?

h) How free energy decides the spontaneity of a process?

i) Which out of the conjugated dienes or non-conjugated dienes are more stable and Why?

j) Differentiate between dry and wet corrosion.

SECTION-B

2. a) Discuss the Schrodinger wave equation for particle in one dimensional box and relate important results from it.

   b) Differentiate between Bonding and Antibonding molecular orbital.

3. a) Explain Crystal field splitting in octahedral complexes.

   b) What is role of doping on Band structures?

4. a) Give important applications of UV-visible spectroscopy with proper examples.

   b) Explain chemical shift in NMR.

   c) Differentiate between Scattering and Diffraction.

5. a) How and why do real gases deviate from ideality?

   b) What do you mean by critical phenomenon in gases? How are critical constants related to vander Waal's constants?

SECTION-C

6. a) Derive Nernst Equation for the calculation of cell E.M.F.

   b) Using Ellingham Diagram to explain carbon monoxide is a suitable reducing agent for oxide ore.

7. **Write short notes on the following :**

   a) Polarizability

   b) Penetration of molecular orbitals

   c) Atomic radius

   d) Co-ordination number.

8. a) Draw all the stereoisomers of 3-chloro-2-pentanol

   $CH_3CH(OH)CHClCH_2CH_3$

   b) Give conditions for a compound to show enantiomerism.

   c) Define linkage Isomerism.

9. a) Compare SN_1 and SN_2 substitution reactions.

   b) **Write short notes on the following organic reactions :**

      i) Oxidation Reactions

      ii) Ring Opening Reactions

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.