

Oct. 2020

B.Tech - II SEMESTER

Chemistry (BSC102)

Time: 3 Hours

Max. Marks:75

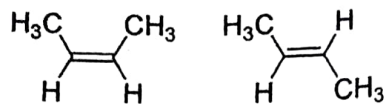
- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
  2. Answer any four questions from Part -B in detail.
  3. Different sub-parts of a question are to be attempted adjacent to each other.

**PART -A**

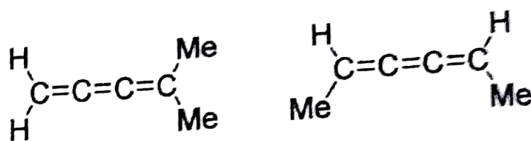
- Q1 (a) Briefly explain role of doping on band structure. (1.5)
- (b) What is schrodinger wave equation? (1.5)
- (c) Write down the principle of spectroscopy. (1.5)
- (d) Define the term fluorescence. (1.5)
- (e) What is the principle of rotational spectroscopy? (1.5)
- (f) Define and explain van Der Wals intractions. (1.5)
- (g) Define and explain the term corrosion. (1.5)
- (h) What is the role of inert pair effect on periodic properties of elements in periodic table. (1.5)
- (i) Define and explain briefly the term racemisation. (1.5)
- (j) Differentiate between elimination and condensation reactions giving suitable examples. (1.5)

**PART -B**

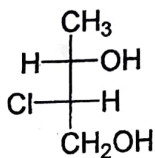
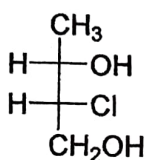
- Q2 (a) Define and explain the following terms : (10)
- (i) Selection rules
- (ii) Chemical shift
- (iii) MRI
- (iv) Diffraction
- (v) Crystal Field Splitting
- (b) Discuss the differences between vibrational and rotational spectroscopy. (5)
- Q3 (a) Write down the electronic configuration of O<sub>2</sub> molecule and draw molecular orbital energy level diagram for same. (10)
- (b) Draw Pi-molecular orbitals of 1, 3, 6-hexatriene. Also mention HOMO and LUMO. (5)
- Q4 (a) Indicate the following compounds as enantiomers/diastereomers/identical or none. (10)



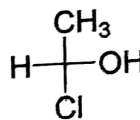
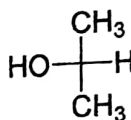
(i)



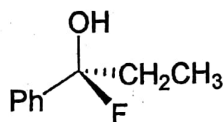
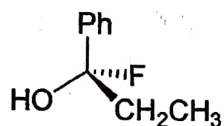
(ii)



(iii)



(iv)



(v)

(b) Derive the equation for particle in one dimensional box. (5)

Q5 (a) Write down three reducing and three oxidizing agents in organic synthesis. (5)

(b) Define the following terms : (10)

(i) Geometrical isomerism

(ii) Optical Activity

(iii) Absolute configuration

(iv) Fischer projection

(v) Chiral centre

Q6 (a) Define and explain the following terms : (10)

(i) Free energy

(ii) Entropy

(iii) HSAB concept

(iv) Effective nuclear charge

(v) Symmetry elements

(b) Draw well labeled Ellingham diagram. (5)

Q7 Discuss the various periodic properties of elements and their trends in groups and periods. (15)

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