[116] SEAT No._____ No. of Printed Pages : 02

Sardar Patel University

B. Sc. (Semester – V) Examination

Date: 23-11-2021, Tuesday Time: 03:00-05:00pm

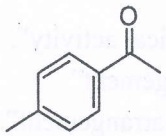
Industrial Chemistry

COURSE NO: US05CICH21 (Advance Organic Chemistry)

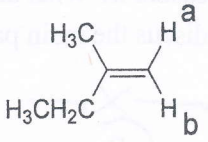
Notes: Figures to the right indicate full marks. Total marks: 70

Q.1 Answer the following Multiple-Choice Questions. (All are compulsory) (10)

1. Compounds which have different arrangements of atoms in space while having same atoms bonded to each other are said to have…
   A. Position Isomerism
   B. Functional Group Isomerism
   C. Chain Isomerism
   D. Stereoisomerism
2. Which of the following can make difference in optical isomers?
   A. Heat
   B. Temperature
   C. Polarized Light
   D. Pressure.
3. Hexane and 3-methylpentane are examples of…
   A. Enantiomers.
   B. Stereoisomers.
   C. Diastereomers.
   D. Constitutional Isomers.
4. Selenium dioxide is an important reagent for…
   A. Reducing
   B. Oxidizing
   C. Brominating
   D. Methylating
5. Sodium borohydride is an important reagent for…
   A. Reducing
   B. Oxidizing
   C. Brominating
   D. Methylating
6. What occurs when a molecule absorbs infrared radiation?
   A. It warms up
   B. It flies around
   C. It vibrates faster
   D. It emits light
7. Fingerprint region of IR spectrum indicates ….. type of vibrations.
   A. Stretching
   B. Bending
   C. Knocking
   D. Complex
8. In IR spectrum, absorption by triple bond between carbon is generally observed at…
   A. 4000-2500 cm^{-1}
   B. 2500-2000 cm^{-1}
   C. 2000-1500 cm^{-1}
   D. 1500-400 cm^{-1}
9. How many signals would you expect to see in the ^{1}H-NMR spectrum of the following compound?



   A. 6
   B. 4
   C. 5
   D. 3
10. The protons marked Ha and Hb in the molecule below are…



   A. Vicinal protons
   B. Geminal protons
   C. Isolated Protons
   D. Equivalent Protons

Q.2 Are the following statements. (All are compulsory) (08)

1. "Every pair of enantiomers consists of mirror images". True Or False?
2. "Every molecule containing one or more asymmetric carbons is chiral" True Or False?
3. "Homolytic cleavage of a carbon-carbon bond produces "Two carbonium ions" True Or False?
4. "Methyl" carbocation has the least stability than "Tert-butyl" carbocation. True Or False?
5. "Increase in conjugation leads to bathochromic shift in UV spectrum". True Or False?
6. "Virtually at UV analysis are carried out in liquid phase". True Or False?
7. "Chemical shift allows a chemist to obtain the idea of how atoms are joined together". True Or False?
8. "Elementary particles such as electrons and nucleus have the property of spin". True Or False?

Q.3 Answer the following short questions (Attempt Any 10 out of 12) (20)

1. State the necessary conditions for a compound to show Geometrical isomerism.
2. Define term "Specific rotation".
3. State the necessary conditions for a compound to show optical isomerism.
4. Write a reaction for "Baeyer Villiger Oxidation reaction".
5. Write a preparation and properties of "LiAlH4".
6. Write a preparation and properties of "N-Bromosuccinimide".
7. Which are the energy sources used for IR radiations?
8. Name the detectors used in IR spectroscopy.
9. Name various detectors used in UV spectrophotometer.
10. What are the characteristics of TMS?
11. Define term shielding and deshielding effects.
12. Why splitting of peak is observed in PNMR spectrum?

Q.4 Answer the following Long questions (Attempt Any 04) (32)

1. Describe R, S notations used in fixing the positions of groups in an optically active compound, with an example.
2. Write note on "Enantiomers and Optical activity".
3. Write note on "Benzilic acid Rearrangement"
4. Write note on "Pinacol-Pinacolone rearrangement".
5. Discuss an application of IR-Spectroscopy.
6. With diagrammatic representation, explain single beam and double beam spectrophotometer.
7. What is Chemical Shift? How to measure it? What are the factors affecting chemical shift?
8. Giving a principle of 1HNMR and discus the main parts of NMR spectrometer.