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**SARDAR PATEL UNIVERSITY**

Bachelor of Science (Semester 5) Examination 2025

US05CICH21: Advance Organic Chemistry

Date: 04-10-2025 (Saturday): 10 AM to 1.00 PM

Total: 70 Marks

Note: Figures to the right indicate full marks.

[10]

Q.1 Answer the following MCQs. (All are compulsory)

- Isomers which are non- superimposable mirror images are known as \_\_\_\_\_  
(a) Enantiomers (c) Diastereomers  
(b) Geometric isomers (d) Chain isomers
- How many chiral carbon presents in 2-bromobutane structure?  
(a) 0 (c) 2  
(b) 1 (d) 3
- Which instrument is used to determine optical activity of any compound?  
(a) Oscillator (c) Polarimeter  
(b) Refractometer (d) pH meter
- $\text{NaBH}_4$  is an important reagent for \_\_\_\_\_  
(a) Reducing (c) Brominating  
(b) Oxidizing (d) Methylating
- Diazomethane is an important reagent for \_\_\_\_\_  
(a) Reducing (c) Brominating  
(b) Oxidizing (d) Methylating
- The role of auxochromes in the depth of colour is \_\_\_\_\_  
(a) increases (c) decreases intensity  
(b) decreases (d) no effects
- Which spectroscopy is also termed as vibrational spectroscopy?  
(a) UV spectroscopy (c) MASS spectroscopy  
(b) IR spectroscopy (d) NMR spectroscopy
- How many  $^1\text{H}$  NMR signals does  $\text{CH}_3\text{OCH}_3$  show?  
(a) 4 (c) 2  
(b) 3 (d) 1
- Protons in same chemical environments are called...  
(a) nonequivalent protons  
(b) equivalent protons  
(c) Spin-Spin protons  
(d) germinal protons



(1)

(P.T.O.)

10. Which of the following is used as reference standard in NMR spectroscopy?
- (a) Tetramethylsilane
  - (b) Dimethylchlorosilane
  - (c) Dimethyl silapentane sulfonate sodium
  - (d) Squalene

**Q.2 Answer the following short question (Attempt 10 out of 12).**

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1. Describes chain isomers with suitable example.
2. Discuss stereoisomers of tartaric acid.
3. What is geometrical isomerism?
4. Write a reaction for Pinacol-Pinacolone rearrangement reaction.
5. Write are action for synthesis of  $\text{LiAlH}_4$ .
6. Write a reaction for synthesis of Aluminiumisopropoxide.
7. Define term 'Chromophores & Auxochromes'.
8. Enlist the name of detectors used in UV spectroscopy.
9. What are the normal modes of vibration in IR spectroscopy?
10. In  $^1\text{H}$ NMR spectrum of compound  $\text{C}_2\text{H}_6\text{O}$  shows one signal only, a singlet. Deduce the structure of it.
11. Describe Spin-Spin Coupling.
12. What are germinal protons?

**Q.3 Answer the following long question.**

[A]. Write a note on Polarimeter.

[10]

Or

[A]. Write a note on Mesocompounds.

[B]. Discuss Enantiomerism and Optical activity in details.

**Q.4 Answer the following long question.**

[A]. Discuss preparation and application of Osmium tetroxide.

[10]

[B]. Write a note on Pinacol-Pinacolone rearrangement.

Or

[A]. Write note on Benzoin condensation reaction reaction.

[B]. Write note on BaeyerVilliger oxidation reaction.

**Q.5 Answer the following long question.**

[A]. Write a note on principle, instrumentation and applications of IR spectroscopy.

[10]

Or

[A]. Write a note on detectors used in UV spectrophotometer.

[B]. Explain double-beam system of UV spectrophotometer.

**Q.6 Answer the following long question.**

[A]. Write a note on main part of  $^1\text{H}$  NMR spectroscopy.

[10]

Or

[A]. Write a note on Chemical Shift.

[B]. Discuss Spin-Spin Coupling.