

Organic Chemistry II (CHEM 202) IR and NMR Spectroscopy: Functional G

University of California, San Diego | CHEM 202 - Organic Chemistry II | Exam Review

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Overview

An exam review for CHEM 202 that builds confidence reading IR and ^1H NMR quickly: spot key functional groups, match common chemical shift patterns, and avoid classic misreads. This note helps students review IR functional group regions (O-H N-H C=O C $\equiv$ N), sp^2 vs sp^3 C-H stretch patterns and what they imply, ^1H NMR chemical shift ranges by environment with clear examples and study prompts.

Key topics

- IR functional group regions (O-H N-H C=O C $\equiv$ N)
- sp^2 vs sp^3 C-H stretch patterns and what they imply
- ^1H NMR chemical shift ranges by environment
- integration and splitting ($n+1$) with coupling notes
- strategy for combining IR and NMR into a structure

How to use it

- label 12 IR spectra with the most likely functional group
- predict ^1H NMR signals for 8 simple molecules
- use integration to choose between two candidate formulas in 6 questions
- solve 5 combined IR+NMR structure ID problems using a checklist
- write a one-page spectroscopy decision tree for exam day

Common mistakes

- calling every broad peak an alcohol without checking context
- ignoring integration and focusing only on chemical shift
- forgetting that symmetry reduces number of signals
- mixing up aldehyde and aromatic proton regions
- overusing $n+1$ rule when coupling is complex