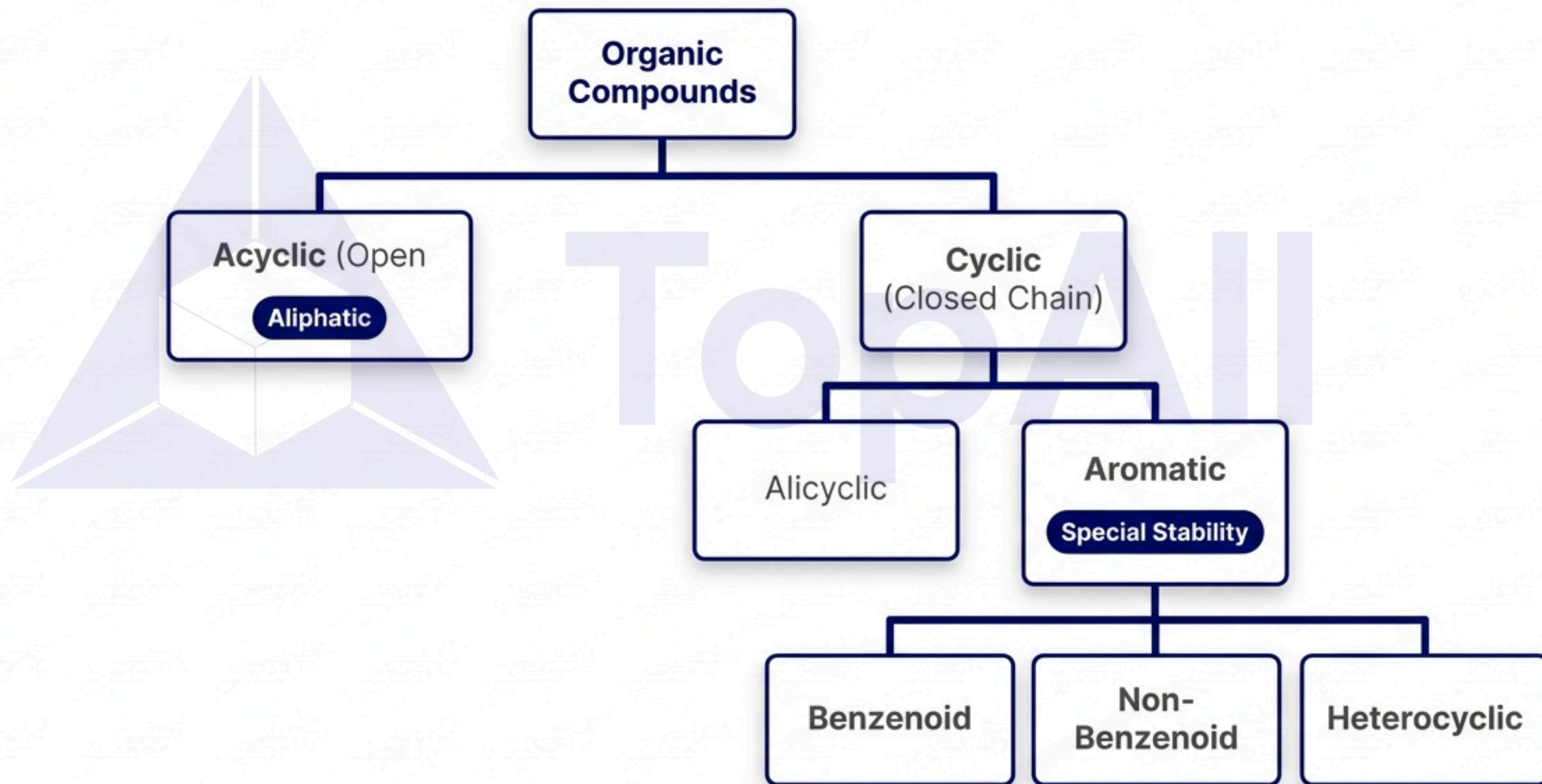


SECTION 8.4 MASTERCLASS

The Classification of Organic Compounds

A comprehensive, visual guide to mastering molecular taxonomy.

The Organic Chemistry Universe



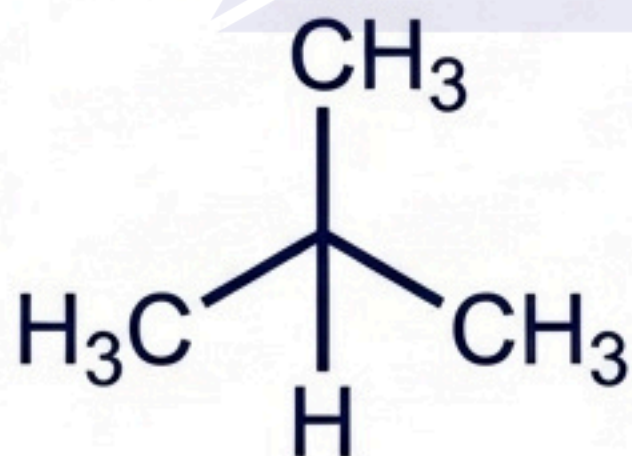
Acyclic vs. Alicyclic Compounds

Acyclic (Open Chain)

Molecules with straight or branched carbon chains. They exhibit aliphatic properties.



Ethane



Isobutane

Alicyclic (Closed Chain)

Molecules containing carbon atoms joined in a ring, yet behaving similarly to open-chain aliphatic compounds. Can be homocyclic or heterocyclic.



Cyclopropane



Cyclohexane



Tetrahydrofuran (THF)



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Defining Aromaticity

Aromatic compounds are defined by their special stability. They possess cyclic, highly unsaturated, and conjugated electron structures.



Benzenoid

Features standard benzene rings

Non-Benzenoid

Highly unsaturated rings without benzene

Heterocyclic

Aromatic rings with non-carbon atoms

Benzenoid vs. Non-Benzenoid Aromatics

Benzenoid Aromatics

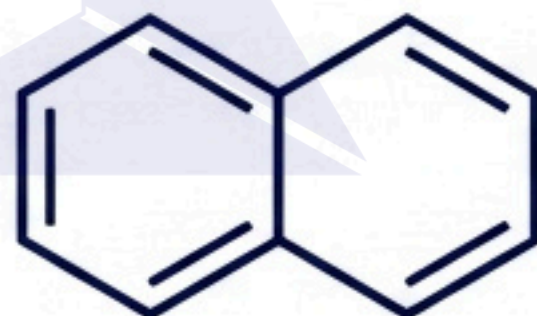
Must contain at least one standard 6-carbon benzene ring.



Benzene



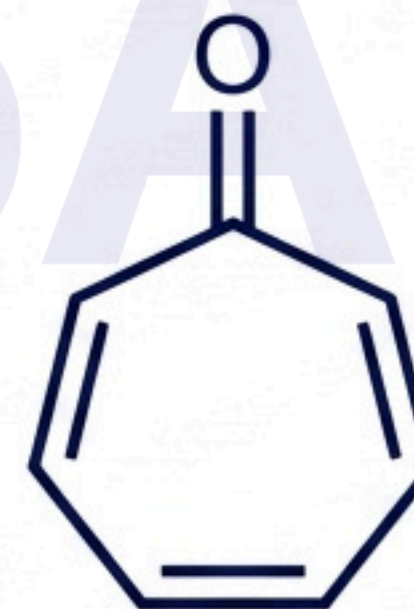
Aniline



Naphthalene

Non-Benzenoid Aromatics

Highly unsaturated, highly stable aromatic rings that do not contain the traditional 6-carbon benzene structure.



Tropone

Non-6-carbon
ring structure

Heterocyclic Aromatic Compounds

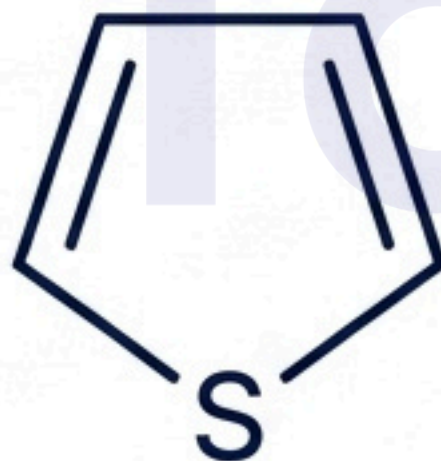
Rings where at least one Carbon atom is replaced by a "heteroatom" (Nitrogen, Oxygen, or Sulfur) while maintaining aromatic stability.

Furan



Oxygen (O) Heteroatom

Thiophene



Sulfur (S) Heteroatom

Pyridine



Nitrogen (N) Heteroatom

Key Takeaways & Exam Strategy

Open Chains (Acyclic)	Simple Rings (Alicyclic)	Aromatics
Rule: Look for straight/branched carbons. No rings. Anchor Examples: Ethane, Isobutane	Rule: Closed rings that behave like open chains. Check for heteroatoms without aromaticity. Anchor Examples: Cyclohexane, Tetrahydrofuran (THF)	Rule: Look for special resonance stability. Divide into Benzene-based, Non-benzene rings, or Heteroatom rings. Anchor Examples: Aniline (Benzenoid), Tropone (Non-benzenoid), Pyridine (Heterocyclic)

Exam Tip: Look for the ring type first, then check for heteroatoms and double-bond conjugation.



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