

JEE WEIGHTAGE: MEDIUM

UNIT 9 • AMINES

9.2 Classification of Amines

Mastering primary, secondary, and tertiary substitution patterns.

The Substitution Ladder



Ammonia | 0 H replaced

0%



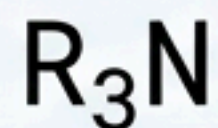
1° Amine | 1 H replaced

33%



2° Amine | 2 H replaced

66%



3° Amine | 3 H replaced

100%

Primary (1°) Amines

1°

1 R-group



2°

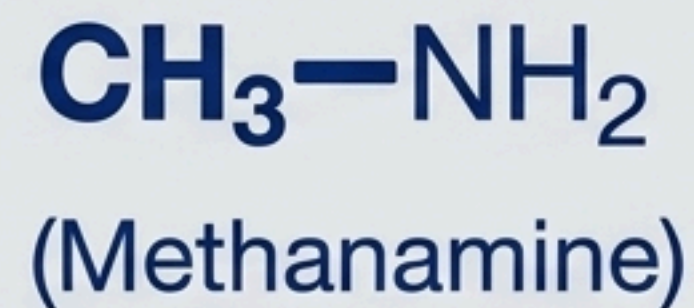
2 R-groups

3°

3 R-groups



One hydrogen atom of ammonia is replaced by an alkyl or aryl group.





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$$E=mc^2$$



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Secondary (2°) Amines

1°

1 R-group

2°

2 R-groups



3°

3 R-groups



Two hydrogen atoms of ammonia are replaced by alkyl or aryl groups.



Tertiary (3°) Amines

1°

1 R-group

2°

2 R-groups

3°

3 R-groups



All three hydrogen atoms of ammonia are replaced by alkyl or aryl groups.



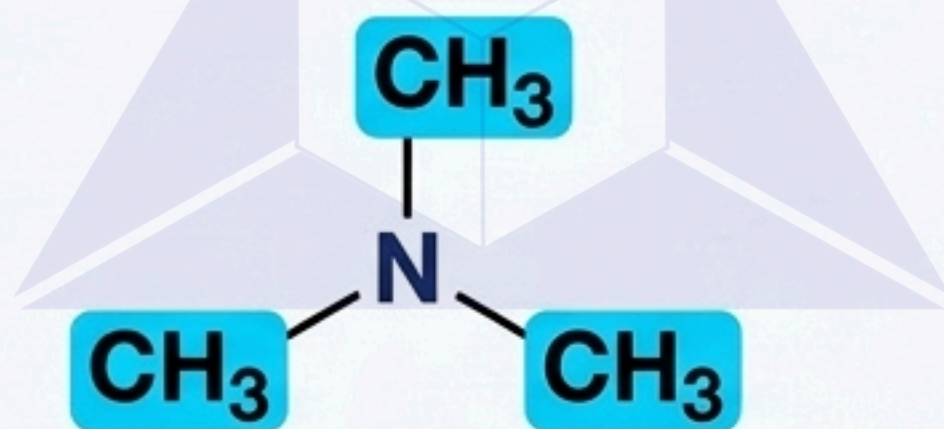
(N,N-Diethylethanamine)

Sub-classifying 2° & 3° Amines

Simple Amines

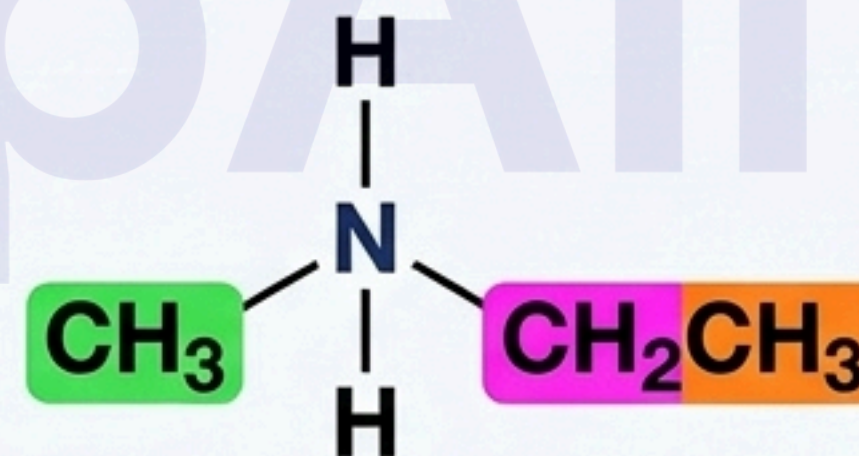
Mixed Amines

All attached alkyl/aryl groups are identical.



(CH₃)₃N
(Trimethylamine)

Attached alkyl/aryl groups are different.



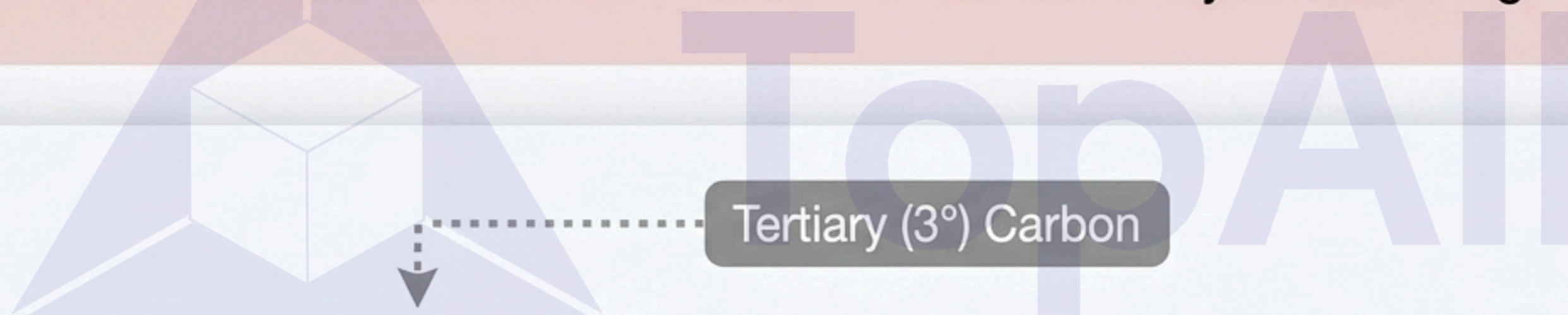
CH₃-NH-CH₂CH₃
(Ethylmethylamine)

JEE Trap Alert: The “Carbon Degree” Trap



Watch for this:

Do **not** classify amines by the degree of the attached carbon atom! Unlike alcohols or alkyl halides, amine classification depends strictly on the number of carbons attached directly to the Nitrogen.



Only **ONE** carbon attached to Nitrogen = 1° Amine

Key Takeaways

- **Amine classification** is based on **Nitrogen**, not Carbon. Count the number of **R or Ar groups** directly attached to the N atom.
- **1°, 2°, 3° hierarchy: Primary (RNH₂), Secondary (R₂NH), Tertiary (R₃N).**
- **Simple vs. Mixed:** 2° and 3° amines are **simple** if all attached groups are identical, and **mixed** if they vary.

You've mastered classification.
Now let's name them.

Try 9.3 Nomenclature next →



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