EngineeringRise

Alcohols and ethers: identification and dehydration

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Class of alcohol	carbon neighbours of carbinol C: 1 primary, 2 secondary, 3 tertiary	count
Lucas test	tertiary: at once; secondary: about 5 min; primary: none at room temperature Valid when: Lucas reagent (ZnCl2 in conc. HCl) at room temperature; alcohols up to about C6	time
Dehydration to alkene	ROH giving alkene + H2O (conc. H2SO4, 443 K) Valid when: excess conc. H2SO4 at about 443 K	1 mol alkene per mol alcohol
Dehydration to ether	2 ROH giving R-O-R + H2O (excess alcohol, 413 K for ethanol) Valid when: excess alcohol with H2SO4 at about 413 K; works for primary alcohols	1 mol ether per 2 mol alcohol
Ease of dehydration	tertiary > secondary > primary Valid when: acid-catalysed dehydration through a carbocation	n/a (order)
Zaitsev rule	major alkene has the most alkyl groups on the double bond; trans over cis Valid when: acid dehydration giving the stable alkene; check for carbocation rearrangement first	n/a (rule)
Alkyl group counts	C1 1, C2 1, C3 2, C4 4, C5 8	count
Isomers of C4H10O	4 alcohols and 3 ethers	count
Isomers of C5H12O	8 alcohols and 6 ethers	count

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/organic-compounds-containing-oxygen/alcohols-and-ethers-identificat

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