Alkanes: nomenclature, isomerism, conformations and halogenation

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

Result	Formula	Units or note
General formula of alkanes	CnH2n+2 Valid when: acyclic saturated hydrocarbons (no ring, no double bond)	dimensionless (counts)
Isomers of CnH2n+2	n = 4: 2; n = 5: 3; n = 6: 5; n = 7: 9 Valid when: structural isomers of acyclic alkanes only (no stereoisomers)	count
Product share in halogenation	share = (number of H x reactivity) / sum over all types Valid when: free-radical monohalogenation; per-hydrogen reactivities known	percent
Relative reactivity (Cl2, room temperature)	1 : 3.8 : 5 for primary : secondary : tertiary C-H Valid when: radical chlorination near room temperature, per hydrogen	dimensionless
Relative reactivity (Br2, about 400 K)	1 : 82 : 1640 for primary : secondary : tertiary C-H Valid when: radical bromination near 400 K, per hydrogen	dimensionless
Energy of a conformer	E = sum of eclipsing and gauche interaction energies Valid when: additive-interaction approximation; energy relative to most stable conformer	kJ per mole
Ethane eclipsed over staggered	about 12 kJ per mole (3 H/H eclipsing interactions) Valid when: ethane only; approximate value, relative to staggered form	kJ per mole
Overall enthalpy of a halogenation	sum(bonds broken) - sum(bonds formed) Valid when: gas phase, using average bond dissociation enthalpies	kJ per mole
Wurtz reaction	2 R-X + 2 Na (dry ether) gives R-R + 2 NaX; two different halides give 3 alkanes Valid when: alkyl halides with sodium in dry ether; best for identical R groups	dimensionless

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/hydrocarbons/alkanes-nomenclature-isomerism-conformations-and-ha

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