EngineeringRise

Phenols and carboxylic acids: acidity and reactions

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

Result	Formula	Units or note
Acid strength order	RCOOH > phenol > water, alcohols (water and the simple alcohols are close together; do not rank them against each other)	n/a (order)
Phenols with substituents	p-NO2 > m-NO2 > H > p-CH3	n/a (order)
Haloacetic acids	CCl3COOH > CCl2HCOOH > CClH2COOH > CH3COOH	n/a (order)
pKa	pKa = -log10 Ka; lower pKa is stronger acid Valid when: compare acids at the same temperature	dimensionless
Weak acid ionisation	alpha = square root of (Ka / C) when alpha is small Valid when: weak acid with small alpha, roughly under 5 percent ionised	dimensionless
Bromination of phenol (bromine water)	C6H5OH gives 2,4,6-tribromophenol (white precipitate) Valid when: excess bromine water at room temperature	3 mol Br per mol phenol
Nitration	dilute HNO3: o- and p-nitrophenol; conc. HNO3 + H2SO4: picric acid Valid when: dilute HNO3 gives mono, conc. HNO3 with H2SO4 gives tri	1 or 3 NO2
Reimer-Tiemann	phenol + CHCl3 + aq NaOH, then H+, giving salicylaldehyde Valid when: CHCl3 with aqueous NaOH, then acid	1 mol CHO per mol
Titration of acid	molar mass = mass / (V x c / basicity) Valid when: pure acid fully neutralised by NaOH; basicity of the acid known	g per mol

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/organic-compounds-containing-oxygen/phenols-and-carboxylic-acids-

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