EngineeringRise

Group 17 and 18 trends and unique behaviour

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

Result	Formula	Units or note
Valence electrons	group 17: ns2 np5; group 18: ns2 np6 (He 1s2) Valid when: neutral ground-state atoms; helium is the exception with 1s2	number = group - 10 (He: 2)
Electron gain (kJ mol^-1)	F -328, Cl -349, Br -325, I -295	kJ mol^-1
X-X bond dissociation	F2 158, Cl2 242, Br2 193, I2 151	kJ mol^-1
Standard potential X2 to 2X-	F2 2.87, Cl2 1.36, Br2 1.09, I2 0.54	V
Acid strength of HX	pKa: HF 3.2, HCl -7, HBr -9, HI -10	pKa units
IE1 of noble gases	He 2372, Ne 2081, Ar 1521, Kr 1351, Xe 1170, Rn 1037	kJ mol^-1
Enthalpy of X2 + 2e- to 2X-	dH = D(X-X) + 2 x EGE; F2 -498, Cl2 -456 Valid when: gaseous X2 and X- ; electron gain enthalpy per atom, so counted twice	kJ mol^-1
Oxidation number of O in OF2	x + 2(-1) = 0, x = +2 Valid when: neutral compound: oxidation numbers sum to zero, F is -1	no unit
First-element anomalies of F	weak F-F bond, EGE below Cl, weak acid HF, only -1 state	n/a (qualitative)

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/p-block-elements/group-17-and-18-trends-and-unique-behaviour

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