

# Atomic Number

The atomic number or proton number of a chemical element is the number of protons found in the nucleus of every atom of that element. The atomic number uniquely identifies a chemical element. It is identical to the charge number of the nucleus.

# Mass Number

The mass number, also called atomic mass number or nucleon number, is the total number of protons and neutrons in an atomic nucleus. It is approximately equal to the atomic mass of the atom expressed in atomic mass units

# Different Types of Atomic Species

Atomic species	Similarities	Differences	Examples
Isotopes (Soddy)	(i) Atomic No. (Z) (ii) No. of protons (iii) No. of electrons (iv) Electronic configuration (v) Chemical properties (vi) Position in the periodic table	(i) Mass No. (A) (ii) No. of neutrons (iii) Physical properties	(i) ${}^1_1\text{H}, {}^2_1\text{H}, {}^3_1\text{H}$ (ii) ${}^{16}_8\text{O}, {}^{17}_8\text{O}, {}^{18}_8\text{O}$ (iii) ${}^{35}_{17}\text{Cl}, {}^{37}_{17}\text{Cl}$

Isobars	(i) Mass No. (A) (ii) No. of nucleons	(i) Atomic No. (Z) (ii) No. of protons, electrons and neutrons (iii) Electronic configuration (iv) Chemical properties (v) Position in the periodic table.	(i) ${}_{18}^{40}\text{Ar}$ , ${}_{19}^{40}\text{K}$ , ${}_{20}^{40}\text{Ca}$ (ii) ${}_{52}^{130}\text{Te}$ , ${}_{54}^{130}\text{Xe}$ , ${}_{56}^{130}\text{Ba}$
Isotones	No. of neutrons	(i) Atomic No. (ii) Mass No., protons and electrons. (iii) Electronic configuration (iv) Physical and chemical properties (v) Position in the periodic table.	(i) ${}_{14}^{30}\text{Si}$ , ${}_{15}^{31}\text{P}$ , ${}_{16}^{32}\text{S}$ (ii) ${}_{19}^{39}\text{K}$ , ${}_{20}^{40}\text{Ca}$ (iii) ${}_{1}^3\text{H}$ , ${}_{2}^4\text{He}$ (iv) ${}_{6}^{13}\text{C}$ , ${}_{7}^{14}\text{N}$
Isodiaphers	Isotopic No. (N – Z) or (A – 2Z)	(i) At No., mass No., electrons, protons, neutrons. (ii) Physical and chemical properties.	(i) ${}_{92}\text{U}^{235}$ , ${}_{90}\text{Th}^{231}$ (ii) ${}_{19}\text{K}^{39}$ , ${}_{9}\text{F}^{19}$ (iii) ${}_{29}\text{Cu}^{65}$ , ${}_{24}\text{Cr}^{55}$
Isoelectronic species	(i) No. of electrons (ii) Electronic configuration	At. No., mass No.	(i) $\text{N}_2\text{O}$ , $\text{CO}_2$ , $\text{CNO}^{-(22e^-)}$ (ii) $\text{CO}$ , $\text{CN}^-$ , $\text{N}_2$ (14e-) (iii) $\text{H}^-$ , $\text{He}$ , $\text{Li}^+$ , $\text{Be}^{2+}$ (2e-) (iv) $\text{P}^{3-}$ , $\text{s}^{2-}$ , $\text{Ar}$ , $\text{K}^+$ and $\text{Ca}^{2+}$ (18e-)
Isosters	(i) No. of atoms (ii) No. of electrons (iii) Physical and chemical properties.		(i) $\text{N}_2$ and $\text{CO}$ (ii) $\text{CO}_2$ and $\text{N}_2\text{O}$ (iii) $\text{HCl}$ and $\text{F}_2$ (iv) $\text{CaO}$ and $\text{MgS}$

			(v) C6H6 and B3N3H6
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