

Fundamental constants

Quantity	Symbol	Value	Unit
Speed of light	c	299 792 458	m s ⁻¹
Permeability of vacuum	μ_0	$4\pi \times 10^{-7} =$ $12.566\ 370\ 614\dots \times 10^{-7}$	N A ⁻²
Permittivity of vacuum	ϵ_0	$1/\mu_0 c^2 =$ $8.854\ 187\ 817 \times 10^{-12}$	C ² m ⁻² N ⁻¹ or F m ⁻¹
Planck constant	h	$6.626\ 068\ 76 \times 10^{-34}$	J s
Electron charge	e	$1.602\ 176\ 462 \times 10^{-19}$	C
Electron mass	m_e	$9.109\ 381\ 88 \times 10^{-31}$	kg
Proton mass	m_p	$1.672\ 621\ 58 \times 10^{-27}$	kg
Avogadro constant	N_A	$6.022\ 141\ 99 \times 10^{23}$	mol ⁻¹
Faraday constant	F	96 485.3415	C mol ⁻¹
Boltzmann constant	k	$1.380\ 650\ 3 \times 10^{-23}$	J K ⁻¹
molar gas constant	R	8.314 472	J K ⁻¹ mol ⁻¹
atomic mass unit	u	$1.660\ 538\ 73 \times 10^{-27}$	kg

Source: *Physics Today* **55** BG6 (2002)

The unit 1 M is commonly used as an abbreviation for 1 mol dm⁻³.

1 cal = 4.184 J

The constants listed on this page and the periodic table will be available to students during the 35th IChO.

Periodic Table of the Elements

		1	2												13	14	15	16	17	18																
1	1	H 1.00794 -259.34 -252.87																			2	He 4.002602 -268.93														
2	3	Li 6.941 180.5 1342	4	Be 9.012182 1287 2471											5	B 10.811 2075 4000	6	C 12.0107 4440	7	N 14.00674 -210.00 -195.79	8	O 15.9994 -218.79 -182.95	9	F 18.998403 -219.66 -188.12	10	Ne 20.1797 -248.59 -246.08										
3	11	Na 22.989770 97.80 883	12	Mg 24.3050 650 1090											13	Al 26.981538 660.32 2519	14	Si 28.0855 1414 3265	15	P 30.973761 44.15 280.5	16	S 32.066 115.21 444.60	17	Cl 35.4527 -34.04	18	Ar 39.948 -189.35 -185.85										
4	19	K 39.0983 63.38 759	20	Ca 40.078 842 1484	21	Sc 44.955910 1541 2836	22	Ti 47.867 1668 3287	23	V 50.9415 1910 3407	24	Cr 51.9961 1907 2671	25	Mn 54.938049 1246 2061	26	Fe 55.845 1538 2861	27	Co 58.933200 1495 2927	28	Ni 58.6934 1455 2913	29	Cu 63.456 1084.62 2562	30	Zn 65.39 419.53 907	31	Ga 69.723 29.76 2204	32	Ge 72.61 938.25 2833	33	As 74.92160 614	34	Se 78.96 221 685	35	Br 79.904 -7.2 58.8	36	Kr 83.80 -157.36 -153.22
5	37	Rb 85.4678 39.31 688	38	Sr 87.62 777 1382	39	Y 88.90585 1522 3345	40	Zr 91.224 1855 4409	41	Nb 92.90638 2477 4744	42	Mo 95.94 2623 4639	43	Tc (98) 2157 4265	44	Ru 101.07 2334 4150	45	Rh 102.90550 1964 3695	46	Pd 106.42 1554.9 2963	47	Ag 107.8682 961.78 2162	48	Cd 112.411 321.07 767	49	In 114.818 156.60 2072	50	Sn 118.710 231.93 2602	51	Sb 121.760 630.63 1587	52	Te 127.60 449.51 988	53	I 126.90447 113.7 184.4	54	Xe 131.29 -111.75 -108.04
6	55	Cs 132.90545 28.44 671	56	Ba 137.327 727 1897	57	La 138.9055 918 3464	72	Hf 178.49 2233 4603	73	Ta 180.9479 3017 5458	74	W 183.84 3422 5555	75	Re 186.207 3186 5596	76	Os 190.23 3033 5012	77	Ir 192.217 2446 4428	78	Pt 195.078 1768.4 3825	79	Au 196.96655 1064.18 2856	80	Hg 200.59 -38.83 356.73	81	Tl 204.3833 302 1473	82	Pb 207.2 327.46 1749	83	Bi 208.98038 271.40 1564	84	Po (209) 254 962	85	At (210) 302	86	Rn (222) -71 -61.7
7	87	Fr (223) 27	88	Ra (226) 7000	89	Ac (227) 1051 3198	104	Rf (261)	105	Db (262)	106	Sg (263)	107	Bh (262)	108	Hs (265)	109	Mt (266)	110	Uun (269)	111	Uuu (272)	112	Uub (277)	113		114									
		Lanthanide series			58	Ce 140.116 798 3443	59	Pr 140.90765 931 3520	60	Nd 144.24 1021 3074	61	Pm (145) 1042 3000	62	Sm 150.36 1074 1794	63	Eu 151.964 822 1529	64	Gd 157.25 1313 3273	65	Tb 158.92534 1356 3230	66	Dy 162.50 1412 2567	67	Ho 164.93032 1474 2700	68	Er 167.26 1529 2868	69	Tm 168.93421 1545 1950	70	Yb 173.04 819 1196	71	Lu 174.967 1663 3402				
		Actinide series			90	Th 232.0381 1750 4788	91	Pa 231.03588 1572	92	U 238.0289 1135 4131	93	Np (237) 644	94	Pu (244) 640 3228	95	Am (243) 1176 2011	96	Cm (247) 1345 3100	97	Bk (247) 1050	98	Cf (251) 900	99	Es (252) 860	100	Fm (257) 1527	101	Md (258) 827	102	No (259) 827	103	Lr (262) 1627				

Atomic number, Symbol
Mean atomic mass (u)
Melting point (°C)
Boiling point (°C)