

Appendix F Tables

TABLE F-1

Color Conventions


















Displacement vectors (d)		Negative charges	
Velocity vectors (v)		Positive charges	
Acceleration vectors (a)		Current direction	
Force vectors (F)		Electron	
Momentum vectors (p)		Proton	
Light rays		Neutron	
Object		Coordinate axes	
Image			
Electric field (E)			
Magnetic field lines (B)			

TABLE F-2

Electric Circuit Symbols



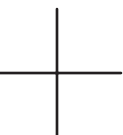





Conductor	Ground	Electric connection	No electric connection	Battery
Switch				
Fuse				
Capacitor				
Resistor (fixed)	Lamp	dc generator	Voltmeter	Ammeter
Potentiometer (variable resistor)				
Inductor				

TABLE F-3

Physical Constants

Quantity	Symbol	Value
Atomic mass unit	u	$1.661 \times 10^{-27} \text{ kg}$
Avogadro's number	N_A	$6.022 \times 10^{23} \text{ particles/mole}$
Elementary charge	e	$-1.602 \times 10^{-19} \text{ C}$
Constant in Coulomb's law	K	$8.988 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$
Gravitational constant	G	$6.673 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$
Mass of an electron	m_e	$9.109 \times 10^{-31} \text{ kg}$
Mass of a proton	m_p	$1.673 \times 10^{-27} \text{ kg}$
Planck's constant	h	$6.626 \times 10^{-34} \text{ J}\cdot\text{s}$
Speed of light in a vacuum	c	$2.998 \times 10^8 \text{ m/s}$

TABLE F-4

Physical Data

Quantity	Value
Absolute zero temperature	-273.15° C
Acceleration due to gravity	9.801 m/s^2
Earth-moon distance	$384 \times 10^3 \text{ km}$
Earth-sun distance (mean)	$149.6 \times 10^6 \text{ km}$
Earth radius (mean)	$6.38 \times 10^3 \text{ km}$
Heat of fusion of water	$3.34 \times 10^5 \text{ J/kg}$
Heat of vaporization of water	$2.26 \times 10^6 \text{ J/kg}$
Mass: Earth	$5.97 \times 10^{24} \text{ kg}$
Moon	$7.36 \times 10^{22} \text{ kg}$
Sun	$1.99 \times 10^{30} \text{ kg}$
Specific heat of water	$4180 \text{ J/kg}\cdot\text{K}$
Speed of sound in air (20° C)	343 m/s

TABLE F-5

Densities of Some Common Substances

Substance	Density at 20° C (g/cm^3)
Aluminum	2.70
Copper	8.96
Gold	19.32
Ice	0.99987
Iron	7.86
Lead	11.34
Silver	10.49
Ethyl alcohol	0.789
Mercury	13.534
Water (4° C)	1.000
Hydrogen	0.0000837
Oxygen	0.001331

TABLE F-6

The Elements

Element	Symbol	Atomic number	Atomic mass	Element	Symbol	Atomic number	Atomic mass
Actinium	Ac	89	227.028	Neodymium	Nd	60	144.24
Aluminum	Al	13	26.982	Neon	Ne	10	20.180
Americium	Am	95	243.061	Neptunium	Np	93	237.048
Antimony	Sb	51	121.757	Nickel	Ni	28	58.693
Argon	Ar	18	39.948	Niobium	Nb	41	92.906
Arsenic	As	33	74.922	Nitrogen	N	7	14.007
Astatine	At	85	209.987	Nobelium	No	102	259.101
Barium	Ba	56	137.327	Osmium	Os	76	190.2
Berkelium	Bk	97	247.070	Oxygen	O	8	15.999
Beryllium	Be	4	9.012	Palladium	Pd	46	106.42
Bismuth	Bi	83	208.980	Phosphorus	P	15	30.974
Bohrium	Bh	107	(262)	Platinum	Pt	78	195.08
Boron	B	5	10.811	Plutonium	Pu	94	244.064
Bromine	Br	35	79.904	Polonium	Po	84	208.982
Cadmium	Cd	48	112.411	Potassium	K	19	39.098
Calcium	Ca	20	40.078	Praseodymium	Pr	59	140.908
Californium	Cf	98	251.080	Promethium	Pm	61	144.913
Carbon	C	6	12.011	Protactinium	Pa	91	231.036
Cerium	Ce	58	140.115	Radium	Ra	88	226.025
Cesium	Cs	55	132.905	Radon	Rn	86	222.018
Chlorine	Cl	17	35.453	Rhenium	Re	75	186.207
Chromium	Cr	24	51.996	Rhodium	Rh	45	102.906
Cobalt	Co	27	58.933	Rubidium	Rb	37	85.468
Copper	Cu	29	63.546	Ruthenium	Ru	44	101.07
Curium	Cm	96	247.070	Rutherfordium	Rf	104	(261)
Dubnium	Db	105	(262)	Samarium	Sm	62	150.36
Dysprosium	Dy	66	162.50	Scandium	Sc	21	44.956
Einsteinium	Es	99	252.083	Seaborgium	Sg	106	(263)
Erbium	Er	68	167.26	Selenium	Se	34	78.96
Europium	Eu	63	151.965	Silicon	Si	14	28.086
Fermium	Fm	100	257.095	Silver	Ag	47	107.868
Fluorine	F	9	18.998	Sodium	Na	11	22.990
Francium	Fr	87	223.020	Strontium	Sr	38	87.62
Gadolinium	Gd	64	157.25	Sulfur	S	16	32.066
Gallium	Ga	31	69.723	Tantalum	Ta	73	180.948
Germanium	Ge	32	72.61	Technetium	Tc	43	97.907
Gold	Au	79	196.967	Tellurium	Te	52	127.60
Hafnium	Hf	72	178.49	Terbium	Tb	65	158.925
Hassium	Hs	108	(265)	Thallium	Tl	81	204.383
Helium	He	2	4.003	Thorium	Th	90	232.038
Holmium	Ho	67	164.930	Thulium	Tm	69	168.934
Hydrogen	H	1	1.008	Tin	Sn	50	118.710
Indium	In	49	114.82	Titanium	Ti	22	47.88
Iodine	I	53	126.904	Tungsten	W	74	183.85
Iridium	Ir	77	192.22	Uranium	U	92	238.029
Iron	Fe	26	55.847	Vanadium	V	23	50.942
Krypton	Kr	36	83.80	Xenon	Xe	54	131.290
Lanthanum	La	57	138.906	Ytterbium	Yb	70	173.04
Lawrencium	Lr	103	260.105	Yttrium	Y	39	88.906
Lead	Pb	82	207.2	Zinc	Zn	30	65.39
Lithium	Li	3	6.941	Zirconium	Zr	40	91.224
Lutetium	Lu	71	174.967	Element 110*	Uun		
Magnesium	Mg	12	24.305	Element 111*	Uuu		
Manganese	Mn	25	54.938	Element 112*	Uub		
Meitnerium	Mt	109	(266)	Element 114*	Uuq		
Mendelevium	Md	101	258.099	Element 116*	Uuh		
Mercury	Hg	80	200.59	Element 118*	Uuo		
Molybdenum	Mo	42	95.94				

*Names have not yet been approved by the IUPAC. Discovery of elements 114, 116, and 118 recently reported.

