Cheatography

Chem 111 Cheat Sheet

by JadeWatson via cheatography.com/20924/cs/3940/

Miscellaneous Formulas		
Area of a Circle	3.14r ²	
Volume	area x height	
Density	mass/volume	
% Composit ion of Element	[(#of atoms of element)x(atomic weight of element)]/formula weight of substance x 100	
% Yield	[(actual yield)/(theoretical yield)] x 100	
Molarity	(moles of solute)/(volume of solution in Liters)	
Effective Nuclear Charge	(atomic number) - (screening constant)	
Dipole Moment	Qr	
Bond Order	(# shared electrons) - (# nonbonding electrons))	
Pressure	(force) / (area)	
Pressure x Volume	nRT	
Density of Gas	mass / volume	
Density of Gas	(pressure x Molarity) / (R x temp.)	
Molarity of Gas	(density x R x Temperature) / pressure	
Vapor Pressure	-(change in Hvap) / RT + C1	

Activity Series Lithium Potassium Barium Calcium Sodium Magnesium Aluminium Manganese Zinc

Chromium

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Activity Series (cont)

lion
Cobalt
Nickel
Tin
Lead
Hydrogen
Copper
Silver
Mercury
Platinum
Gold
The higher up, the greater the ease of oxidation

Light Formulas	
The speed of light (c)	3.00 x 10 ⁸ ms
C =	(wavelenght) x (velocity)
Planck's Constant (h)	6.626 x 10 ⁻³⁴ J-s
E =	hv
Rydberg Constant (Rh)	1.097 x 10 ⁷ m ⁻¹
wavelength =	h / (mv)

Calories in Food	
Fat	8.8
Protein	4.1
Carbs	4.1

Intermolecular Forces			
Bond	Substan ce	Melting Point (K)	Boiling Point (K)
Covalent	Diamond	3800	4300
Metallic	Beryllium	1560	2742
lonic	Lithium Fluoride	1118	1949
Dispersion Force	Nitrogen	63	77

Intermolecular Forces (cont)

Dipole-Dipole Force	HCI	158	188
Hydrogen	HF	190	293

Metric System			
Prefix	Abbreviation	Meaning	
Peta	Р	10 ¹⁵	
Tera	т	10 ¹²	
Giga	G	10 ⁹	
Mega	М	10 ⁶	
Kilo	k	10 ³	
Deci	d	10 ⁻¹	
Centi	С	10 ⁻²	
Milli	m	10 ⁻³	
Micro	u	10 ⁻⁶	
Nano	n	10 ⁻⁹	

Temperature Conversions			
Celsius to Kelvin	K = C + 273.15		
Kelvin to Celsius	C = K - 273.15		
Celsius to Fahrenheit	F = 9/5(C) + 32		
Fahrenheit to Celsius	C = 5/9 (F) - 32		

Laws	
Law of Constant Competit ion	-French Chemist, Joseph Louis Proust (1800):the elemental composition of a compound is almost always the same
Law of Conserv ation of Mass	The total mass of substances present at the end of a chemical process is the same as the mass of substances present before the process took place

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Energy Formulas			
Kinetic Energy (Ek)	1/2mv ²		
Potential Energy (Eel)	(kQ1Q2)/d		
Work	force x distance		
Work	-Pressure x (change in Volume)		
Internal Energy	E(final) - E(initial)		
Enthalpy (H)	(internal energy) + (pressure x volume)		
Enthalpy of Reaction	H (products) - H (reactants)		
Specific Heat	(heat transferred) / (mass x change in temp.)		
Change in Enthalpy	m x s x (change in T)		
Lattice Energy	K [(Q1Q2) / d]		

Exceptions to the Octet Rule

- ions or molecules have an odd number of electrons

- ions or molecules with less than an octet
-ions or molecules with more than 8 valence
electrons

Conversions	
1 amu	1.66054 x 10 ⁻²⁴ g
Grams to Moles	divide by formula weight
Moles to Grams	multiply by formula weight
Moles to Molecules	multiply by 6.022 x 10^{23}
Molecules to Moles	divide by 6.022 x 10 ²³

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Magnetic Quantum Number		
n	I .	m1
1	0	0
2	0	0
-	1	1, 0, -1
3	0	0
-	1	1, 0, -1
-	2	2, 1, 0, -1, -2
4	0	0
-	1	1, 0, -1
-	2	2, 1, 0, -1, -2
-	3	3, 2, 1, 0, -1, -2, -3

The Scientific Method

-hypothesis: tentative explanation -theory: an explanation of the general causes of

phenomena -scientific law: a concise law that summarizes something

-mass: a measurement of the amount of material in an agent

SI Units		
Physical Quantity	Name of Unit	Abbreviati on
Mass	Kilogram	kg
Length	Meter	m
Time	Second	s or sec
Tempertature	Kelvin	К
Amount of Substance	Mole	mol
Electric Current	Ampere	amp or A
Luminous Intensity	Candela	cd

States of Matter		
Liquid	Gas	Solid
assumes shape	assumes	retains
of the portion of	volume and	own
container it	shape of	shape
occupies	container	and
		volume

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Linear	2 / 0	Linear
Trigonal Planar	3 / 0	Trigonal Planar
	2 / 1	Bent
Tetrahedral	4 / 0	Tetrahedra
	3 / 1	Trigonal Pyramid

Bonding /

Nonbondi

ng

States of Matter (cont)

expands to

container

compressi ble

flows

readily

diffusion

occurs

rapidly

fill

is

does not

container

is virtually

incompressible

does not flow

diffusion occurs

Molecular

Geometry

extremely

slowly

expand to fill

does not

container

is virtually

incompressible

flows readily

occurs slowly

Molecular Shapes

Electron -

Domain

diffusion

Steric

#

2

3

4

expand to fill

		2/2	Bent
5	Trigonal Bipyramida I	5/0	Trigonal Bipyramida I
		4 / 1	Seesaw
		3 / 2	T-shaped
		2/3	Linear
6	Octahedral	6 / 0	Octahedral
		5 / 1	Square Pyramidal
		4 / 2	Square Planar

Steric # = (# of bonds) - (nonbonding electron pairs)

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Metals vs. Nonmetals	
Metals	Nonmetals
shiny luster, various colors, more silvery	no luster, various colors
solids are malleable, ductile	solids are brittle, some hard, some soft
good conductors of heat and electricity	poor conductors of heat and electricity
most oxides are ionic, most solids are basic	most oxides for acidic solutions
tend to form cations in aqueous solutions	tend to form anions or oxyanions in aqeuous solutions

Strong Bases and Acids

Strong Acids	Strong Bases
HCI	LiOH
HBr	NaOH
HI	КОН
HCIO3	RbOH
HCIO4	CsOH
HNO3	Sr(OH)
H2SO4	Ba(OH2)



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