

Exam 1			Exam 1 (cont)			Exam 1 (cont)			Exam 1 (cont)		
Kelvin to Celsius	$K = C + 273$		electrostatic energy	$E_{el} = \frac{Q_1 Q_2}{d}$	Q1 and Q2: product of charges; d: distance between charges	energy (hv) of a photon used to eject electrons from a metal surface via the photoelectric effect is equal to the sum of kinetic energy of the ejected electron (Ek) and the work function (W)	hv = Ek + W	Ek = hv - W	difference in energy between two quantum states	$E = hv = -2.18 \times 10^{-18} \text{ J} \left(\frac{1}{n(f)^2} - \frac{1}{n(i)^2} \right)$	
Fahrenheit to Celsius	$F = \frac{9}{5}C + 32$										
density	$d = m/V$	SI: kg/m^3 , g/mL or g/cm^3 commonly used									
moles to atoms and molecules	1 mole = 6.022×10^{23} atoms or molecules		joule	1 J = $1 \text{ kg} \times \text{m}^2/\text{s}^2$	1 J = 1 N x m	wavelength of emitted/absorbed light	1/wavelength = $1.097 \times 10^7 \text{ m}^{-1} \left(\frac{1}{n(f)^2} - \frac{1}{n(i)^2} \right)$		energy of an electron with a given quantum state	$E_n = -2.18 \times 10^{-18} \text{ J} \left(\frac{1}{n^2} \right)$	
moles to grams	1 mole = atomic mass (g)	1 mole = formula mass (g)	speed, wavelength, and frequency	$c = (\text{wavelength}) \times (\text{frequency})$	c: speed of light - $3.00 \times 10^8 \text{ m/s}$; wavelength: in meters; frequency (v): in s^{-1} or Hz	when an electron transitions from one quantum state to another			wavelength of emitted/absorbed light	$1/\text{wavelength} = 2.18 \times 10^{-18} \text{ J/hc} \left(\frac{1}{n(f)^2} - \frac{1}{n(i)^2} \right)$	
grams to atoms or molecules	atomic mass (g) = 6.022×10^{23} atoms	formula mass (g) = 6.022×10^{23} molecules	energy of a photon	$E = hv$	$h: 6.63 \times 10^{-34} \text{ J} \times \text{s}$; v : frequency in s^{-1} or Hz				de broglie wavelength	wavelength = h/mu	m: mass of particle in kg; u: velocity of the particle in s^{-1} or Hz
avagadro's number	6.022×10^{23} moles										
kinetic energy of a moving object	$E_k = \frac{1}{2} mu^2$	u: velocity									



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Published 13th December, 2022.
Last updated 13th December, 2022.
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Exam 4 (cont)			Exam 4 (cont)			Exam 4 (cont)			Exam 4 (cont)		
average	$u^2 =$	$u^2:$	comparing	$Urms(1)/Urms(2) =$		pressure	$P =$	SI unit of	SI unit of pressure	$P =$	pressure
kinetic	uN^2/N	average	number of	square root of molar			force/area	force:	(Pa, 1 Pa = 1 N/m ²)		of a
energy of		speed for	values of	mass (2)/molar				Newton			fixed
a group of		all the	molecules	mass (1)				(1 N =			amount
gas		molecules in						1kg x			of gas at
molecules		in the	different					m/s ²)			constant
		sample; mean	gas			pressure	$P = hdg$	P:	h:	d:	g: temper-
		square	samples			exerted		pressure	height	density	ature is
		speed	graham's	rate =	rate of	by a		in Pa	of	of fluid	inversely
			law	1/square	diffusion	column			column	in	proport-
			T:	root of	or	of fluid			in	kg/m ³	ional to
total	$E_k = 3/2$	R: 8.314	temper-	molar	effusion				meters	9.80665	the
kinetic	RT	J/K x mol	ature in	mass	is					m/s ²	volume
energy of			Kelvin		inversely						of the
one mole					proport-						gas
of any					tional to						
gas					the						
root-m-	$Urms =$	R: 8.314	molar		square						
ean-sq-	square	J/K x mol	mass in		root of						
uare-	root of		kg/mol		the						
speed	$3RT/\text{molar}$				molar						
	mass				mass						



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Exam 4 (cont)			Exam 4 (cont)			Exam 4 (cont)			Exam 4 (cont)		
charles law	$V_1/T_1 = V_2/T_2$	volume of a fixed amount of gas at constant pressure is directly proportional to the absolute temperature of the gas	avogadros law	$V_1/n_1 = V_2/n_2$	volume of a sample of gas at constant temperature and pressure is directly proportional to the number of moles in the sample	ideal gas equation	$PV = nRT$	R: 0.08206 L x atm/K x mol	T partial pressure	P total = sum of partial pressures	
						density of a gas	$d = P(\text{molar mass})/RT$	molar mass in kg/mol	R: amount of reactant consumed	n = P x (V/RT) at constant volume and temperature	n: number of moles consumed
						molar mass of a gas	molar mass = dRT/P	R: 0.08206 L x atm/K x mol	molar mass: in kg/mol	P total = P O ₂ + P H ₂	
						van der waals equation	$(P + \frac{a^2}{V^2})(V - nb) = nRT$	a and b depend on the element	pressure over water		
			combined gas law	$P_1V_1/n_1T_1 = P_2V_2/n_2T_2$		compressibility factor	$Z = PV/RT$				



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