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3.1 THERMAL CONCEPTS

THE PARTICLE MODEL OF MATTER.

	gases
Polida apicillar est boliquido	inter-particle
Grande inin Grandes are	forces are
able to move	negligible !!
Backet a constant	significant
Can 7 Das below bonds	force exists
he haggin them:	between only.
enough such that	particles during
they cannot move	collisions.
far away.	

TEMPERATURE:

LA measure of the average kinetic energy of the particles of a substance

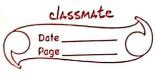
The direct proportionality between temperature a the average kinetic energy is only true for the absolute or the Kelvin scale.

T(K) = T(°C) + 273

The magnitude of a kelvin scale is the same as that of a degree celsius.

Measuing Temperature - Thermometer.

The themometer is kept in contact with the body whose temperature is to be measured



=	A Harris transferred
_	A thermal interaction takes place. Energy is transferred
	until thermal equilibrium is rattained in land at to
_	HEAT -> Energy that is transferred from one body to another
_	HEAT - chergy that is every in temperatures.
	as a result of difference in temperatures.
_	Heating increasing increases the internal energy of a body.
_	heating increasing
	total random kinetic energy
	entres tool to visit home of the particles
	· Alle + me at equilibrium is reneted temperature
	Increasing seperation of him interpallicle potential
	requires work to be done requires work to be done
	This working is into increasing in and in the interesting in a second in the interesting in the interesting in the interesting in the interesting in a second in the interesting in the in
	the potential energy of the particles. Intalination
	· Alex traismed equilibrium is reached the final
	Specific heat capacity (c) is the energy required to
	increase the temperature of a unit mass of a body
	by one kelvin. brown I told
	Q=mcAT) 1 MILLER MARCH
	We en
	LATENT HEAT:
	Heat supplied does work on particles to increase seperation
	so there is a gain in Ep not Ex, so temperature is
	constant.
-	Production of the second
	Latent Heat is the amount of energy required to change
	the phase of a unit mass at constant temperature
4	I pay of pasticles in our mar is 6.022 × 10-22 (Ma).
	· Q= mulling (1 as out milt
	V V

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	in repeation
61	Ly > LF: Because the increase in seperation
	from liquid to vapous than from solid to
anton	tiquid. So more work is required to a chieve
	the greater seperation q therefore more energy
	is required.
mhad s	The state of the s
	Method of Mintures (to measure specific heat
nnini	III CADA CITY) AND LATORS
• 3	A and die Dut in a container of hot water.
•	Attas therena a landitum is reactive,
	lice hornvoled as the solid is transfer an
ticles	a colorinaltie of known temperature of
	I specific heat capacity. It contains water
	is insulated. while of the lines
•	After thurnal equilibrium is reached, the final
	temperature is noted.
1.)	increase the temperature of a unit mark of a but
U	Elost = Egained.
	3.2 MODELLING A GAS:
	MOLE:
	One mole of a substance is a quantity of the
v611	substance that contains a number of particles
, , , ,	equal to the Avagadro constant (6.023 x 10-23)
	a whose mass in grams is equal to the molar
The state of	mais of the substance.
2020	a rat be important of property of the second
C	If a substance contains N particles by the
	no. of particles in one mole is 6.023×10-23 (NA),
1	Her the hot o moles is:
	$n = \frac{N}{NA}$
	✓ Just Ask

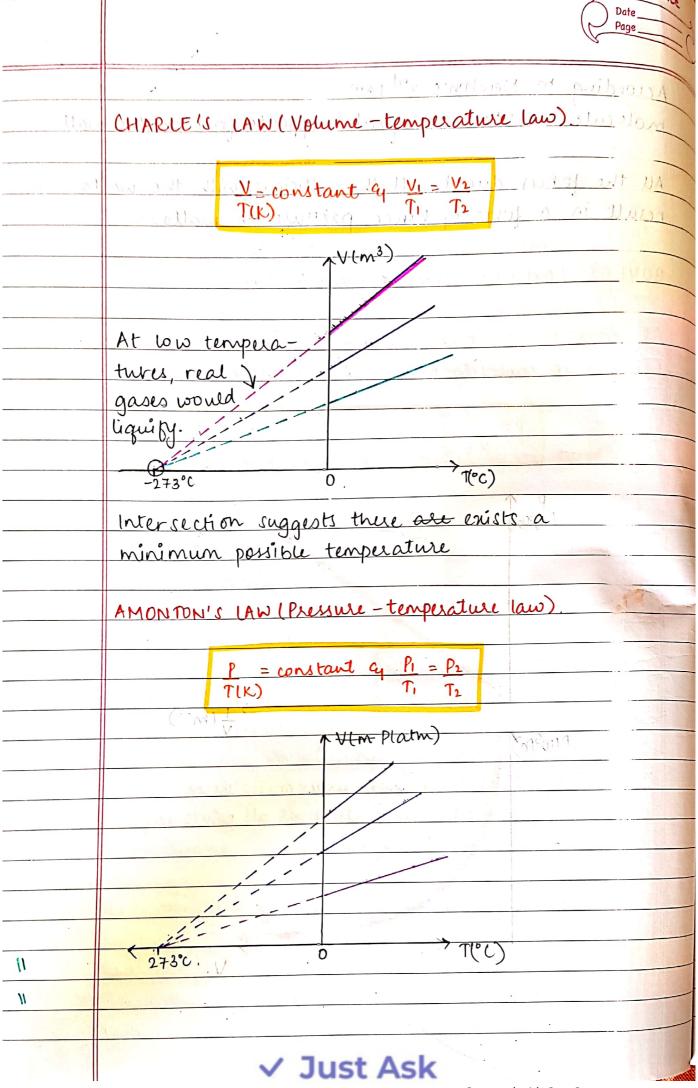
	Atomic mass unit: 1/12 of the mass of one anot ration of (u) carbon-12.
	Atomics moutin is Day Assertable of the X south
	Atomic man (in u) & Augrams of 2x
	for monoatomic substances, I mole of the substance - quantity
	of substance vohose mass in grans is atomic mass.
	relations had only and in program of it or tea
	Molae mass For monoatomic rubstances
the e-	For molecules -> sum of atomic masses of the atoms making
	up the molecule (co2 = 12+(2x16) = 44gm)
	Christian A
	The no. of moles in a quantity of m grams of a substance
-	with molar mass in is:
_	$\binom{n = m}{\mu}$
-	Mark as the same of the same o
_	
_	PRESSURE: normal force applied per unit area.
_	
	P = F
	2 1
	IDEAL GAS -> Theoretical model of a gas.
	Assumptions:
	• All molecules are point particles Molecules have a range of
-	with negligible volvine. speeds of move randomly.
-	The duration of collisions are negligible compared
_	They obey laws of to the time between collisions.
	mechanics is so I result a source to sell tray all so
	there are no forces between molecules.
	= except when they collide.
	the conficient are
	etastic (with each other quall).
1	-) (no lots at (a))

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Ja 20 11	An ideal gas cannot be liquified or solidified.
	REAL GAS
•	There are always forces between molicules leven
Tig 1000	when they are not in contact) is indicated in
•	A real gas will behave like an idual gas
	when the density is low (so that molecules
	are far apart with negligible inter-molecular
	forces between them) a when the temperature
	is not too low lother wise the gas might liquipy
	or solidify).
3 KM C COMPRE	the record meterine of quartity of married ex
	A real gas may be approximated by an ideal
	gas at:
1. . 2.	low pressure low density
v.	High temperature
	High svolumen no britage and to myon super it
	<u> </u>
	<u></u>
	D=W1000
	Š Š
	ing of the distribution of the said of the
	· And it was the
	D== boy(019 V
4 ''	P=-mvcas 0
1 ,	Δp= 2mvcos 0
	The fact that momentum has changed means
1	that a force acted on the molecule (from
	the wall.
	V Tuet Ack



	According to Newton's 3rd Law:
	molecule exerted an equal & opposite force on the wall
	All the forces due to all the collisions with the walls
	result in a force of hence pressure on walls.
	BOYLE'S LAW (The pressure - volume Law)
	At constant temperature q with a fixed quantity of gas. pressure is inversely proportional to volume, that is.
	pressure is inversely proportional to volume, that is.
	100 May 100 Ma
	$P \propto I$ or $PV = constant$ or $P_1 V_1 = P_2 V_2$.
	(5°)7 (°C)
	(105m) tries and through to the most
	minimum pruis temperature
	Carrie Contract of
	$\frac{1}{V}(m^{-3})$
	P (105Pa)
	isothermal curve or isotherm
- 4	the temperature at all points is
	the same).
	V. 5846
	V ·
	/ T A - I -





	STATE OF AN IDEAL GAS EQUATION.
	PV = nRT) temperature in Kelvin.
	PV = NRT
	•
	no. of moles many many
	and a relax tobact a feet motion
	THE BOLTZMANN EQUATION.
	it is a mark in the token to market
	3 The speed at the peak
_	T=100k represents the most
	T= 300k molecules.
	For a system to project of the way was 3
	Nove a restoring the same of E. 3.
	La jard the bright the cott of E
	remarks the en wither partien
	(21m) Norm it is displaced.
	Boltzmann's Constant:
pro libert of	$\Gamma V = 2\Gamma V$. $\Gamma V = 2\Gamma V$
	$\frac{2 Na}{NA} = \frac{R}{NA} = \frac{1.36 \times 10^{-23} \text{ J K}^{-1}}{1.36 \times 10^{-23} \text{ J K}^{-1}}$
7	The diffusion property.
	This expression can be used to
	Ex = 3 kg. Ty for the internal energy of an 2 videal gast since molecules of
	rideal gast since molecules of
	an ideal gas don't
	Suppose a gas has N molecules, have potential energy.
	U=3 N. RITA U=3/n/RITA DA horiza and all 20 Milyan with a trating my in horizon with all
	26 Milando est partiration primary of bridge with of
	work with the strain was the sipp of the
	oss cive o wine two more of time time.
	Le there is fived equilibrium position
	✓ Just Ask