IMPORTANT FORMULAE

EXPANSION	Unit
* Linear Momentum $p = mv$	$m \rightarrow$ mass $v \rightarrow$ velocity	$kgms^{-1}$
* Moment of force $\tau = f \times d$ τ (Tow)	$F \rightarrow$ force $d \rightarrow$ distance	Nm
* Moment of Couple $M = F \times S$	$F \rightarrow$ force $S \rightarrow$ displacement	Nm
* Newton's II law $F = ma$ where $a = \frac{v-u}{t}$ $u \rightarrow$ initial velocity $v \rightarrow$ final velocity $t \rightarrow$ time	$F \rightarrow$ force $m \rightarrow$ mass $a \rightarrow$ acceleration	$kgms^{-2}$ acceleration unit $\rightarrow ms^{-2}$
* Conservation of linear momentum $m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$	$m_1, m_2 \rightarrow$ mass of two objects $u_1, u_2 \rightarrow$ initial velocity of two objects $v_1, v_2 \rightarrow$ final velocity of two objects.	-
* Gravitational force $G = \frac{Fr^2}{m_1 m_2}$	$F \rightarrow$ force $r \rightarrow$ distance bet two objects	Nm^2kg^{-2} 6.674×10^{-11}

* Acceleration due to gravity $g = \frac{GM}{R^2}$	G - Gravitational Constant M → Mass of the earth R → Radius of the earth	$R \simeq 6400 km$ $M = 5.972 \times 10^{24} kg$ unit = ms^{-2}
chapter 2 (1m) (P) * Snell's law $\frac{\sin i}{\sin r} = \mu$ $\mu = \frac{c}{v}$	μ - refractive index c → Velocity of light in vaccum ($3 \times 10^8 ms^{-1}$) v → Speed of light in medium	no unit
(P) * Lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$	f → focal length v - image distance u → object distance	f → m v → m u → m
* (1m) Magnification $= \frac{h'}{h} = \frac{v}{u}$ $m > 1$ → enlarged image $m < 1$ → diminished image	h' → height of the image h → height of the object v → image distance u → object distance	no unit
Lens Maker's formula $\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$	f → focal length μ → refractive index R_1 & R_2 → radii of curvature of the two faces of the lens.	
* Power of the lens (1m) (P) $P = 1/f$ Power of convex (+ve) concave (-ve)	f → focal length	unit of power - dioptre symbol (D) $1D = 1m^{-1}$

focal length of concave lens to rectify Myopia $f = \frac{xy}{x-y}$	$x \rightarrow$ object distance $y \rightarrow$ image distance	meter (m)
focal length of Convex lens to rectify hypermetropia $f = \frac{dD}{d-D}$	$d \rightarrow$ object distance D - image distance	m
Ch3 Boyle's law (Temp-const) $p \propto \frac{1}{V}$ (or) $pV = \text{constant}$	$P \rightarrow$ pressure $V \rightarrow$ volume	
Charles's law $V \propto T$ (at const. pressure) or $V/T = \text{const.}$	$V \rightarrow$ Volume $T \rightarrow$ Temperature	
Avogadro's law $V \propto n$ (or) $\frac{V}{n} = \text{constant}$	$n \rightarrow$ no of atoms or no. of molecules.	
Co-efficient of linear expansion $\frac{\Delta L}{L_0} = \alpha_L \Delta T$	ΔL - change in length $L_0 \rightarrow$ Original length $\Delta T \rightarrow$ change in temp. $\alpha_L \rightarrow$ co-efficient of	α_L - unit (K^{-1})

Co-efficient of cubical expansion $\frac{\Delta V}{V_0} = \alpha_V \Delta T$	ΔV - change in Volume V_0 - Original Volume ΔT - change in Temp. α_V - co-efficient of cubical expansion	K^{-1}
Co-efficient of ~~Areal~~ Areal expansion (Superficial) $\frac{\Delta A}{A_0} = \alpha_A \Delta T$	$\Delta A \rightarrow$ change in areal A_0 - Original Area ΔT - change in temp α_A - co-efficient of areal expansion	K^{-1}
Cha: 4 Current $I = Q/t$	Q - charge t - time	I - ampere(A) Q - Coulomb(C) t - second(s)
Potential difference. $V = W/Q$	V - Potential difference W - Work done Q - charge.	(V) - Volt (V) $W \rightarrow$ joule(J)
Ohm's law $V = IR$ (or) $\frac{V}{I} = R$	V - potential difference I - current R - resistance	$R \rightarrow$ ohm (Ω)
Resistivity $\rho = \frac{RA}{L}$	R - Resistance A - Area L - length	Ω m
Conductivity $\sigma = \frac{1}{\rho}$		~~Ω~~ mho^{-1}
Joule's law of heating $H = I^2Rt$ or $H = VIt$	$I \rightarrow$ current R - resistance t - time V - potential difference	J (joule)

Electric power $P = VI$	V - p.d I - current	watt
Electrical energy = power x time = P x t	P → power t → time	kWh
cha. 5 Velocity = d/t $V = n\lambda$ $n = \frac{1}{T}$	d - distance t - time V - Velocity n → frequency λ - wavelength T - time period.	ms^{-1} wavelength - metre frequency - hertz (H_z) Time period - Seconds
Speed of sound (echo) $v = \frac{2d}{t}$	d - distance t - time	ms^{-1}
% composition = $\frac{\text{Mass of substance}}{\text{Molecular mass of compound}} \times 100$		

No. of moles = $\frac{\text{Mass of the element}}{\text{Atomic mass of the element}}$

No. of moles = $\frac{\text{Number of atoms of the given element}}{\text{Avogadro's number}}$

Mass of a compound = $\frac{\text{Molecular mass} \times \text{no. of particles}}{\text{Avogadro's number}}$

No. of atoms of an element = $\frac{\text{Mass of the given element} \times \text{Avogadro's number}}{\text{Atomic mass of the element}}$

No. of molecules = $\frac{\text{Avogadro no.} \times \text{Given mass}}{\text{Gram molecular Mass}}$

No. of molecules of a compound based on volume = $\frac{\text{Give Volume of the Substance at STP}}{\text{Molar Volume at STP}}$

Solubility of the solute = $\frac{\text{Mass of the Solute}}{\text{Mass of the solvent}} \times 100$

Mass percentage of solute = $\frac{\text{Mass of the Solute}}{\text{Mass of the Solution}} \times 100$

[Where Solution = solute + solvent]

$$\text{Volume Percentage} = \frac{\text{Volume of the solute}}{\text{Volume of the solvent} + \text{Volume of the Solute}} \times 100$$

[where {Volume of the solvent + Volume of the Solute} = Volume of the solution]

Cha·10

$$p[H^+] = -\log_{10}[H^+]$$

$$p[OH^-] = -\log_{10}[OH^-]$$

$$pH + pOH = 14$$