YAKEEN NEET 2.0

2026

Units and Measurements

PHYSICS | Lecture - 01

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Todays Goal

- Vector ques practice
- Unit & measurement.

$$|\vec{A}+\vec{B}| = \sqrt{A^2+B^2+2AB\cos\theta}$$

$$|\vec{A}-\vec{B}| = \sqrt{A^2+B^2-2AB\cos\theta}$$

$|\vec{A}| = 2, \quad |\vec{B}| = 3$

Q. $|\vec{A}+\vec{B}| = \sqrt{2}\,|\vec{A}-\vec{B}|$

find angle b/w $\vec{A}$ & $\vec{B}$

Sol^n

$$\sqrt{A^2+B^2+2AB\cos\theta} = \sqrt{2}\sqrt{A^2+B^2-2AB\cos\theta}$$

$$4+9+2\times2\times3\cos\theta = 2\,(4+9-2\times2\times3\cos\theta)$$

$$13+12\cos\theta = 26-24\cos\theta$$

$$36\cos\theta = 13$$

$$\cos\theta = \frac{13}{36}$$

$$|\vec{A}+\vec{B}| = \sqrt{A^2+B^2+2AB\cos\theta}$$

$$|\vec{A}-\vec{B}| = \sqrt{A^2+B^2-2AB\cos\theta}$$

$|\vec{A}| = 2, \quad |\vec{B}| = 3$

Q. $|\vec{A}+\vec{B}| = \sqrt{3}\,|\vec{A}-\vec{B}|$

find angle b/w $\vec{A}$ & $\vec{B}$

Sol^n

$$\sqrt{A^2+B^2+2AB\cos\theta} = \sqrt{3}\sqrt{A^2+B^2-2AB\cos\theta}$$

Two vectors $\vec{A}$ and $\vec{B}$ are defined as $\vec{A} = a\hat{i}$ and $\vec{B} = a(\cos\omega t\,\hat{i} + \sin\omega t\,\hat{j})$ where a is a constant and $\omega = \frac{\pi}{6}$ rad s^{-1}. If $|\vec{A}+\vec{B}| = \sqrt{3}\,|\vec{A}-\vec{B}|$ at time $t = \tau$ for the first time, the value of τ, in seconds, is _____.

$A = a$
$B = a$

JM
NEET

$\sqrt{A^2+B^2+2AB\cos\theta} = \sqrt{3}\sqrt{A^2+B^2-2AB\cos\theta}$

$a^2+a^2+2a^2\cos\theta = 3(a^2+a^2-2a^2\cos\theta)$

$2a^2+2a^2\cos\theta = 6a^2-6a^2\cos\theta$

$8\cos\theta = 4$

$\cos\theta = \frac{1}{2}$ $\quad \theta = \frac{\pi}{3}, 60^\circ$

$\vec{A}\cdot\vec{B} = AB\cos\theta$

$a^2\cos\omega t = a \cdot a\,\frac{1}{2}$

$\cos\omega t = \frac{1}{2}$

$\omega t = \frac{\pi}{3} \cdot 60^\circ$

$\frac{\pi}{6}t = \frac{\pi}{3}$

$t = 2$

QUESTION

In an octagon $ABCDEFGH$ of equal side, what is the sum of $\overrightarrow{AB} + \overrightarrow{AC} + \overrightarrow{AD} + \overrightarrow{AE} + \overrightarrow{AF} + \overrightarrow{AG} + \overrightarrow{AH'}$ if, $\overrightarrow{AO} = 2\hat{i} + 3\hat{j} - 4\hat{k}$ [JEE Main-2021]

Ans : (2)

copy

$\vec{AO} = 2\hat{i} + 3\hat{j} - 4\hat{k}$

$\vec{AB} + \vec{AC} + \vec{AD} + \vec{AE} + \vec{AF} + \vec{AG} + \vec{AH} = ?$

$\vec{AO} + \vec{OB} + \vec{AO} + \vec{OC} + \vec{AO} + \vec{OD} + \vec{AO} + \vec{OE} + \vec{AO} + \vec{OF}$
$+ \vec{AO} + \vec{OG} + \vec{AO} + \vec{OH}$

$= 7\vec{AO} + \vec{OE} = 7\vec{AO} + \vec{AO} = 8\vec{AO} = 16\hat{i} + 24\hat{j} - 32\hat{k}$

$\vec{OB} + \vec{OC} + \vec{OD} + \vec{OE} + \vec{OF}$
$+ \quad \vec{OG} + \quad \vec{OH}$

$\vec{AO}$

copy

$\vec{AO} = 2\hat{i} + 3\hat{j} - 4\hat{k}$

$\vec{AB} + \vec{AC} + \vec{AD} + \vec{AE} + \vec{AF} + \vec{AG} + \vec{AH} = ?$

$\vec{AO} + \vec{OB}$

नौ धूर जमीन का केस 54 वर्षों तक लड़ने में बिक गई नौ बीघा जमीन

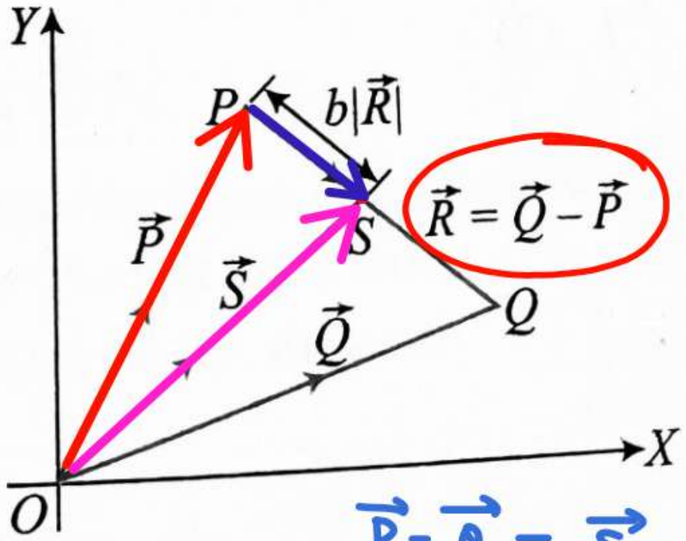
1. Three vectors $\vec{P}$, $\vec{Q}$ and $\vec{R}$ are shown in the figure. Let S be any point on the vector $\vec{R}$. The distance between the points P and S is $b\,|\vec{R}|$. The general relation among vectors $\vec{P}, \vec{Q}$ and $\vec{S}$ is:

(1) $\vec{S}=(1-b)\vec{P}+b^2\vec{Q}$

(2) $\vec{S}=(b-1)\vec{P}+b\vec{Q}$

(3) $\vec{S}=(1-b)\vec{P}+b\vec{Q}$

(4) $\vec{S}=(1-b^2)\vec{P}+b\vec{Q}$



Shortcut

$\vec{P}=\vec{a}=\vec{S}$

$\vec{R}=0$

Proper

$\vec{P}, \vec{a}, \vec{S}$

Given = P, a, S, R ← आना है

$\vec{P}+b|\vec{R}|\,\hat{R}=\vec{S}$

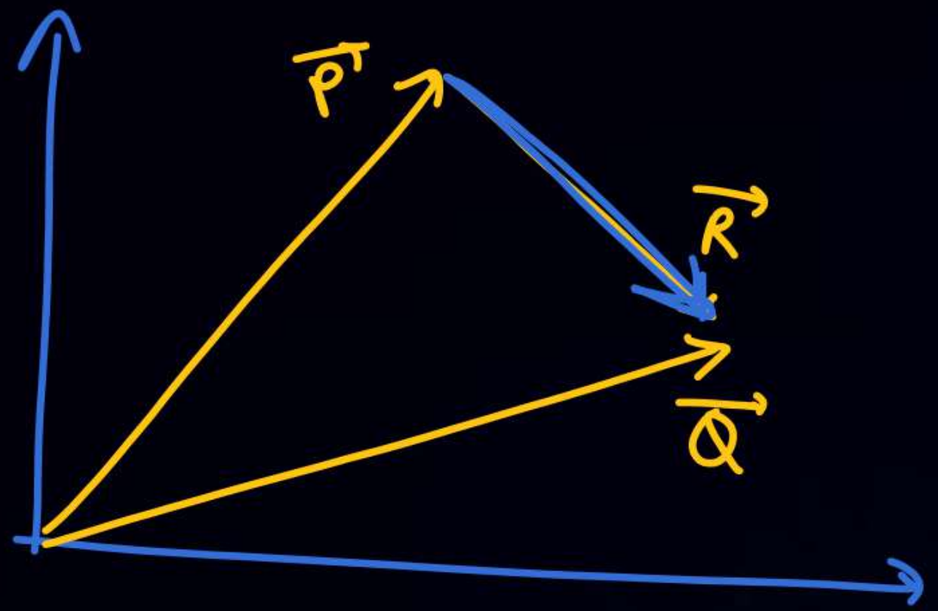
$\vec{P}+b|\vec{R}|\,\frac{\vec{R}}{|\vec{R}|}=\vec{S}$

$\vec{P}+b(\vec{a}-\vec{P})=\vec{S}$

$\vec{S}=b\vec{a}+\vec{P}(1-b)$

3 ③ RHS $\Rightarrow (1-b)\vec{S}+b\vec{a}=\vec{S}-b\vec{S}+b\vec{S}$

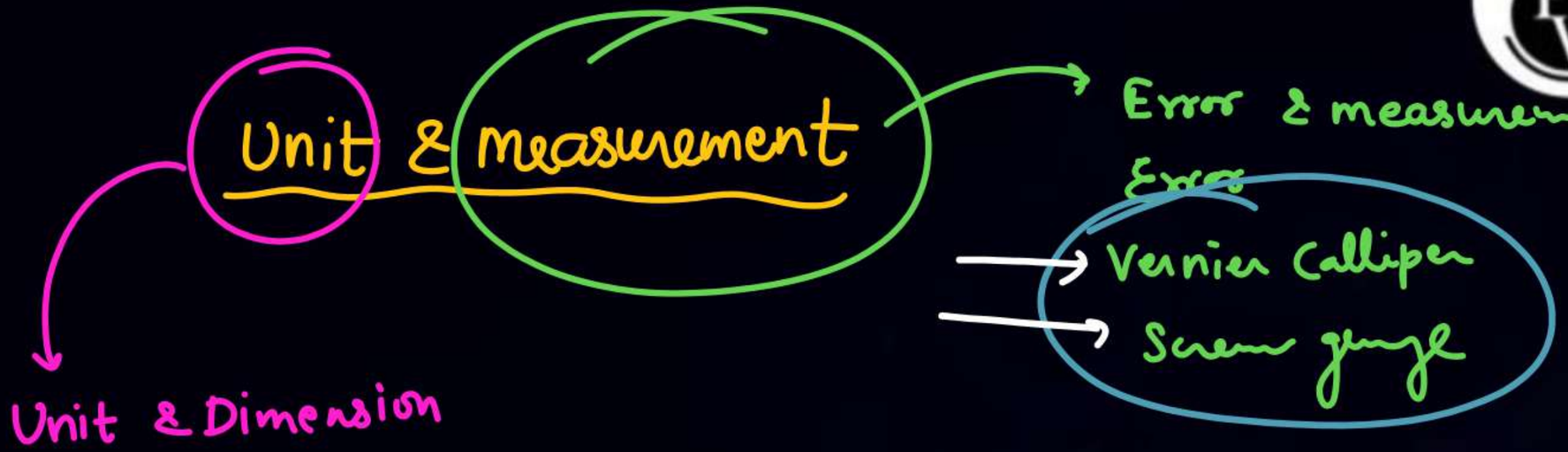
$=\vec{S}$



$\vec{R} = \vec{P} - \vec{Q}$

If $\vec{P} = \vec{Q}$

$\vec{R} = 0$


Unit & measurement
Unit & Dimension
Error & measurement
Vernier Calliper
Screw gauge

Unit & Dimension

* Physical quantity → which can be measure.

Classification

- Based on direction
  - scalar
  - Vector
- Based on dependency
  - Fundamental Phy. quant.
  - Derived physics qua

Fundamental Phy quantity

		Unit	Symbol
①	mass	Kilogram	Kg
②	Length	meter	m
③	time	Sec	S
④	temp.	Kelvin	K
⑤	Amount of Subst.	mole	Md
12* ⑥	Electric current	Ampere	A
⑦	Luminous Intensity	Candella	Cd

Unit

If $n_2 > n_1 \Rightarrow u_2 < u_1$

$5m = 500\,cm.$

Length of the rod $= 5m = 500\,cm.$

$$Q = n_1 u_1 = n_2 u_2$$

$$nu = \text{const}$$

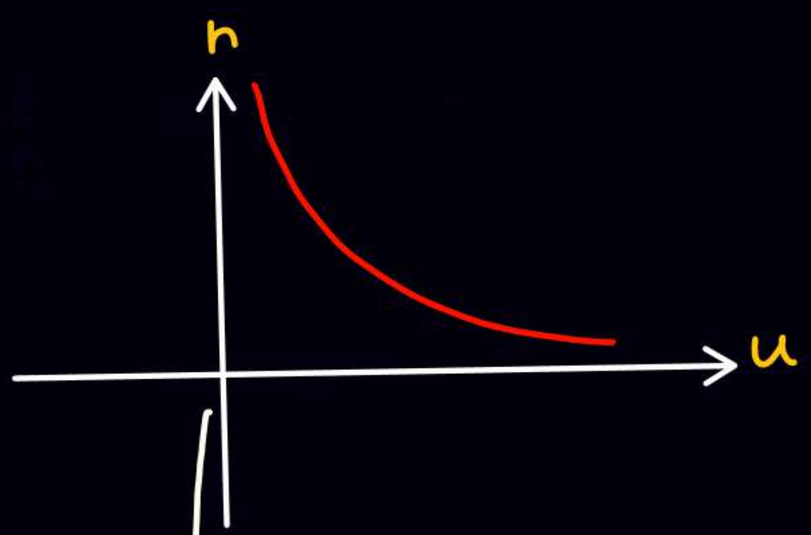
$n_1 \rightarrow$ numerical value of measurement in 1st system

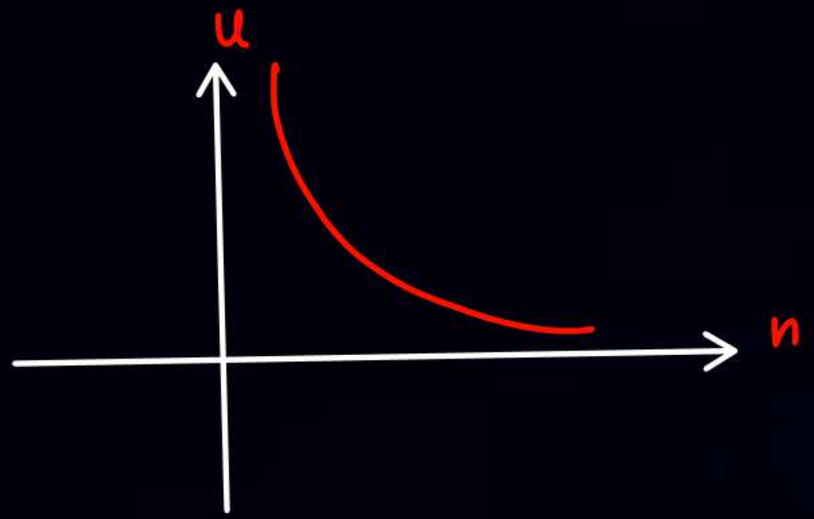
$n_2 \rightarrow$ " " " " 2nd system

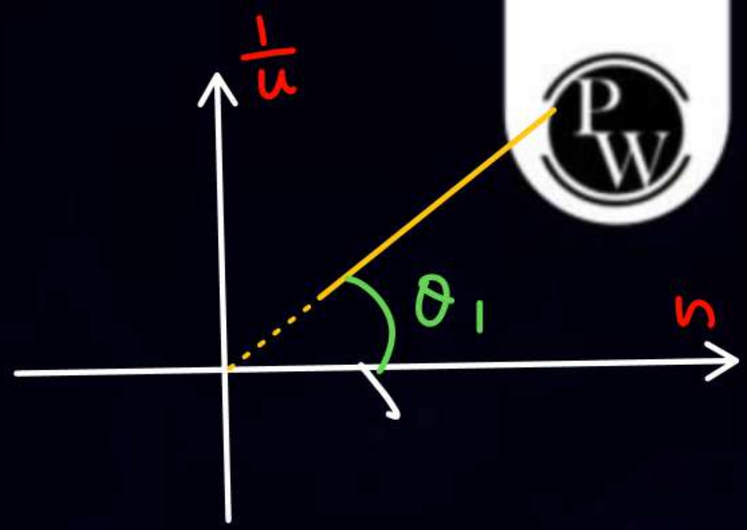
$u_1 \rightarrow$ Unit of measurement " 1st system

$u_2 \rightarrow$ " " " 2nd "

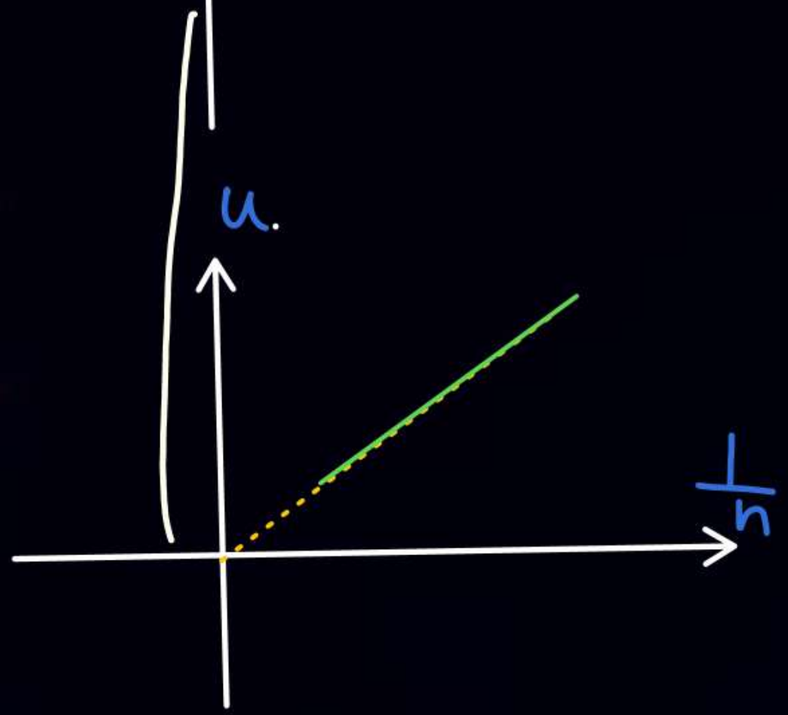
$Q \rightarrow$ phy. qnan to be measure.







$(nu = \text{const})$



Fundamental Phy-Quant. (Base Quantity) ⇒ which are independent to each other.

* ye kisi se milke Nahi Bane hai.

Derived phy-quant. ≡ speed,

↳ Derived.

① Speed = $\frac{\text{Distance}}{\text{time}} \longrightarrow \frac{m}{sec} = m/sec.$

② Velocity = $\frac{\text{Displacement}}{\text{time}} \longrightarrow \frac{m}{sec} = m/sec$

③ Acceleration = $\frac{\text{Velocity}}{\text{time}} \longrightarrow \frac{m/sec}{sec} \longrightarrow m/sec^2$

④ Force $(F = ma) \equiv \longrightarrow kgm/sec^2 = 1N$

SKC

Unit same हैं तो जरूरी नहीं कि phy-Quant. same हो

mks, CGS, FPS

④ SI system ⇒ ✓

Force ⟶ Newton

Energy ⟶ Joule

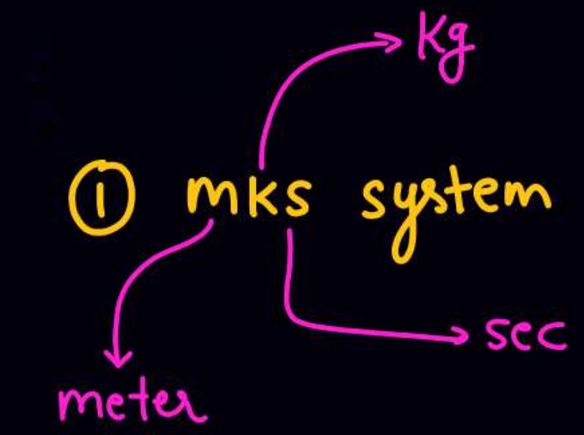
Power ⟶ watt

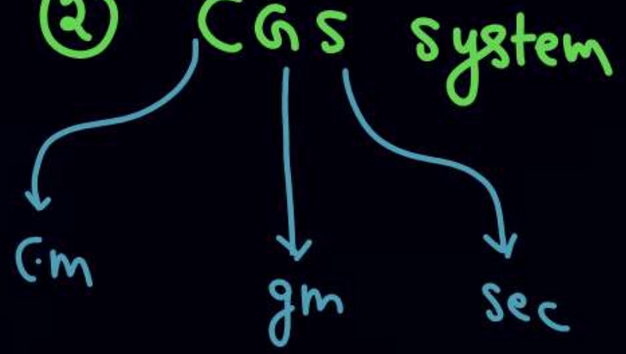
$1N = 1 \frac{Kg\,m}{Sec^2}$

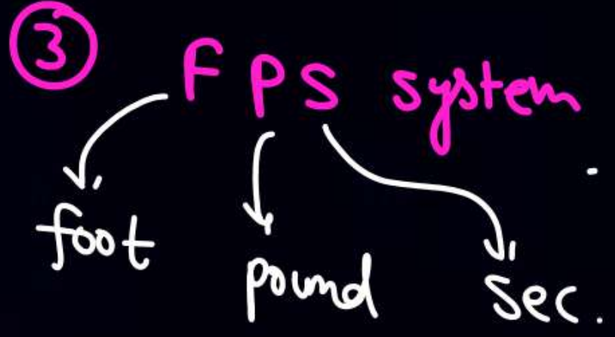
$1J = 1 \frac{Kg\,m^2}{Sec^2}$

$1\,Watt = 1 \frac{Kg\,m^2}{Sec^3}$

Lami theorem ⟶ NLM me...







Q A particle of mass 2kg is moving with velocity 10 m/s. along +x Axis.

(a) Momentum (in MKS) $= mv = 2\,kg \cdot 10\,\frac{m}{sec}$

$= 20\,\frac{kg\,m}{sec}$

(b) Momentum (in CGS) $= mv = (2000\,gm)\,\frac{10 \times 100\,cm}{sec}$

$= 2 \times 10^6\,\frac{gm\,cm}{sec}$

Q momentum = $20 \frac{kg\,m}{sec}$ $\xrightarrow{CGS}$ $20 \times \frac{1000gm \times 100cm}{sec}$

$= 2 \times 10^{6}$ gm.cm/se

Q Density = $6 \frac{Kg}{m^3}$ (MKS) $\xrightarrow{CGS}$ $\frac{6 \times 1000gm}{(100\,cm)^3} = 6 \times 10^{-3} \frac{gm}{cm^3}$ (CGS)

Q $\rho = .6 \frac{gm}{cc}$ (CGS) $\xrightarrow{MKS}$ $\frac{.6 \times \frac{1}{1000} kg}{(\frac{1}{100}m)^3} = 600 \frac{kg}{m^3}$

$cc \equiv (cm)^3$

↳ (centimeter cube)


@SALEEMSIR_PW

Homework

- Vector summary lecture
- PYQ (KPP) solve again
- Get fresh energy & lets... Restart..

THANK YOU