

YAKEEN NEET 2.0

2026

Units and Measurements

Physics

Lecture - 01

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MR Sir



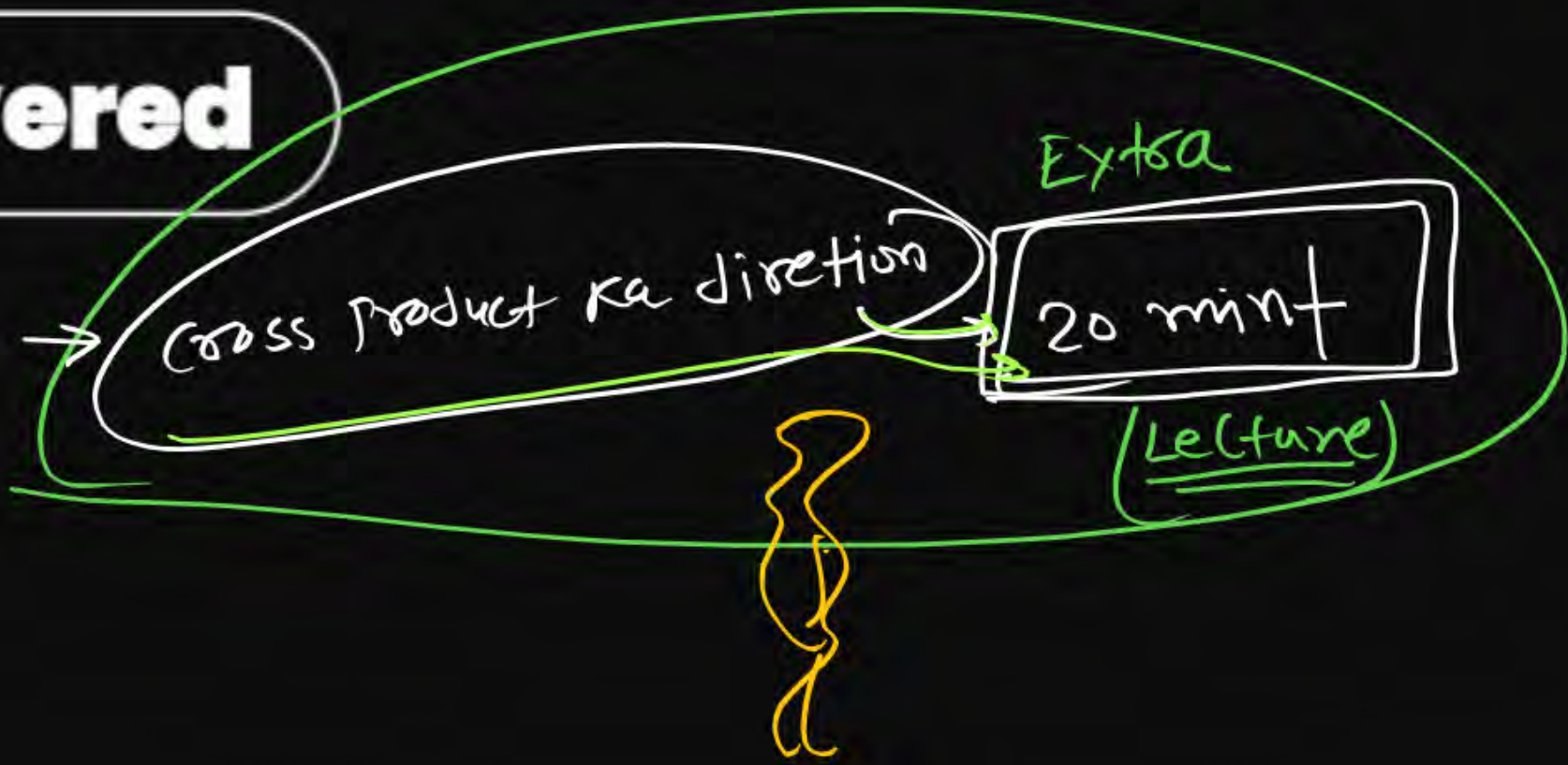
Topics to be covered

1 # [Lamiris theorem]

2 Basic unit & dim^m

3

4



for 27%

Vector detailed
Lecture 4.5 hr

↳ 150 around
+ assignment for
lena ✓

100% thes
80% quatin

4-5 lecture ka
kitne logo ka
backlog hai??

(a) Yes → 27% only

~~(b)~~ No. 72%

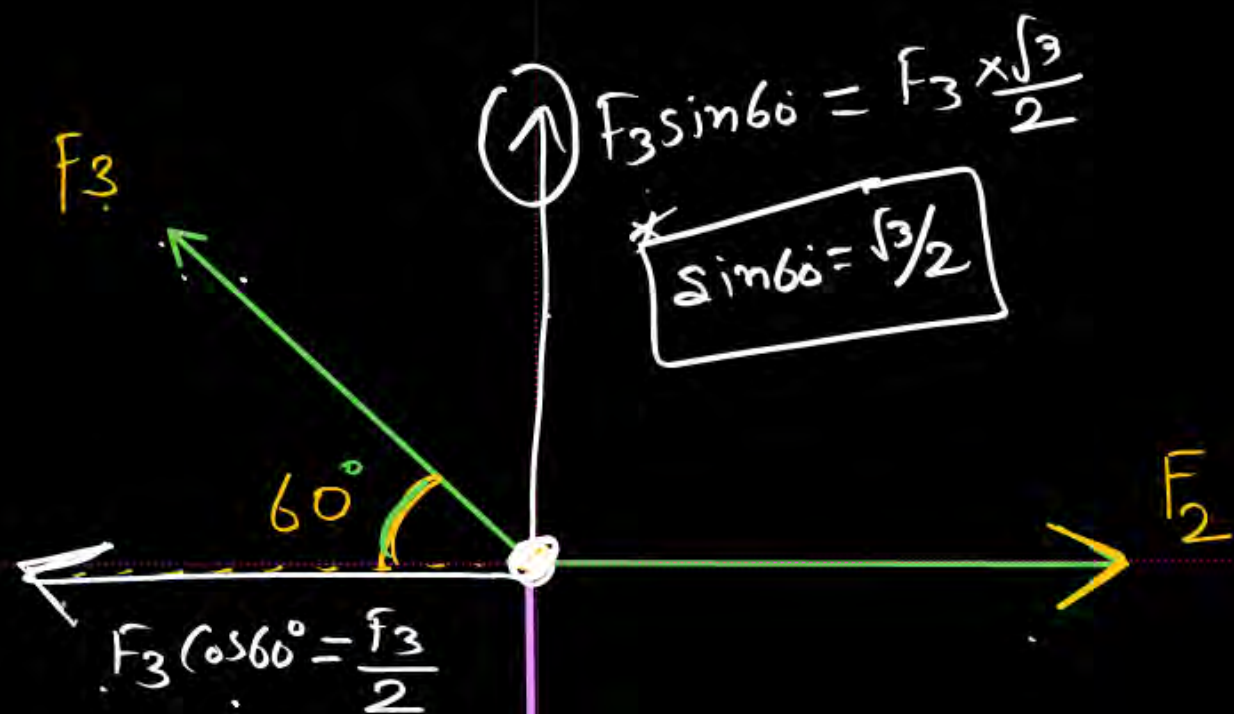
aaT Sanghvi assignm \rightarrow 3
Vets Ka

Compleat Based
on JEE-main.

~~5~~ 7 year

2019 to 2025

if $F_1 + F_2 + F_3 = 0$ then find $F_3 = ??$
 $\frac{F_3}{\sqrt{3}} = F_2$ *



$$[F_{net} = 0]$$

$$\frac{F_3}{2} = F_2 \quad \text{--- (1)}$$

$$(F_{net})_y = 0$$

$$\frac{\sqrt{3} F_3}{2} = F_1$$

Put F_1

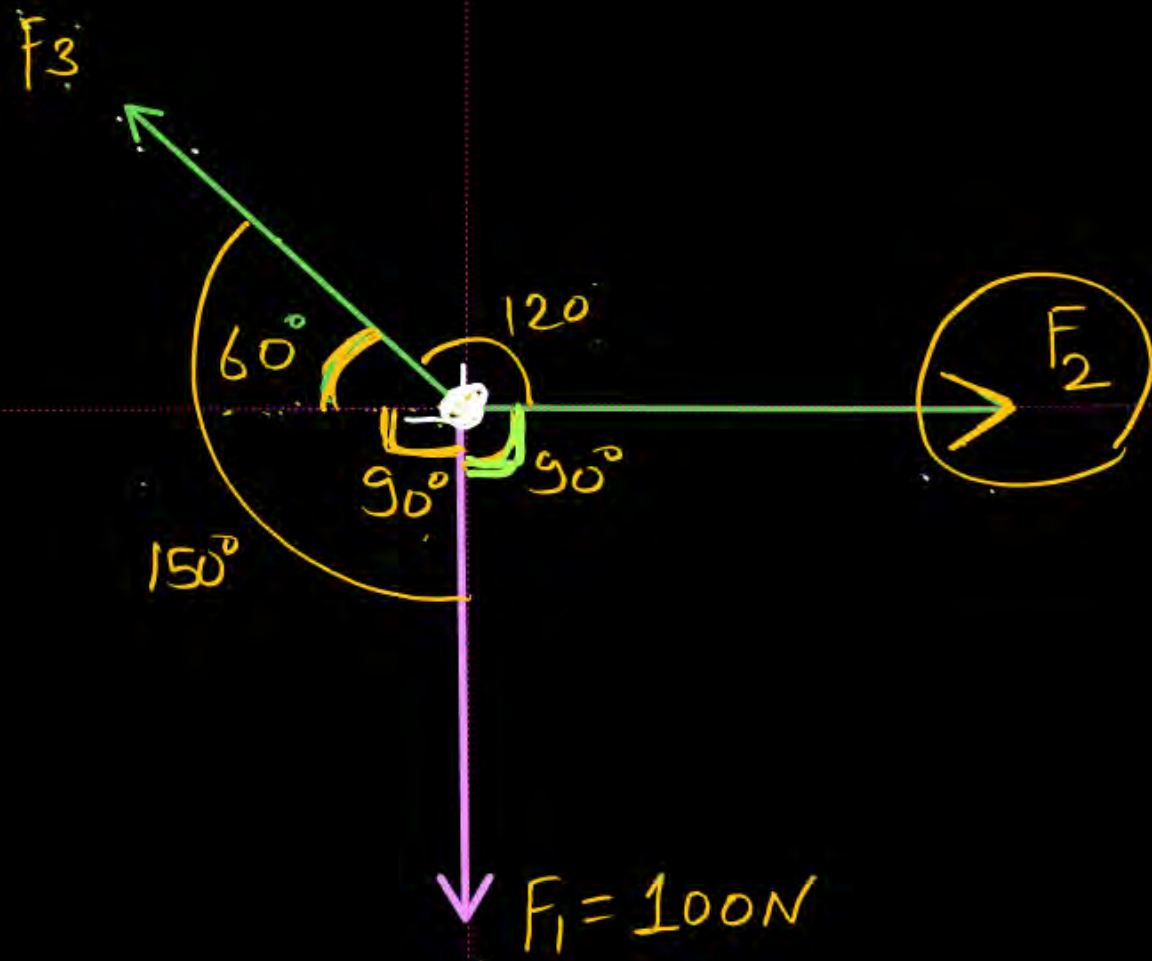
$$F_3 = \frac{2(100)}{\sqrt{3}} = \frac{200}{\sqrt{3}}$$

using eq (1)

$$\frac{F_3}{2} = F_2$$

$$\frac{200}{\sqrt{3} \times 2} = F_2$$

$$\frac{100}{\sqrt{3}} = F_2$$



gf $F_1 + F_2 + F_3 = 0$ then find $F_3 = ??$
 $3 F_2 = ??$

Lami's theorem (only applicable when result of 3-force is zero)

• gf vector sum of given three vector is zero.

$$\vec{F}_1 + \vec{F}_2 + \vec{F}_3 = 0$$



magnitude of force

$$\frac{F_1}{\sin \alpha} = \frac{F_2}{\sin \beta} = \frac{F_3}{\sin \gamma}$$

α = Angle b/w F_2 & F_3
 β = Angle b/w F_1 & F_3

$$\sin(120) = \sin 60 = \frac{\sqrt{3}}{2}$$

$$\sin 150 = \sin 30 = \frac{1}{2}$$

$$\frac{F_3}{\sin 90} = \frac{F_1}{\sin 120}$$

$$\frac{F_3}{1} = \frac{100 \times 2}{\sqrt{3}} = \left(\frac{200}{\sqrt{3}} \right)$$

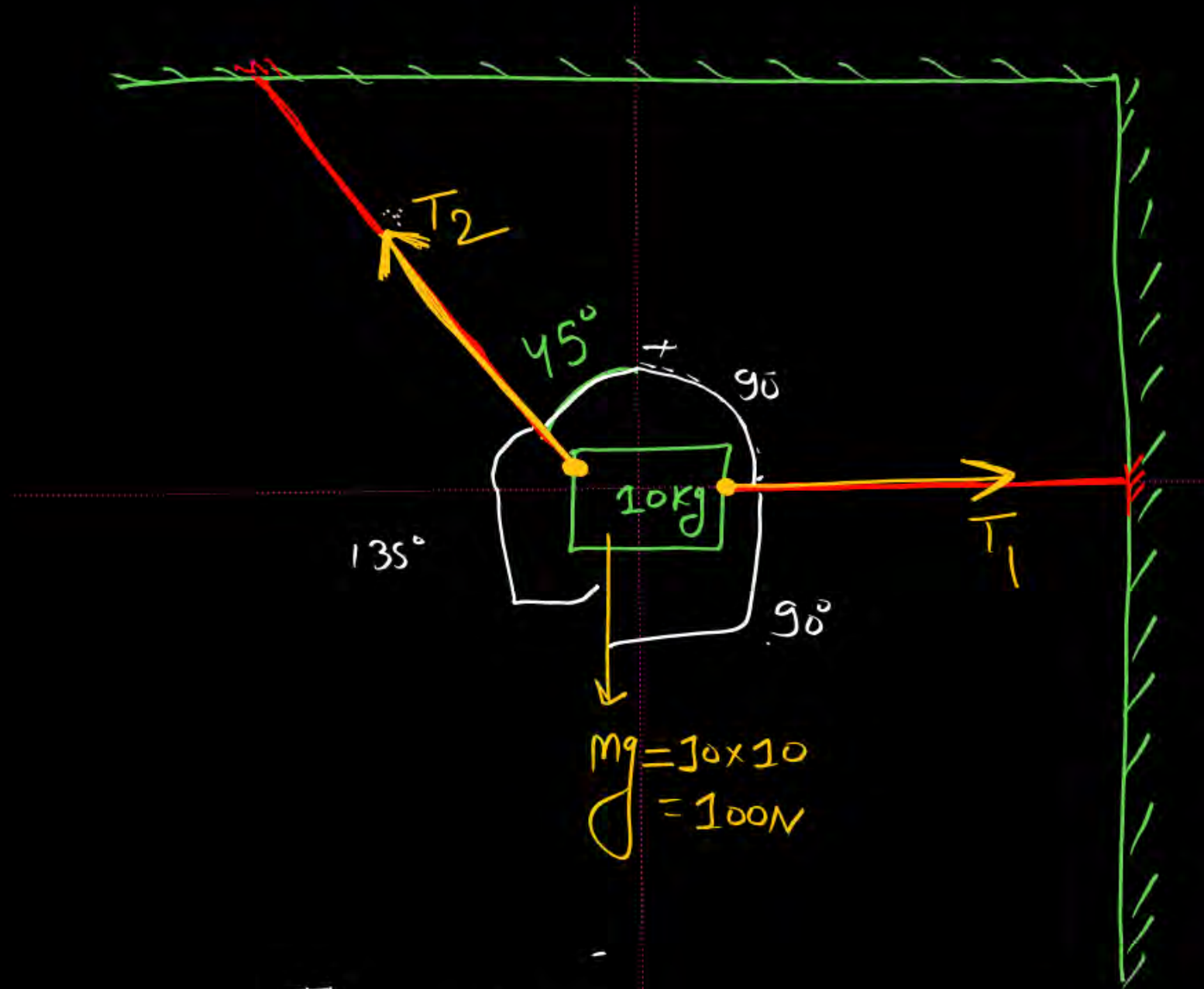
Soln

$$\frac{F_1}{\sin 120} = \frac{F_2}{\sin 150}$$

$$\frac{100}{\frac{\sqrt{3}}{2}} = \frac{F_2}{\frac{1}{2}}$$

$$F_2 = \frac{100}{\sqrt{3}}$$

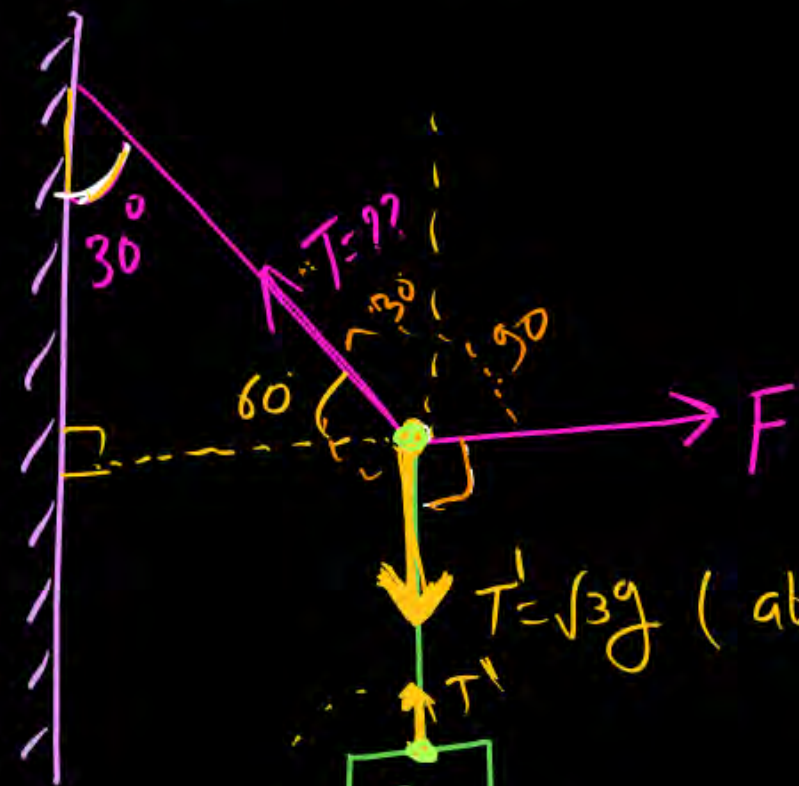
Find Tension in both string. if net force on object is zero.



$$\frac{T_2}{\sin 90} = \frac{100}{\sin 135}$$

$$T_2 = \frac{100}{\frac{1}{\sqrt{2}}} = 100\sqrt{2} \text{ Ans}$$

JEE mains - 2023 (25 JAN)



$T = \sqrt{3}g$ (abhi ke liye ye given hai)

$\sqrt{3}kg$

$mg = \sqrt{3}g$

$T = \sqrt{3}g$

find Tension (T)

(a) 30N

(b) 25N

(c) 20N

(d) 15N

Lami's th^m

$$\frac{\sqrt{3}g}{\sin 120} = \frac{T}{\sin 90}$$

$$\frac{\sqrt{3}g}{\frac{\sqrt{3}}{2}} = \frac{T}{1}$$

$$2 \times g = T$$

$$T = 2 \times 10$$

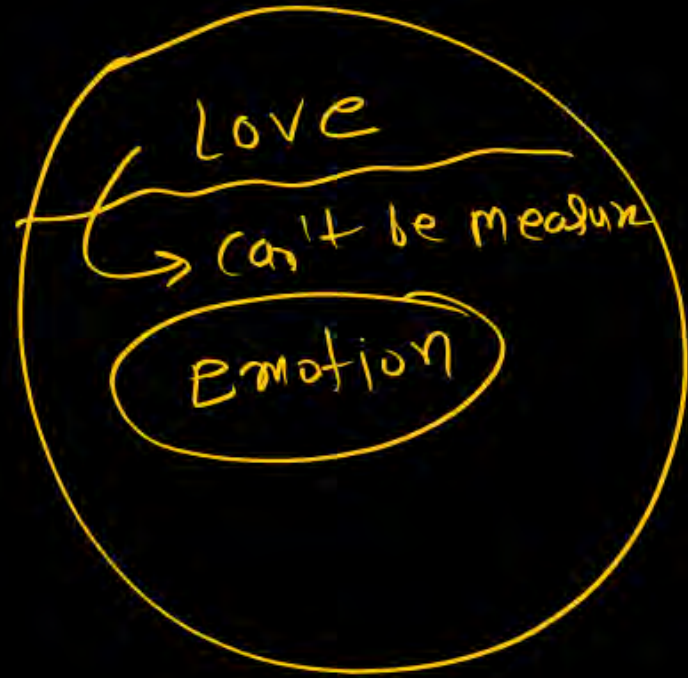
$$T = 20N$$

Unit and measurement

Physical quantity \rightarrow quantity that can be measure
of physical quantity
(P.Q.)

Ex - length, velocity, mass, force.

Type of P.Q.



① fundamental (P.Q.)

* (1) Mass.

* (2) length

* (3) Time

* (4) current

* (5) Temp

* (6) Amount of sub.

* (7) Luminous Intensity.

Ham Kisi se Nahi Bane, ham se Sab bana hai.

\rightarrow quantities that are independent on other

\rightarrow Group of fundamental P.Q. are the group that independent upon each other.

② Derived P.Q.

quantities that are derived from fundamental P.Q.

Ex $Velocity = \frac{displacement}{time} = \frac{m}{sec} = m/sec$

$$acc^n = \frac{velocity}{time} = \frac{m}{(sec)^2}$$

$Volume = L^3 = m^3$

$density = \frac{mass}{volume} = kg/m^3$

③ # Supplementary P.Q.

Angle / Solid Angle

unit (radian)

unit (st. radian)

Both are dimensionless but have unit

Girls

Without Makeup

With Makeup

(fundamental P.Q.)

(Derived P.Q.)

Electric field

makeup ignored

makeup effect

fundament P.Q.

1. Mass

2. Length

3. Time

4. Temp
current

5. Amount of substance

6. Luminous Intensity

S.I
kg
m

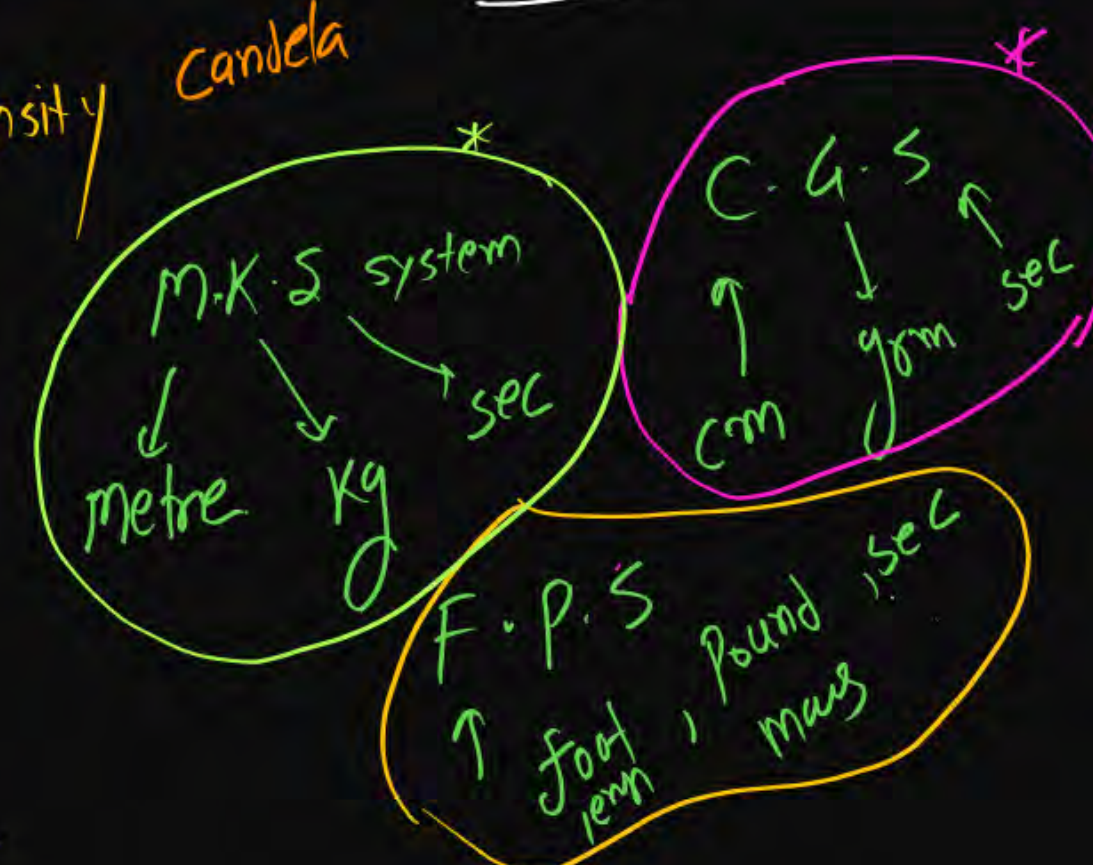
sec
K
Amp

mol

candela

C.G.S.
gram
cm
sec
Kelvin
Biot

mol



Girls without
make up

7(P.Q)



Girls after 1
hour make up



Girls after
2 hours



Over all
result



mass
length
time

→ kg
→ m
→ sec

$$\text{velocity} = \frac{L}{\text{time}} = \frac{m}{\text{sec}}$$

$$\text{acc}^n = \frac{\text{vel}^n}{\text{time}} = \frac{L}{T \times T} = \frac{L}{T^2} = \frac{m}{s^2}$$

$$\text{force} = m \times \text{acc}^n = \text{kg} \frac{m}{s^2} = 1N$$

$$\text{Work} = \text{force} \times \text{dist}^n = \text{kg} \frac{m}{s^2} \times m = \text{kg} \frac{m^2}{s^2} = 1J$$

(work) energy

$$\text{Power} = \frac{\text{work}}{\text{Time}} = \frac{\text{kg} \frac{m^2}{s^2}}{s \times \text{sec}} = \frac{\text{kg} \frac{m^2}{s^2}}{s^3}$$

$$\text{Area} \rightarrow m^2$$

$$\text{Volume} \rightarrow m^3$$

$$\text{density} = \frac{\text{mass}}{\text{Vol}^n} = \frac{\text{kg}}{m^3}$$

$$\text{Momentum } P = mv = \text{kg} \frac{m}{\text{sec}}$$

① which of the following group of P-Q. can be a fundamental P-Q.

(a) force, mass, acc ($F=ma$) ✓

(b) momentum, mass, velocity ($P=mv$)

✓ (c) force; mass; time _(28%) ✗

(d) accⁿ, length, time \rightarrow accⁿ = m/sec^2

~~(e) None of these~~
(53%) \rightarrow Masji Kadam
Chappel Hare II

\rightarrow fundamant ~~hoga hi~~
 \rightarrow fundamant assume
kar sakte hai.

Ans \rightarrow (c)

makeup
ही दो concept

Dimension

When any physical quantity express in terms of fundamental P.Q. (makeup उतार दिया) then power of fundamental P.Q. is called dimension.

$$\text{Velocity} = \frac{L}{T} = \underbrace{L^1 T^{-1} M^0}_{\text{dimensional formula of velocity}}$$

⑧ Dimension of velocity is 1 in length and -1 in time zero in mass

$$\text{⑧ acceleration} = \frac{\text{Velocity}}{\text{Time}} = \frac{L T^{-1}}{T} = L T^{-2}$$

$$\text{⑧ Force} = ma = M^1 \times L T^{-2}$$

$$\text{⑧ Work (energy)} = \text{force} \times \text{dist} = M L T^{-2} \times L = M L^2 T^{-2}$$

$$\text{⑧ Power} = \frac{\text{Work}}{\text{Time}} = M L^2 T^{-3}$$

$$\frac{1}{x^n} = x^{-n}$$

$$M^0 = 1$$

		(Unit)
Mass	M^1	kg
length	L^1	m
Time	T^1	sec
Temp	K^1	Kelvin
current	A^1	Ampere

$$\text{Area} = (\text{length})^2 = \underbrace{4\pi}_X R^2$$

$$= M^0 L^2 T^0$$

pure no does not
have unit & dimⁿ

$$\text{mass density} = \frac{\text{mass}}{\text{volume}} = \frac{M}{L^3} = M^1 L^{-3}$$

* Momentum

$$P = m u$$

$$= M (L T^{-1})$$

$$= M L^1 T^{-1}$$

* Torque = force \times distⁿ

$$= M L T^{-2} \times L$$

$$= M L^2 T^{-2}$$



A physical quantity does not have unit



That P.Q. must be dimension less.

Ex — strain = $\frac{\Delta l}{l} = \frac{m}{m} = \text{unit less}$

- Coefficient of friction

$$F_f = \mu mg$$

$$\mu = \frac{F_f}{mg} = \text{unitless}$$

- Refractive Index

$$\mu = \left(\frac{c}{v}\right) = \text{unit less}$$

⇒ A Physical quantity is dimension less

That P.Q. may have unit.
(due to Angle)

- Ex — strain
Coefficient of friction
Refractive Index

(Angle & solid Angle)

dimⁿ less but have unit.

#

A P.Q have unit.

That P.Q. may have dim^n .

Ex — velocity ✓

Angle, solid.
(0)

②

A P.Q have dimension.

That P.Q. must have unit.

velocity

accel

mass

<p>gori ka makan</p>	<p>dimension 2nd floor</p>	<p>must be dimⁿ leg</p>	<p>may have dimⁿ</p>	<p>A P.Q. is dimⁿ leg</p>	<p>A P.Q. have Dimⁿ.</p>
<p>Phoolo ki dukan</p>	<p>Unit (1st floor)</p>	<p>→ A P.Q. is Unit leg.</p>	<p>A P.Q. have Unit. Ex - Angle → velen</p>	<p>may have Unit</p>	<p>Must have Unit</p>

→ phoolo ki dukan to bhot hai
→ lekin gori ka makan 1 fe hai

X
chappal
ki duka

X No gori
phool ki
duka

yes gori
phool ki
duka

gori has
phool ki



DIMENSION LESS PHYSICAL QUANTITY



- ☐ ✓ Angle / ✓ Solid angle / Strain = $\frac{\Delta l}{l}$
- ✓ Poisson's ratio, refractive index ✓

Trigonometry formula / exponential functions, relative permittivity, efficiency,
ratio, pure no.

✓ $\sin \theta = \frac{p}{h} = \text{unitless}$
 $= \text{dim}^0 \text{less}$

$\odot^x \rightarrow \text{dim}^0 \text{less}$

$\mu_r = \left(\frac{\mu_m}{\mu_0} \right)$ Same physical quantity

$\text{efficiency} = \frac{(\text{Power})_{\text{out}}}{(\text{Power})_{\text{input}}}$

Relative velocity $V_{AB} = V_A - V_B$

have unit and dimⁿ

THANK
YOU