NDA-CDS 1 2025

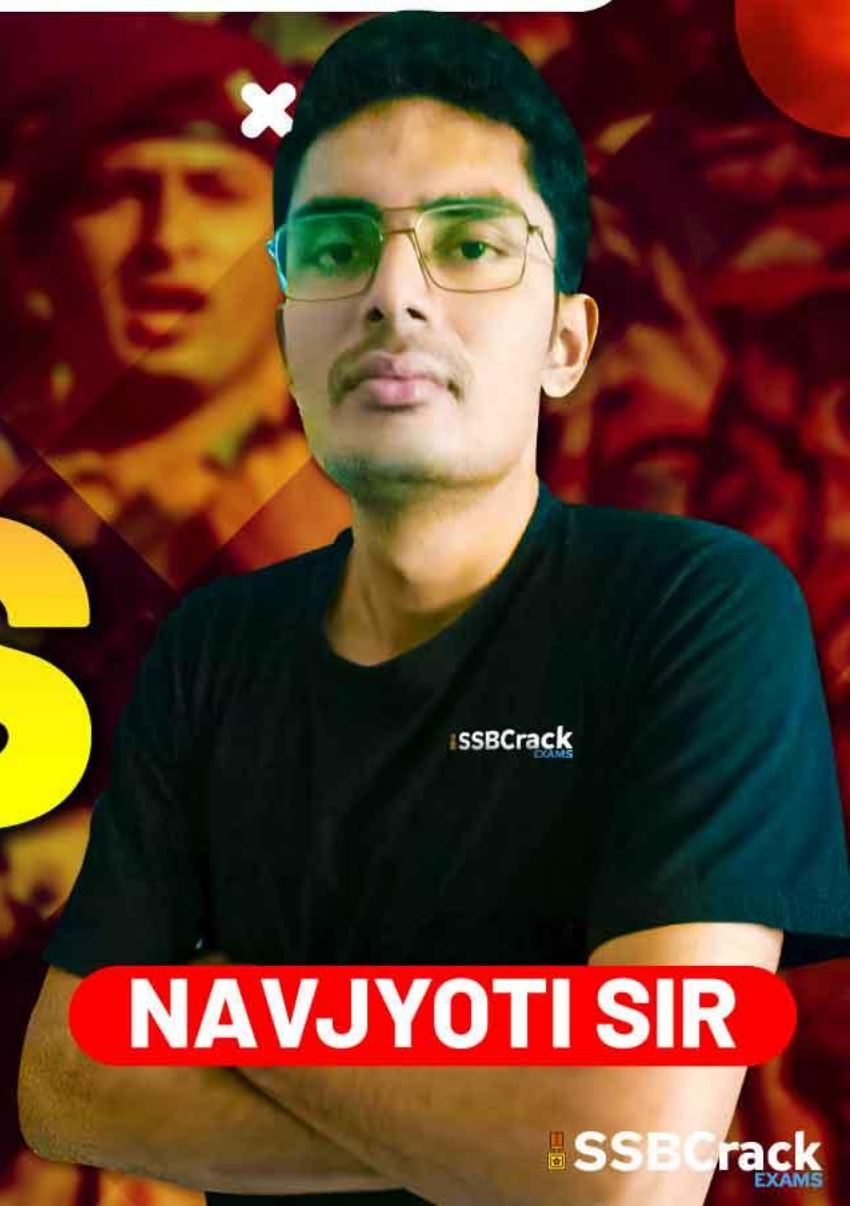
GS

LIVE

PHYSICS

UNITS & DIMENSIONS

CLASS 2



NAVJYOTI SIR

SSBCrack EXAMS

22 Nov 2024 Live Classes Schedule

8:00AM	22NOVEMBER 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	22 NOVEMBER 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM	MOCK PERSONAL INTERVIEWS	ANURADHA MA'AM

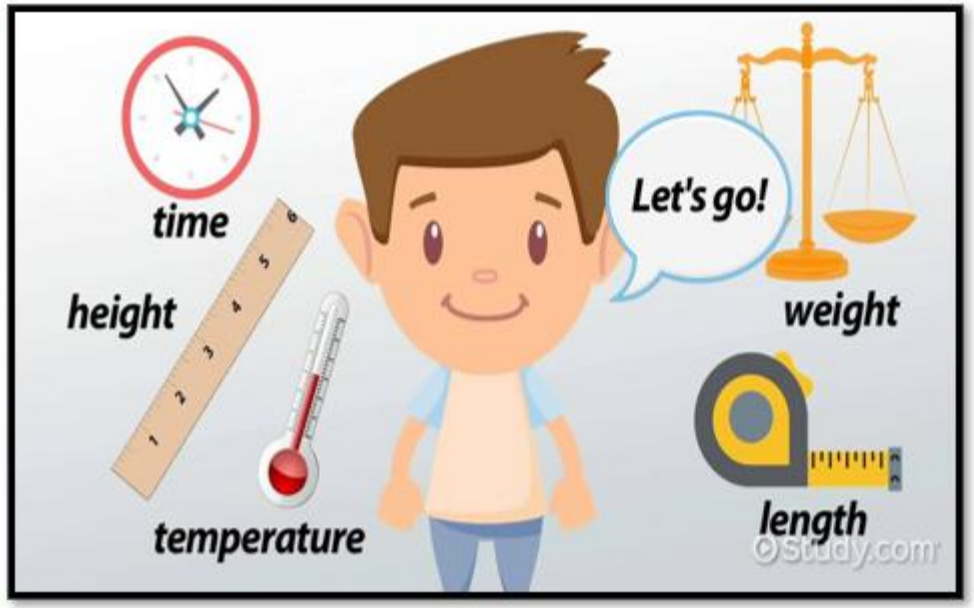
NDA 1 2025 LIVE CLASSES

11:30AM	GK - ECONOMICS - CLASS 5	RUBY MA'AM
1:00PM	PHYSICS - UNITS & DIMENSIONS - CLASS 2	NAVJYOTI SIR
4:30PM	ENGLISH - USAGE OF PAIRED WORDS - CLASS 2	ANURADHA MA'AM
5:30PM	MATHS - MATRICES & DETERMINANTS - CLASS 4	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

11:30AM	GK - ECONOMICS - CLASS 5	RUBY MA'AM
1:00PM	PHYSICS - UNITS & DIMENSIONS - CLASS 2	NAVJYOTI SIR
4:30PM	ENGLISH - USAGE OF PAIRED WORDS - CLASS 2	ANURADHA MA'AM
7:00PM	MATHS - SPEED DISTANCE TIME - CLASS 4	NAVJYOTI SIR

MCQ PRACTISE – UNITS AND DIMENSIONS



Which Of The Following Is The Fundamental Unit Of Thermodynamic Temperature ?

A. K

B. ° C

C. ° F

D. None of the Above

K → Kelvin

Which Of The Following Is The Fundamental Unit Of Thermodynamic Temperature ?

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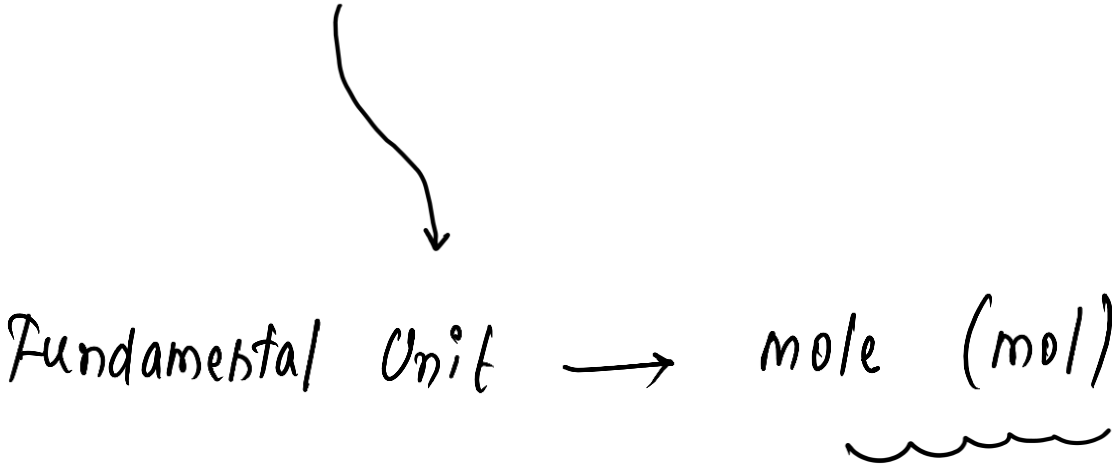
The Symbol To Represent unit of Amount Of Substance Is

A. K

B. A

C. Cd

D. mol



The Symbol To Represent Amount Of Substance Is

A. K

B. A

C. Cd

D. mol

The Smallest Value Which Is Measured Using An Instrument Is Known As

A. Absolute Count

B. Precision

C. Accurate Count

D. Least Count

The Smallest Value Which Is Measured Using An Instrument Is Known As

A. Absolute Count

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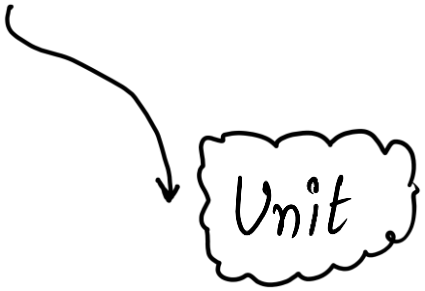
Which of the following is not a Physical Quantity ?

A. Density

B. Momentum

C. Work

D. Kilogram



Which of the following is not a Physical Quantity ?

A. Density

B. Momentum

C. Work

D. Kilogram

Which among the following is a Supplementary Fundamental Unit?

A. Ampere

B. Second

C. Kilogram

D. Radian

7 + 2

Supplementary Quantities

→ Plane Angle — radian

→ Solid Angle — steradian

Which among the following is a Supplementary Fundamental Unit?

A. Ampere

B. Second

C. Kilogram

D. Radian

Which Of The Following Is A System Of Unit ?

A. SMS

B. MKP

C. CJS

D. FPS

Which Of The Following Is A System Of Unit ?

A. SMS

B. MKP

C. CJS

D. FPS

Length	Mass	Time
Foot	Pound	second

Metre	Kilogram	second	(MKS)
centimetre	Gram	second	(CGS)

The SI unit of Work is

A. Joules

B. ergs

C. volt

D. Ampere

$W = F \times S$

= (mass x acceleration) x displacement

$kg\ ms^{-2} \times m$

$kg\ m^2 s^{-2}$ — Joules (J)

ergs → cgs unit of work $g\ cm^2 s^{-2}$

(HW) → 1 J = ? ergs

The SI unit of Work is

A. **Joules**

B. ergs

C. volt

D. Ampere

Which of the following is not a unit of time ?

A. Solar Day

B. Leap Year

C. Lunar Month

D. Parallactic Second

Which of the following is not a unit of time ?

A. Solar Day

B. Leap Year

C. Lunar Month

D. Parallactic Second

One pico Farad is equal to

A. 10^{-24} Farad

B. 10^{-12} Farad ✓

C. 10^{-18} Farad

D. 10^{-6} Farad

pico — 10^{-12}

nano — 10^{-9}

micro — 10^{-6}

milli — 10^{-3}

fermi — 10^{-15}

One pico Farad is equal to

A. 10^{-24} Farad

B. 10^{-12} Farad

C. 10^{-18} Farad

D. 10^{-6} Farad

What is the unit of Force / Energy ?

A. second

B. m^{-1} ✓

C. Kg

D. m^2

Energy ~ Work done — same units / dimensions / dimensional formula.

$$\frac{\text{Force}}{\text{Energy}} = \frac{\text{Force}}{\text{Work}} = \frac{\text{Force}}{F \times \text{disp.}} =$$

disp. — length — m

$$\frac{1}{m} = m^{-1}$$

What is the unit of Force / Energy ?

A. second

B. m^{-1}

C. Kg

D. m^{2}

The Smallest Unit Of Length Is

A. Micrometre

B. Angstrom

C. Nanometre

D. Fermimetre ✓

micro — 10^{-6}

angstrom — 10^{-10}

Nano — 10^{-9}

fermi — 10^{-15}

The Smallest Unit Of Length Is

A. Micrometre

B. Angstrom

C. Nanometre

D. Fermimetre

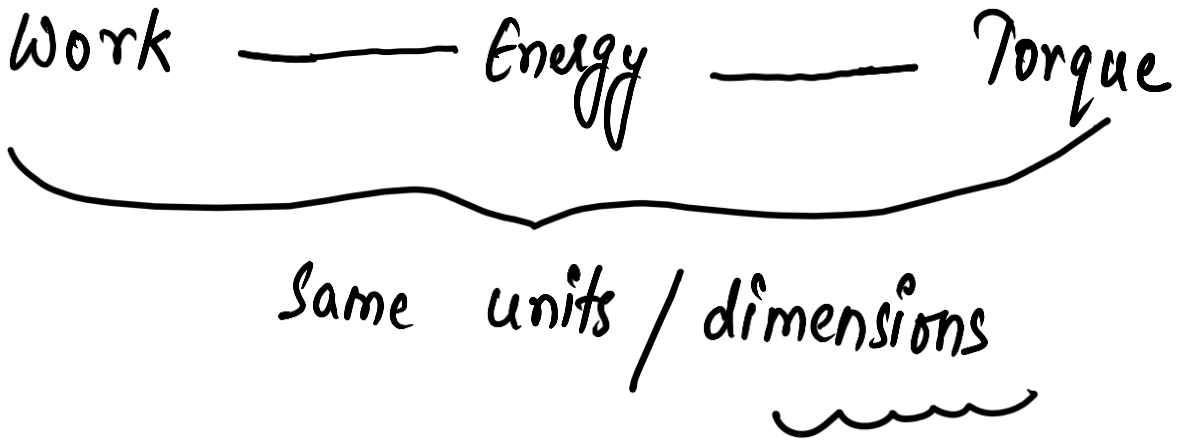
Dimensions Of Kinetic Energy Is The Same As

A. Acceleration

B. Velocity

C. Work

D. Force



Dimensions Of Kinetic Energy Is The Same As

A. Acceleration

B. Velocity

C. Work

D. Force

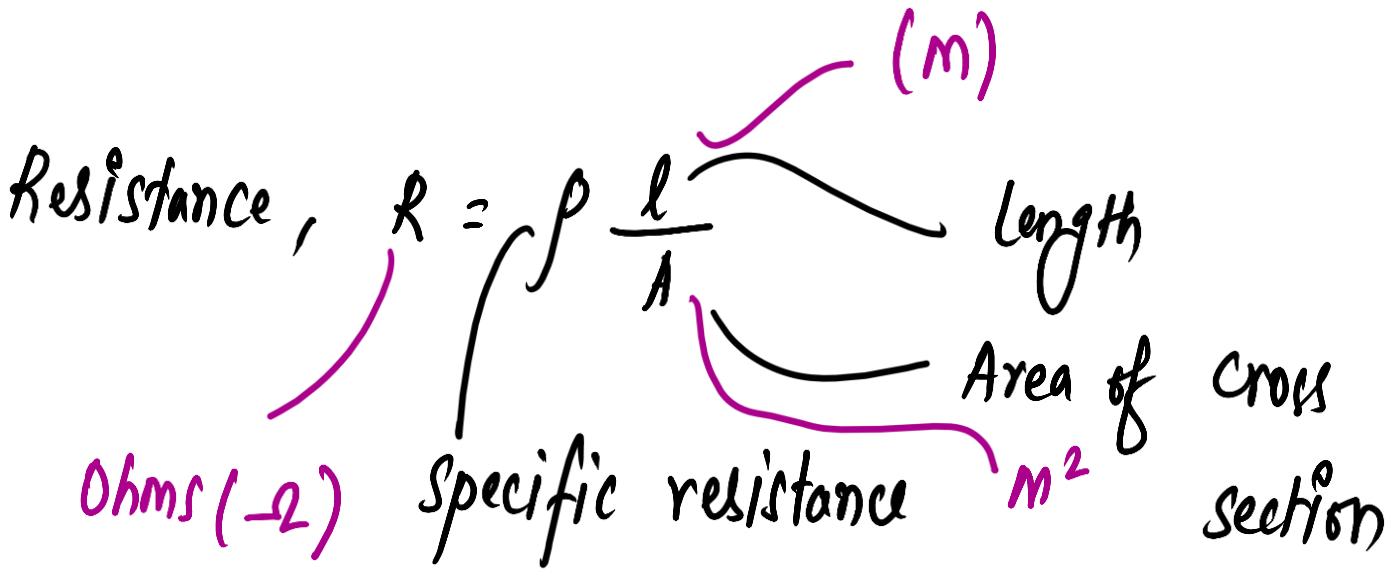
Unit Of Specific Resistance Is

A. ohm-m^2

B. ohm-m^3

C. ohm / m

D. ohm-m



$$\rho = \frac{RA}{l} = \frac{\Omega\, m^2}{m}$$

$$= \Omega\, m$$

(ohm-m)

Unit Of Specific Resistance Is

A. ohm-m^2

B. ohm-m^3

C. ohm / m

D. ohm-m

What Is The Unit Of Luminous Intensity ?

A. mol

B. kg

C. Cd

D. m

It is a fundamental quantity

Unit → Candela (cd)

What Is The Unit Of Luminous Intensity ?

A. mol

B. kg

C. Cd

D. m

Select the pair having the same dimensions ,

A. Kinetic Energy and Surface Tension ✗

B. Torque and Potential Energy ✓

C. Momentum and Force ✗

D. Pressure and Energy / Time ✗

$\gamma = \frac{\text{Force}}{\text{length}}$

$\frac{ML^2T^{-2}}{T}$

$[ML^2T^{-3}]$ ✗

Momentum = Mass x velocity

Force = mass x accleration

pressure — $\frac{\text{Force}}{\text{Area}} \Rightarrow \frac{kgms^{-2}}{m^2} = kgm^{-1}s^{-2} \Rightarrow [ML^{-1}T^{-2}]$

Select the pair having the same dimensions ,

A. Kinetic Energy and Surface Tension

B. Torque and Potential Energy

C. Momentum and Force

D. Pressure and Energy / Time

What Is The Unit Of Force In CGS Units ?

A. kg ms^{-2}

B. g ms^{-2}

C. g cms^{-2}

D. None of the Above

kg ms-2

g cms-2 (dyne)

What Is The Unit Of Force In CGS Units ?

A. kg ms^{-2}

B. g ms^{-2}

C. g cms^{-2}

D. None of the Above

The Density Of A Cubic Material in SI Units Is 128 Kgm^{-3}. In Certain Units, the Edge Length Is 25 cm And Mass Is 50 g , Then The Numerical Value Of The Density Of Material In This System Of Units Is

A. 40

B. 640

C. 16

D. 410

$n_1 u_1 = n_2 u_2$

$128\ kg\ m^{-3} = n_2 \times \frac{2}{25 \times 25}\ g\ cm^{-3}$

$n_2 = \frac{64}{\cancel{128} \times 25 \times 25} \times \frac{\cancel{kg}}{\cancel{g}} \times \frac{m^{-3}}{cm^{-3}}$

$n_2 = 64 \times 25 \times 25 \times \frac{1000\ \cancel{g}}{\cancel{g}} \times \left(\frac{cm}{100\ cm}\right)^3$

$Density = \frac{50\ g}{(25)^3\ cm^3}$

$= \frac{50}{25 \times 25 \times 25}\ g\ cm^{-3}$

$$= 64 \times 25 \times 25 \times 1000 \times \frac{1}{100 \times 100 \times 100}$$

$$= 64 \times 25 \times \frac{1}{4 \times 10} = 40$$

$$128\ kg\ m^{-3} = 40$$

The Density Of A Cubic Material Is SI Units Is 128 Kgm^{-3}. In Certain Units, the Edge Length Is 25 cm And Mass Is 50 g , Then The Numerical Value Of The Density Of Material In This System Of Units Is

A. 40

B. 640

C. 16

D. 410

Electron Volt is the unit of

A. Luminosity

B. Force

C. Frequency

D. Energy ✓

Potential difference (V) = $\frac{\text{Work done (W)}}{\text{Quantity of charge (Q)}}$

$V = \frac{W}{Q} \Rightarrow W = VQ$

equivalent to

energy — 1 Volt x 1 C

Electron Volt is the unit of

A. Luminosity

B. Force

C. Frequency

D. Energy

If the energy E of a photon is equal to $h\nu$, where ν is the frequency and h is Planck's constant, then the dimensions of Planck's constant is

(a) $[ML^2T^{-3}]$ (b) $[M^0L^2T^{-1}]$

(c) $[ML^2T^{-1}]$ ✓ (d) $[ML^2T^{-2}]$

$E = h\nu$

$h = \frac{E}{\nu} \longrightarrow \frac{[ML^2T^{-2}]}{[M^0L^0T^{-1}]}$

Frequency $= \frac{1}{\text{Time period}}$

$h = [ML^2T^{-2+1}]$

$= [ML^2T^{-1}]$

If the energy E of a photon is equal to $h\nu$, where ν is the frequency and h is Planck's constant, then the dimensions of Planck's constant is

(a) $[ML^2T^{-3}]$ (b) $[M^0L^2T^{-1}]$

(c) $[ML^2T^{-1}]$ (d) $[ML^2T^{-2}]$

ANSWER : (C)

Photon is quantum of radiation with energy $E = h\nu$ where ν is frequency and h is Planck's constant. The dimensions of h are the same as that of

(a) Linear impulse
(b) Angular impulse
(c) Linear momentum
(d) Angular momentum ✓

$$\frac{ML^2T^{-2}}{T^{-1}} = [ML^2T^{-1}]$$

Impulse { Force x time $= [MLT^{-2} \times T] = [MLT^{-1}]$ — α

Momentum — Linear — mass x velocity $[MLT^{-1}]$ — α

Momentum — Angular — $\frac{\text{change in torque}}{\text{time}}$ $\frac{\text{torque}}{\text{time}} = \frac{\text{Energy}}{\text{time}}$ ✓

Angular momentum

$$\frac{\text{change in torque}}{\text{time}} \rightarrow \frac{ML^2T^{-2}}{T} \rightarrow [ML^2T^{-1}] \checkmark$$

equivalent to energy

Which of the following pairs of physical quantities does not have same dimensional formula?

(a) Work and torque. ✓
(b) Angular momentum and Planck's constant. ✓
(c) Tension and surface tension.
(d) Impulse and linear momentum. ✓

Tension — force — $[MLT^{-2}]$

surface tension — $\frac{\text{force}}{\text{length}}$ — $[MT^{-2}]$

(Momentum ⟶ Linear momentum)

Which of the following pairs of physical quantities does not have same dimensional formula?

(a) Work and torque.
(b) Angular momentum and Planck's constant.
(c) Tension and surface tension.
(d) Impulse and linear momentum.

ANSWER : (C)

The mean length of an object is 5 cm. Which of the following measurements is most accurate?

(a) 4.9 cm ✓
(b) 4.805 cm
(c) 5.25 cm
(d) 5.4 cm

The closest the measurement to true value ⇒ most accurate result

Least difference ⟶ most accurate

Which of the following are *not* a unit of time?

(a) Second
(b) Parsec
(c) Year
(d) Light year

multiple select question,

Units for measuring very large distances

Answer : (b) and (d)

NDA-CDS 1 2025

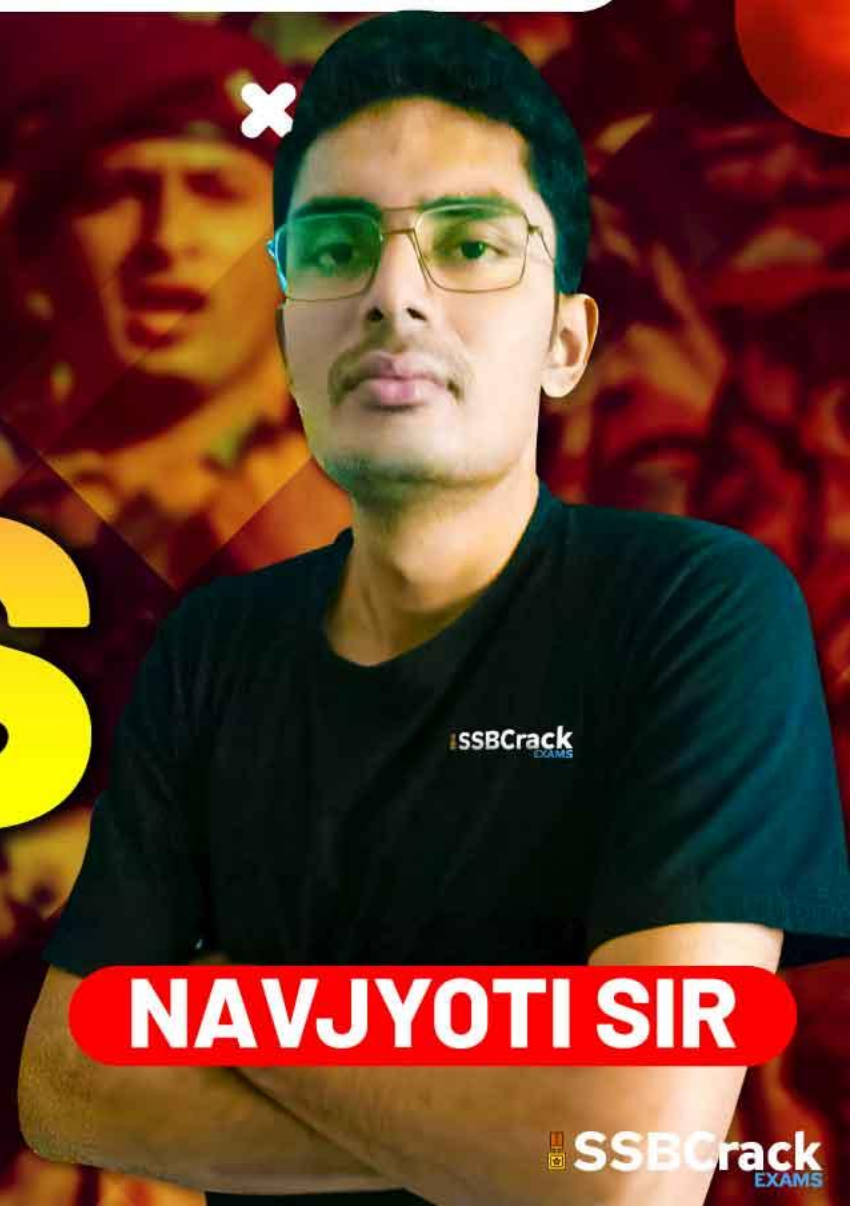
GS

LIVE

PHYSICS

REFLECTION OF LIGHT

CLASS 2



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