

Unit-2

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Physics:- It is the study of fundamental relation between matter and energy.

In physics we study about those quantities which can be measured. Such quantities are called physical quantities.

We have seven fundamental physical quantities

S.No	Base Quantity	Name	Symbol
1	Length	Meter	m
②	Time	Second	s
③	mass	Kilogram	kg
④	temperature	°Kelvin	K
⑤	Electric current	ampere	A
⑥	Amount of substance	mole	mol
⑦	Luminous Intensity	candela	cd.

Derived physical quantities:-
These physical quantities is derived from fundamental quantities.

$$\text{Velocity} = \frac{\text{Displacement}}{\text{time}}$$

$$= \frac{\text{length}}{\text{time}}$$

$$v = \frac{x}{t}$$

System of units:-

(i) C.G.S System:-

In this system the length is measured in centimeter mass in gram and time in second.

(ii) F.P.S System

F = foot (length)

P = Pound (mass)

S = Second (time)

(iii) M.K.S System

M = Meter (Length)

K = Kilogram (Mass)

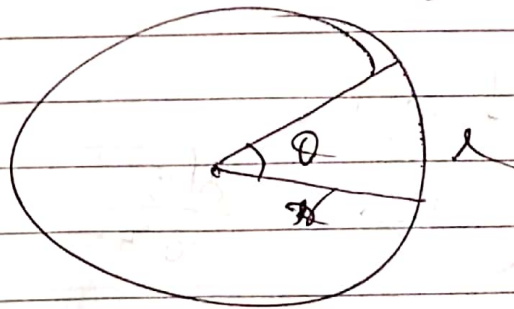
S = Second (Time)

S.I units :-

It is modified form of M.K.S & called S.I unit.

Two subsidiary units have been included in S.I units

(9) Geometrical angle



$$\theta = \frac{l}{r} \text{ (radian)}$$

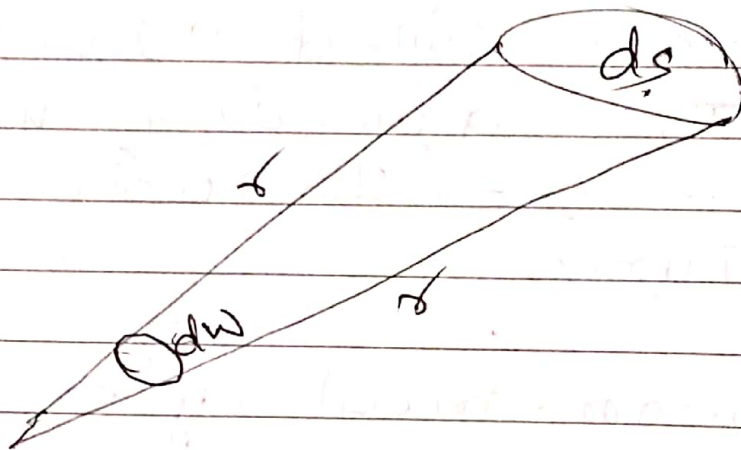
$$180^\circ = \pi \text{ radian}$$

$$1^\circ = \frac{\pi}{180} \text{ radian}$$

$$30^\circ = 30 \times \frac{\pi}{180}$$
$$= \frac{\pi}{6} \text{ rad.}$$

$$45^\circ = 45 \times \frac{\pi}{180}$$
$$= \frac{\pi}{2} \text{ rad.}$$

② Solid angle

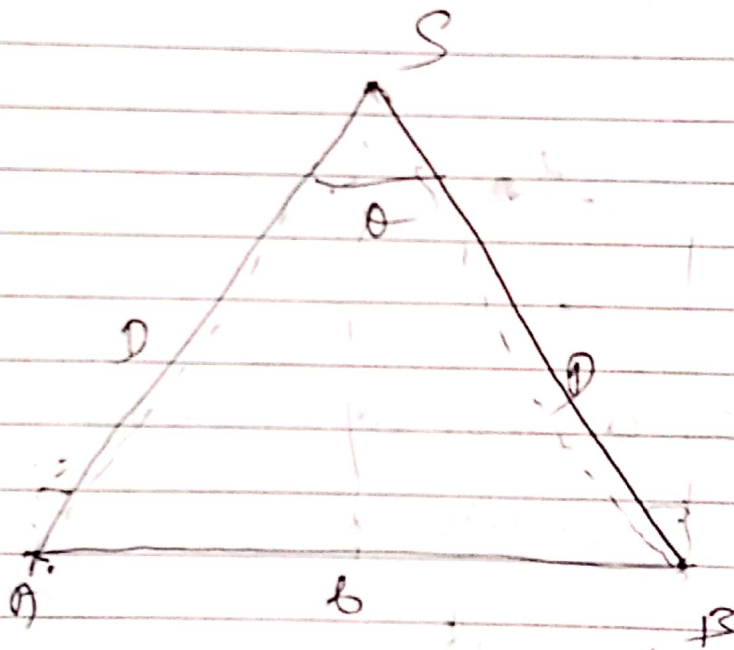


Solid angle

$$d\omega = \frac{ds}{r^2} \text{ Steradian}$$

Measurement of Astronomical distances (Parallax method):-

When two stationary distant objects are viewed from different positions, it is found that there is virtual separation between them, this is called parallax.



$$AB = \text{basis} = b$$

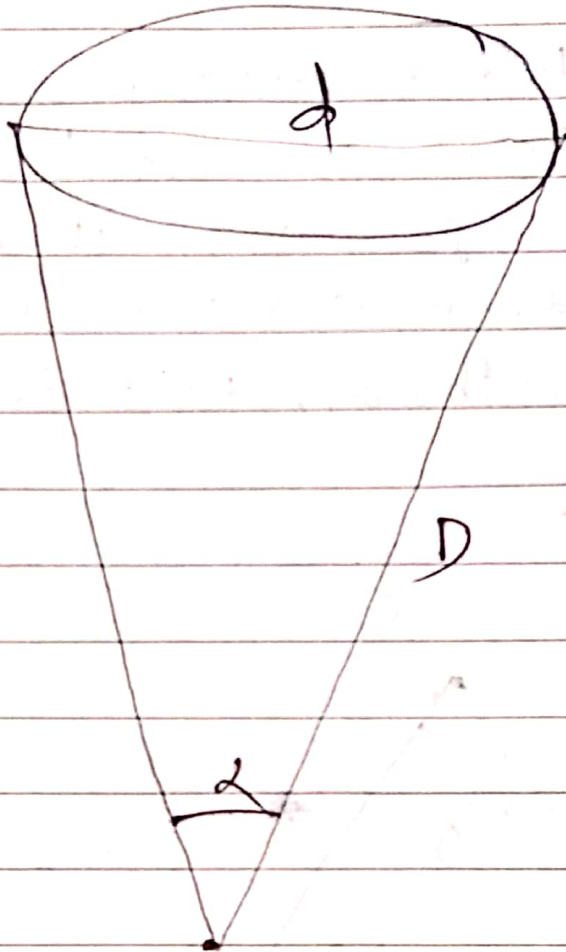
θ = parallaxic angle

$$\text{Distance} = D$$

$$\theta = \frac{b}{D}$$

$$\boxed{D = \frac{b}{\theta}}$$

Angular Diameter



α = angular diameter

D = distance

$$\alpha = \frac{d}{D}$$

$$\boxed{d = \alpha D}$$

Range of lengths:

Smaller units

$$1 \text{ f} = 1 \text{ fermi} = 1 \times 10^{-15} \text{ m}$$

$$1 \text{ p} = 1 \text{ pica} = 1 \times 10^{-12} \text{ m}$$

$$1 \text{ n} = 1 \text{ nano} = 10^{-9} \text{ m}$$

$$1 \mu = 1 \text{ micro} = 10^{-6} \text{ m}$$

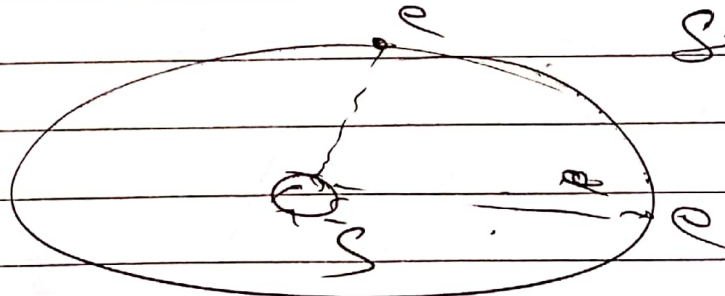
$$1 \text{ m} = 1 \text{ milli} = 10^{-3} \text{ m}$$

Astronomical units

Large units:

1 astronomical unit (AU)

1 AU = Avg radius of earth
around
Sun.



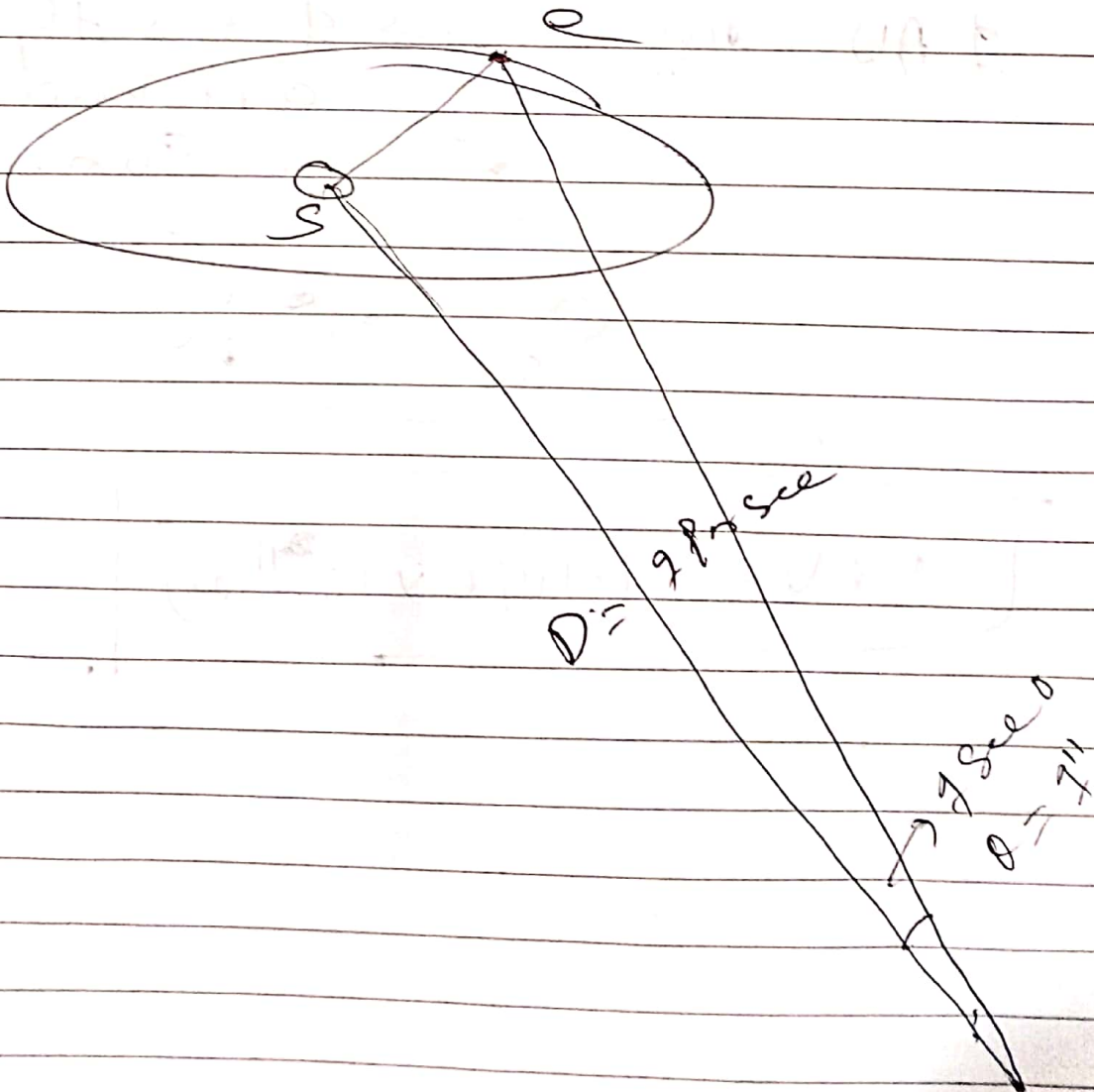
$$1 \text{ AU} = 1.496 \times 10^{11} \text{ m}$$

Light year:-

The distance travelled by light in one year is called one light year

$$1 \text{ ly} = 9.46 \times 10^{15} \text{ m}$$

Parsec



It is the distance of 1 parsec
from a point which subtends
an angle of $1''$ to earth
looking towards Sun.

$$1 \text{ parsec} = 3.08 \times 10^{16} \text{ m}$$