

SURVEYING

(#) Introduction :-

Earth - earth is an oblate spheroid.

Diameter = 12740 km (Average)

Average Radius = 6370 km

At equator = 12756.75 km

At Poles = 12713.80 km

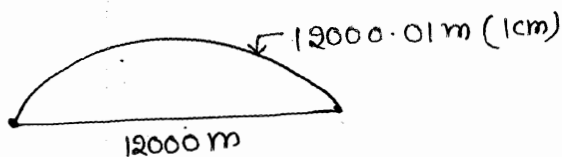
difference = 42.95 km

0.34%

(#) Types of Surveying :

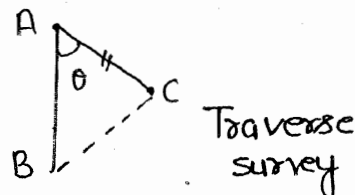
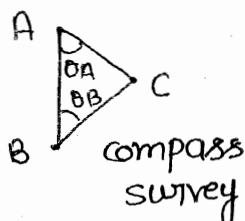
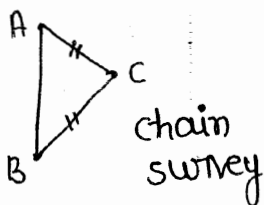
(1) Geodetic Survey : If earth curvature is considered for survey work.

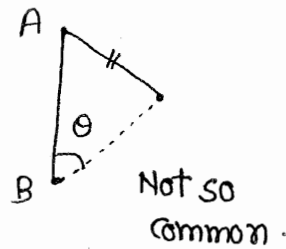
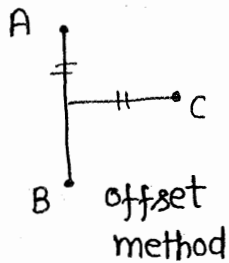
(2) Plane survey : If earth curvature is not considered suitable for small distance.



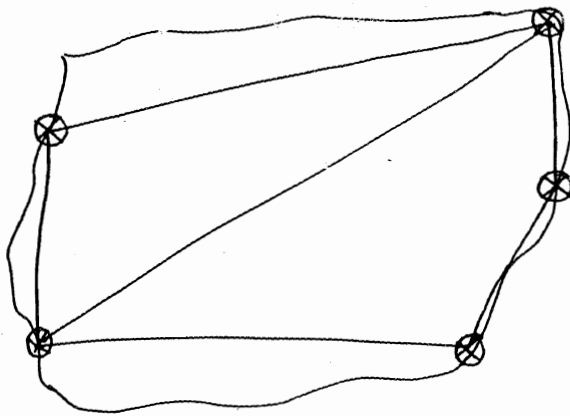
(#) Principle of surveying :-

(1) Location of point is measured w.r.t. two reference points.





(2) Working Whole to part :-



→ Major control points are decided & measured accurately with high degree of precision. Minor details can be collected later to avoid the error to be accumulated.

LINEAR MEASUREMENTS

(#) (1) Scale :- Scale is a ratio of map distance to ground distance.

If on the drawing.

Scale \Rightarrow 1 cm = 100 m

1 cm on paper = 100 m on ground

Ratio :- $\frac{1 \text{ cm}}{100 \text{ m}} = \frac{1 \text{ cm}}{10,000 \text{ cm}} = \frac{1}{10,000}$ (R.F.)

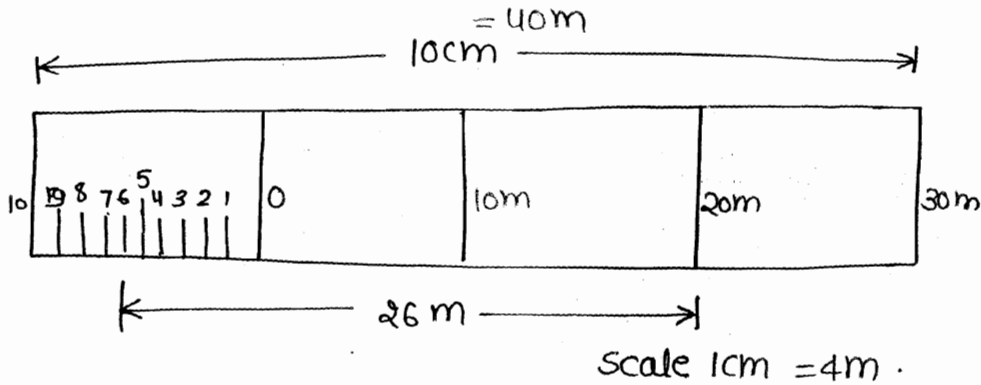
R.F = Representative fraction.

Types of Scale :-

(1) Plane scale :- Plane scale measure only two dimension.

$$1\text{cm} = 4\text{m}$$

(#) How to make a scale $1\text{cm} = 4\text{m}$ —



(1) Take a 10cm long line divide it in 4 equal parts. Each part is of 10m length.

(2) Now divide 1st part in another 10 parts. This smaller divisions will show 1m.

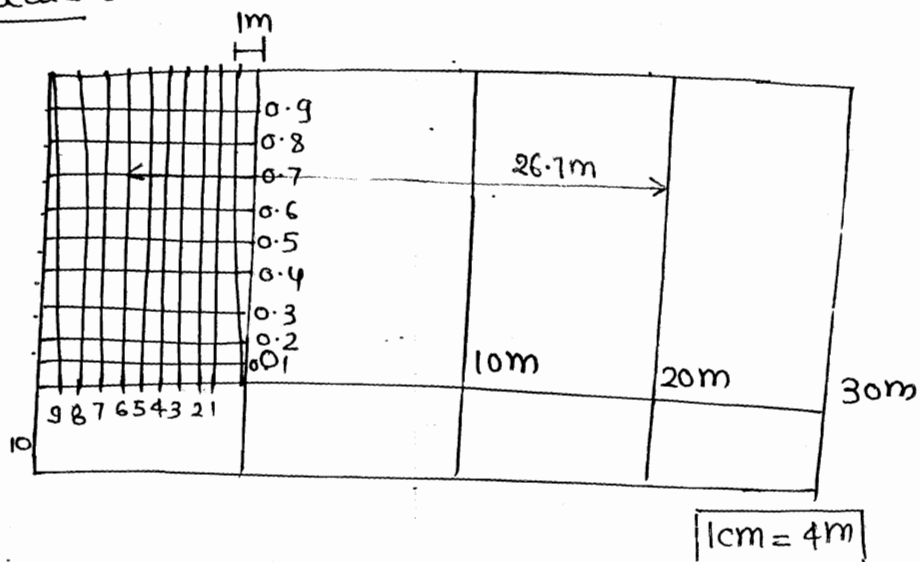
Two dimension that can be read

(1) 10m (Decameter)

(2) 1m (meter)

(2) Diagonal scale :-

this scale can read upto three dimension



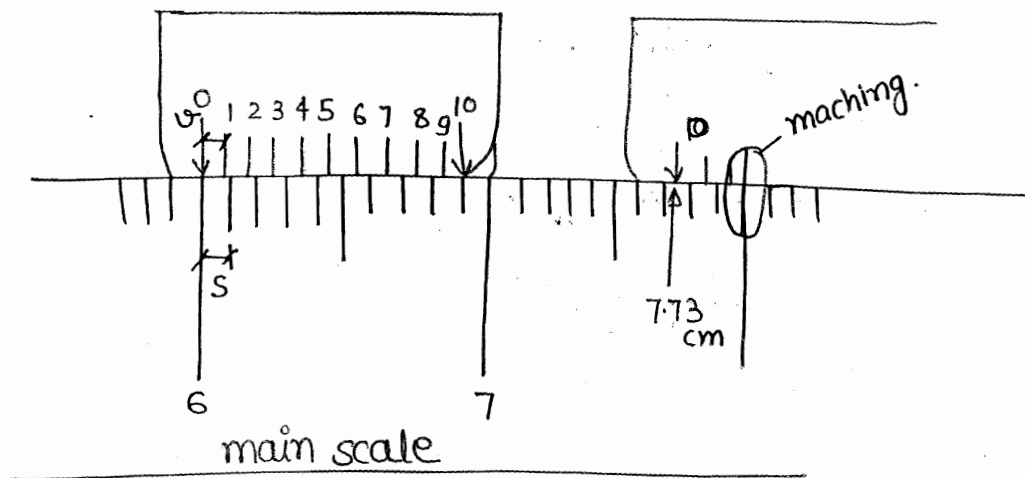
→ It works on the principle of similar triangle.

→ Three dimension

(1) 10m	→	Decameter
(2) 1m	→	meter
(3) 0.1m (10cm)	→	Decimeter.

(3) Vernier Scale :-

(1) Direct Vernier :-



→ In case of direct vernier $(n-1)$ division of main scale is divided into n divisions of vernier scale.

$$(n-1)s = nxv$$

$$v = \frac{(n-1)}{n} \times s$$

⊕ Least Count :- least count is the minimum dimension that can be read by a scale.

$$\text{Least count} = s - v$$

$$= s - \frac{(n-1)}{n} \times s$$

$$= \frac{sn - ns + s}{n} = \boxed{\frac{s}{n}}$$