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ID **16242**

SUBJECT **SURVEY I**

SEMESTER **02**

EXAME **FINAL TERM**

DATE **22-06-2020**

SUBIMMITTED **ENGE HUMAIRA**

Q1) The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line 2.82, 3.37, 5.82, 4.26, 6.59, 7.90, 8.52., 7.42, 5.43 m. Calculate the area enclosed between the survey line, irregular boundary line and first and last offset by:

A) Simpson's rule **B) Trapezoidal Rule** **C) Average ordinate Rule**

(Ans) **2.82 , 3.37 , 5.82 , 4.26 , 6.59 , 7.90 , 8.25 , 7.42 , 5.43**

2.82 , 3.37 , 5.82 , 4.26
6.59, 7.90 , 8.52 , 7.42
5.43m

(A) Simpson's Rule

Area = A = $d/3$ $(O_0 + 4xO_1 + 2xO_2 + 4xO_3 \cdots + 2xO_{n-2} + 4O_{n-1} + O_n)$

Area = $10/3$ $\{(2.82 + 4x(3.37 + 4.26 + 7.90 + 7.42) + 2x(5.82 + 6.59 + 8.52) + 5.43)\}$

= $3.33\,(2.82 + 91.8) + (41.86) + 5.43(94.12) \cdots + 47.29)$

Area = 473.06 Sq.m

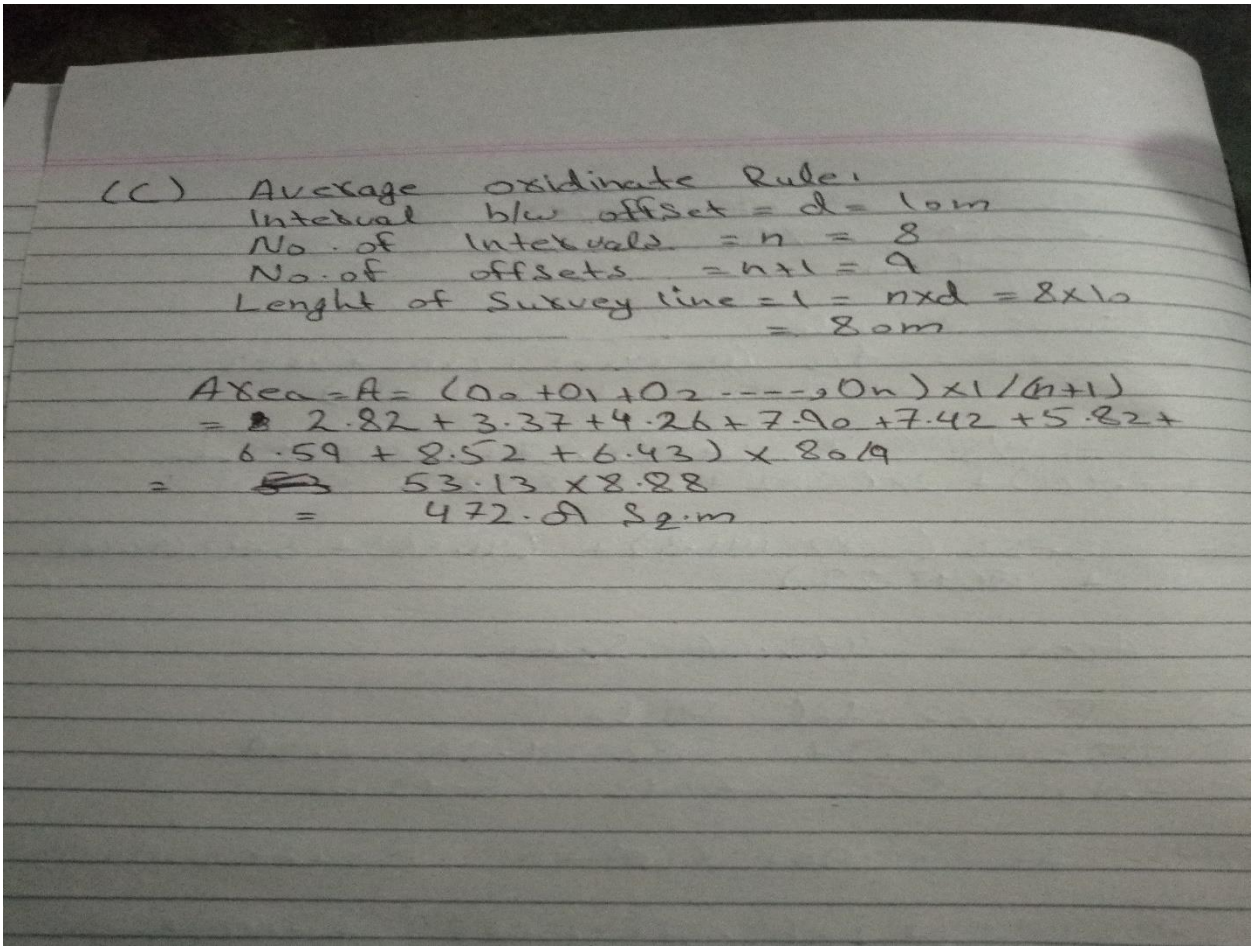
(B) Trapezoidal Rule

2.82 , 3.37 , 5.82 , 4.26 , 6.59 ,
7.90 , 8.52 , 7.42 , 5.43 m

Area = A = $d/3$ $\{(O_0 + 2x(O_1 + O_2 + O_3 + 2xO_{n-1})O_n)\}$

= $10/3\,(2.82 + 2x(3.37 + 4.26 + 7.90 + 7.42) + \cdots + 2x(5.82 + 6.59 + 8.52) + 5.43$

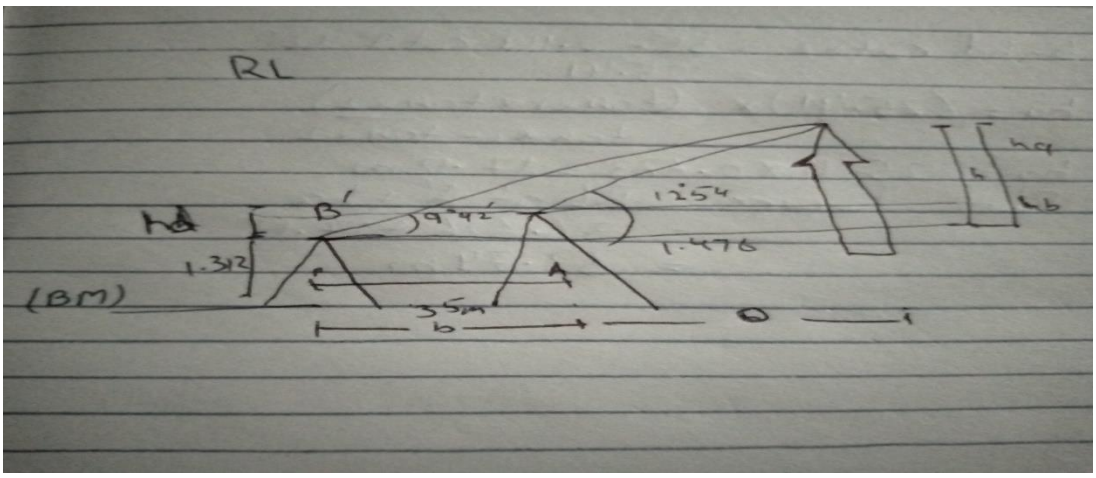
$= 3.33\,(2.82 + 2x(22.95) + 2(20.93) + 5.43$
$= 3.33\,(2.82 + 45.9 + 47.29)$
$= 3.33 \times 96.01$
$= 320.01$ Sq.m



Q2) To determine the elevation of top of church tower, the following observations were made • Station A and B and top of church tower are in the same vertical plane. Distance between A and B = 35 m.

Instrument Station	**Reading on BM**	**Angle of Elevation**	**Remarks**
Station A	**1.476**	**12 o 54'**	**Reduced level of bench marks is 35.150m**
Station B	**1.362**	**9 o 42'**	

(ANS)



RL of 1st axiset $A' = 35.150 + 1.476$

$A' = 36.626$

RL of int axiset $B' = 35.150 + 1.362$

$B' = 36.512$

difference $= hd = 36.626 - 36.512$

$hd = 0.114$

correction $= (b - hd \cot\alpha 2)$

$b - hd \cot\alpha 2 = 35 - 0.114 \cot 9°42''$

$= 25.41$

$ha = (25.41) \times \frac{(\tan\alpha 1 \times \tan\alpha 2)}{\tan\alpha 1 - \tan\alpha 2}$

$ha = 25.41 \times 0.673 = 17.12\ m$

RL of tower = RL at $A' + ha$

$= 36.626 + 17.12$

$= 53.74\ m$

Q3) Two straights AB and AC intersect at a chainage of 4242m. The angle of intersection is 140 ^{o} it is required to set out 5 ^{o} curve to connect the straights. Calculate all the data necessary to set out the curve by method of offsets from the chord produced. Peg interval is 30m.

(ANS)

The chain used is of 30m.

Radius of the crave , R=1720\D= 344m

DEFLECTION ANGLE = 180-140= 40 DEGREE

Tangant length = Rtan (d\2)=344 tan 20*= 125,2m

Point B =4242 m

Chaning of T1 = (4242-125.2) = 4116.8m

Length corve RD\180 =240.16M

Chaining of T2 = t1 +length od corve

Courve = 4116,.8+240.16 m

Length of chords

C1 = 4140-4116.8=23.2m

C9= 4356.96-4350= 6.96m

Hence there will be nine chords althogether

The offsite are

The bearing of the two straight AB and CD which intersect at E are 65 degree ans 100 degree

Respectively

Q4) Explain the following

1. **Objective of hydrographic surveying**
2. **Equipment for making sounding**
3. **Classification of leveling**

(Ans). Objective of hydrographic surveying

1) Measurement of tides for sea coasts i.e. construction of the sea defense work, harbors etc

2) Determination of the bed depth by sounding

a) For navigation
b) Location of rock, sand bar, buoys, navigation lights etc.
c) For location of the under water works , volume of the under water excavation etc.
d) In connection with irrigation & land drainage scheme.

3) Determination of direction of current in connection with

a) Location of sewer out fall
b) Determination of the area subjected to silt & scour
c) For navigation purposes

4) Measurement of quantity of water & flow of water in connection with water scheme, power scheme, flood control etc.

Equipment for making sounding

1. Soundind boat

In hydrographic surveying, sounding is the measurement of depth below the water surface. Sounding is most important for any water body to improve its navigable properties, to know about silting and scouring etc.

2. Sounding Rod

a) Sounding rod are convenient in shallow & smooth water up to depth of about 4 to 6m (15 to 20 feet) .
b) They are made of well season tough timber & are circular in cross section of 5cm diameter (2inch) & usually 3 to 7.5m long (12 to 25ft long) , graduated in meter or feet with a metal shoe at the bottom
c) Direct depth measurements are taken by lowering it vertically into the water until it hits the bottom & reading the graduation at the surface

3. Lead Line

a) Lead lines are also called sounding lines are used for depth over about 6m (20ft). It consists of suitable length of stretchresistance cord or other material to which a heavy lead weight 5 to 10 lb is attached.
b) The cord is marked with feet or meter graduation & there should be checked frequently against a steel tape, for their accuracy.
c) In use the weight is lowered into the water being careful to keep the cord vertical. The graduation at the surface is read when the weight hits bottom

4. **Sounding chain**
    a) For regular sounding a brass chain is most satisfactory since its length is practically constant.
    b) The links are welded . the brass tags are attached at 0.2m interval but leather or cloth tags are preferred as the brass tags can injure the hands of the lead man .
    c) The chain should be tested periodically
5. **Sounding Lead**
    a) The weight attached to the lead line conical in shape & varies from 2.5 kg to 12.5 kg depending upon the depth of water & the strength of the water currents.
    b) The shallow still water weight equal to 2.5 kg (5 lb)
    c) Moderate depth upto 10m (40 ft) weight is equal to 5kg (10lb)
    d) Greater the depth where current are strong weight is equal to 10kg (20lb)
    e) The weight is circular in cross section & length equal to 3 to 4 diameter & slightly tapers towards the top end.
6. **Sounding Machine**
    a) It is very useful when much sounding is to be done.
    b) The type commonly used in hand driven & consists of a paino wire carrying a 7 kg load & wound around a drum .
    c) Two dials , the outer one indicated the depth in m or ft & an inner one is tenth of a meter
7. **Fathometer:**

a. For ocean sounding an instrument known as fathometer is used.
b. It is electric device and measure the time required for the sound (impulses) travel to the bottom of water and back.
c. The travel time is converted into depth displayed in either digital or graphic for fathometer is also called echo sounder.

8. **Sextant:**
    a. The theodolite and other instrument used in land surveys are not used in a boat where the support is unstable. The sextant is well suited to hydro graphic work and has the added advantage of measuring angles in any plane.
    b. It is the most precise hand instrument yet device for measuring angles.
    c. There are two versions of the instruments

    a) Nautical sextant (or sounding sextant)
    b) Box sextant

9. **Signals:**

a. Shore signals are required to mark the ranges i.e, lines along which sounding are to taken and the reference points to which angular observations are to be taken from the boat.
b. They should be clearly visible for considerable distances. If the water is shallow, ordinary pole signal may be used but if water deep buoys are used as signals.

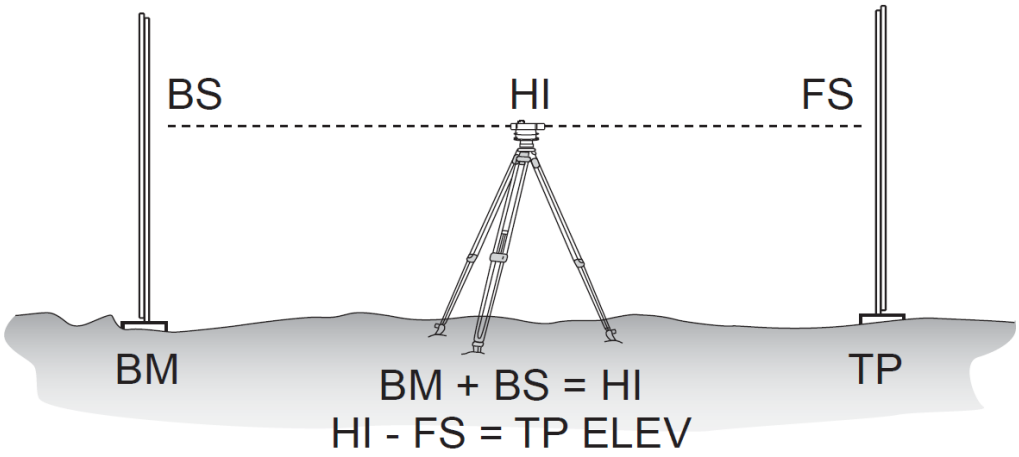
10. Ranges:

a. The lines on which sounding are taken are called ranges or range lines.
b. They are laid on the shore parallel to each other and at right angles to the shore line or radiating form a prom nay natural object when the shore line is very irregular.
c. Each range line should be marked by means of signals erected at 2 points it, at considerable distance apart.
d. The spacing of range lines vary form 6m 30m (20 to 100ft) depending upon the object of survey and the nature of the bottom.

Classification of Leveling

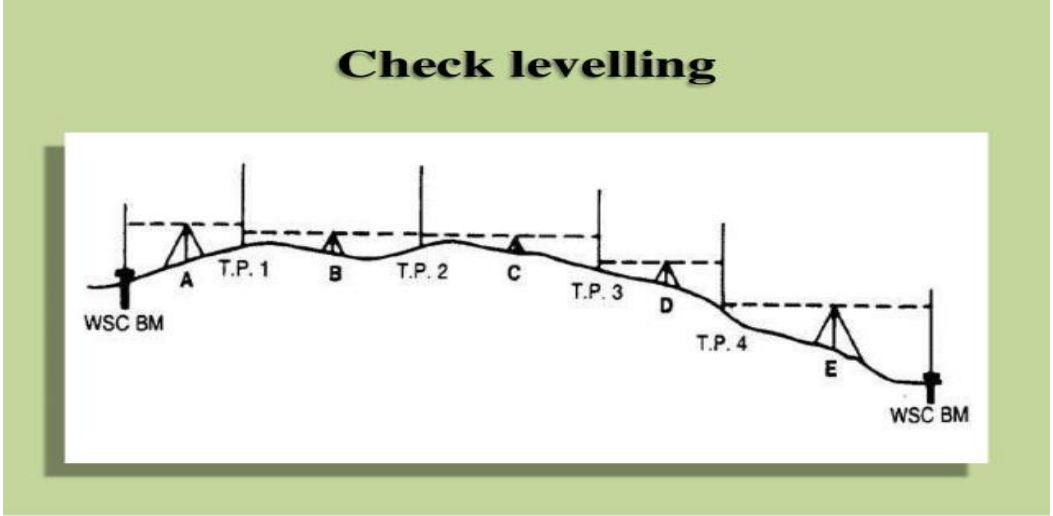
Differential Leveling

Differential leveling is a technique used to determine differences in elevation between points that are remote from each other. Differential leveling requires the use of a surveyor's level together with graduated measuring rods. An elevation is a vertical distance above or below a referenced datum.



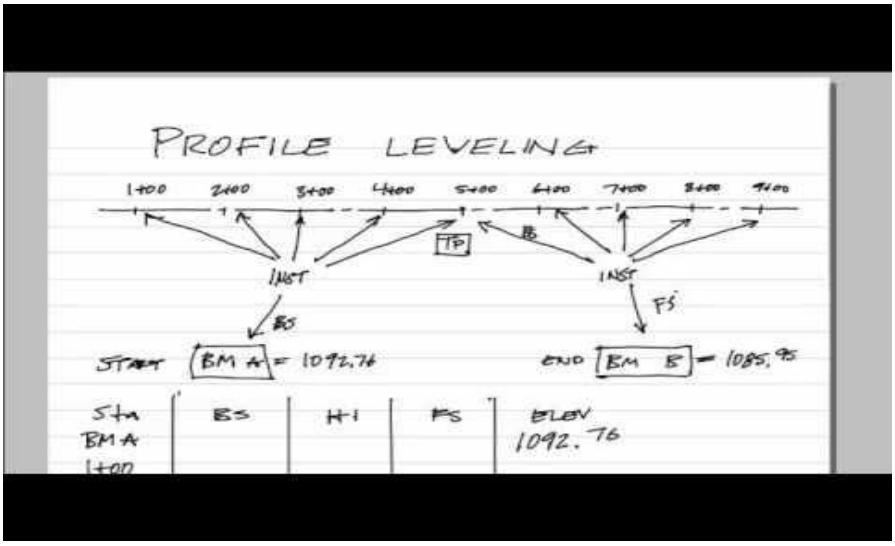
Check leveling

It is the operation of running levels for the purpose of checking a series of levels, which have been previously fixed.



Profile leveling

Profile leveling is a method of surveying that has been carried out along the central line of a track of land on which a linear engineering work is to be constructed/ laid. The operations involved in determining the elevation of ground surface at small spatial interval along a line is called profile leveling.

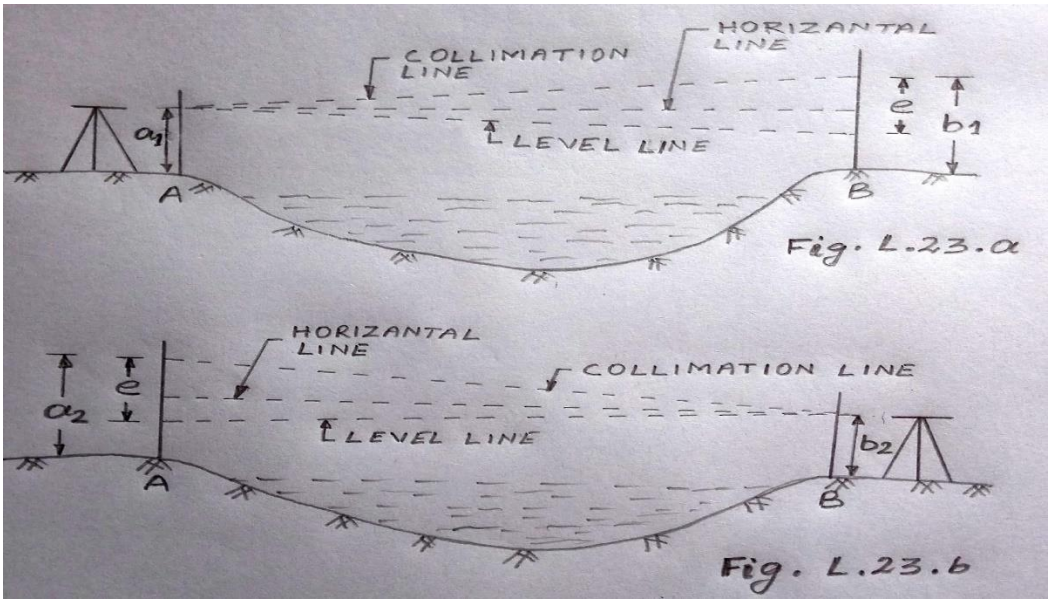


Cross-sectioning

In profile leveling, you determine the elevations of a series of points lengthwise along a highway. In cross-section leveling, you determine the elevations of points on a succession of lines running at right angles to the lengthwise line of the highway.

Reciprocal Leveling

In reciprocal levelling, the level is set up on both bank of the river or valley and two sets of staff reading is taken by holding the staff on both banks in this case it is found that error is completely eliminated and true difference of level is equal to the mean of the two apparent difference of level.

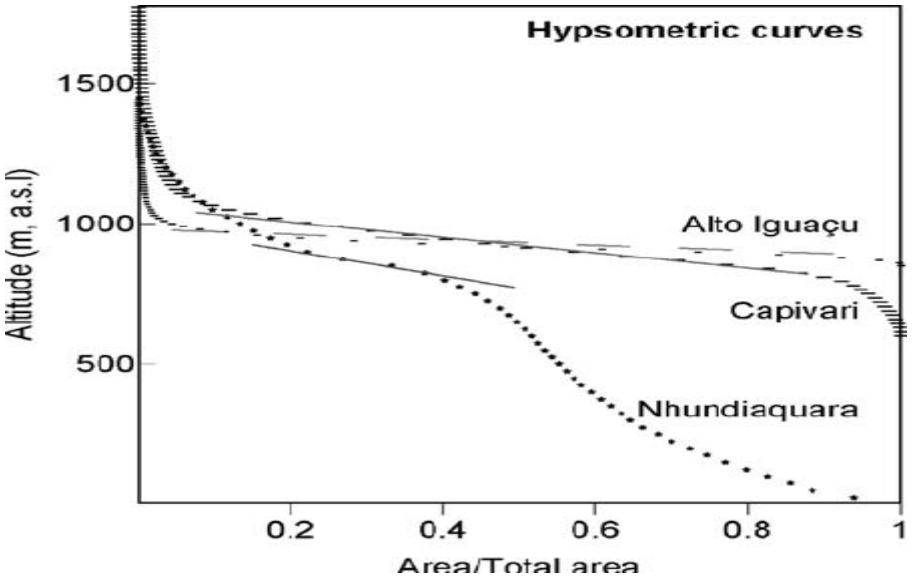


Barometric Leveling

A type of indirect leveling in which differences of elevation are determined from differences of atmospheric pressure observed with altimeters or barometers.

Hypsometric Leveling

Hypsometry describes the distribution of elevation of land with respect to sea level within an area of interest, with positive values being above sea level and negative values below sea level.



Trigonometrical Leveling

Trigonometric Leveling is the branch of Surveying in which we find out the vertical distance between two points by taking the vertical angular observations and the known distances. The known distances are either assumed to be horizontal or the geodetic lengths at the mean sea level(MSL).

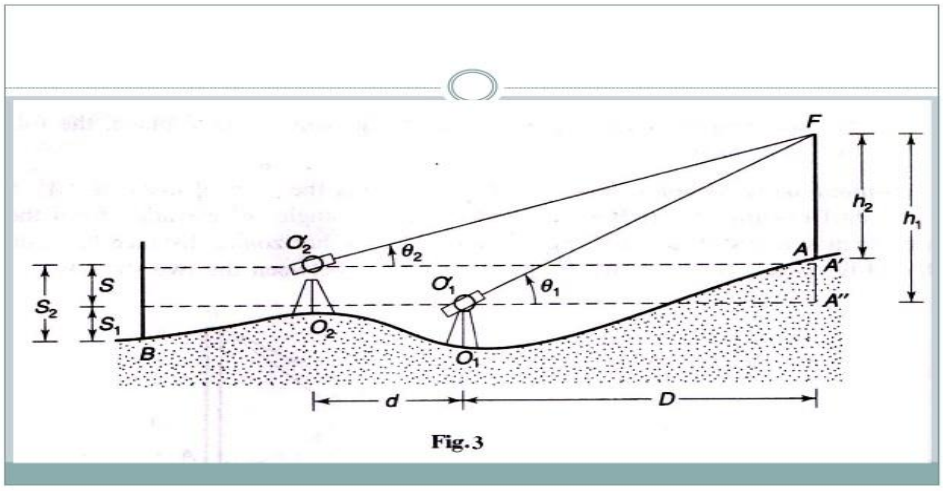


Fig. 3