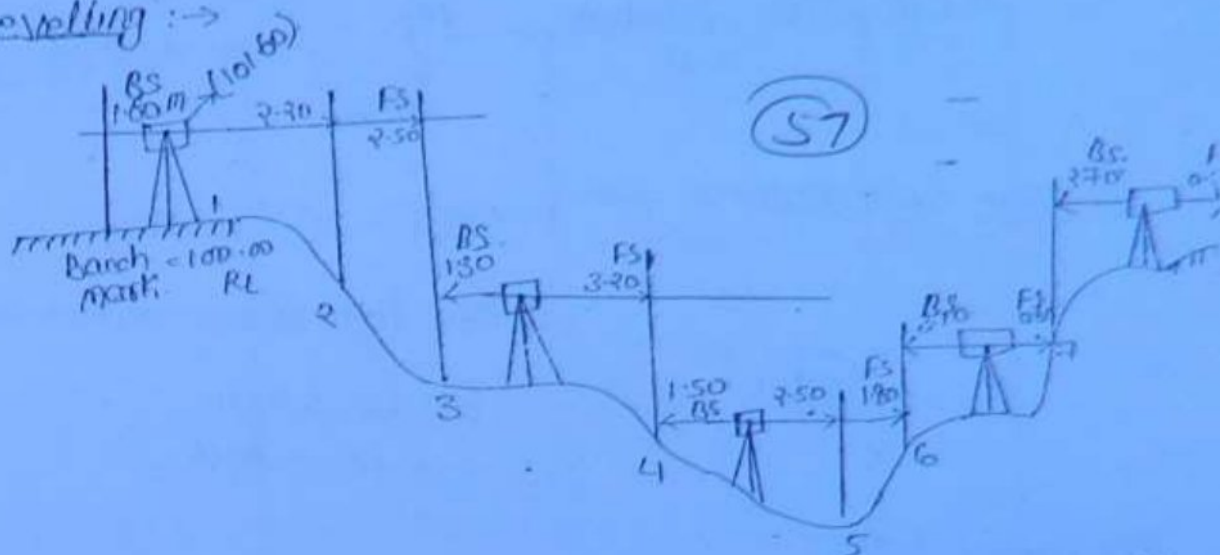


★ Levelling :->



Terms :->

- ① Reduced Level :-> Reduced level of point on earth surface is the elevation of that point w.r. to a fixed location (mean sea level) or C.O.R. length of certain bench marks.
- ② Back Sight (Reading) :-> First reading taken after setting up the instrument (leveling instr.) at a particular location.
- ③ Fore Sight (Reading) :-> Last reading taken from an instrument location after which ^{operation} instrument is being changed is called fore sight reading.
Last reading after which survey work is closed is also a fore sight.
- ④ Intermediate Sight :-> All other readings than BS and FS are intermediate sight.
- ⑤ Height of Instrument :-> The elevation of line of sight at particular instrument location.
$$H.I \text{ of } 1^{th} \text{ location} = RL \text{ of BM} + BS @ 1$$

$$\text{H.I. of next station} = \underset{\substack{\uparrow \\ \text{Height}}}{\text{HI}} - \text{FS}_{(2)} + \text{BS}_{(3)}$$

⑥ Rise and fall: \rightarrow 1st reading - 2nd reading

(taken from same instrument station)

(58)

(+) ve \rightarrow Rise
(-) ve \rightarrow Fall

⑦ Level Book: \rightarrow

Point	Back Side (BS)	Intermediate at Side (IS)	Fore Side (FS)	Height of Instrument (HI)	R.L
1 BM	1.60			101.60	100.00 (Given)
2		2.20			99.40 = 101.60 - 2.20
3	1.30		2.50	99.10 + 1.30 = 100.40	99.10 = 101.60 - 2.50
4	1.50		3.20	97.20 + 1.50 = 98.70	97.20
5		2.50	4.80		96.20 = 98.70 - 2.50
6	3.10		4.80		
7	2.70		70.60		
8			70.70		

Rise and fall method: \rightarrow

Level Book	Rise	Fall	R.L
	-	-	100.00
		0.60	99.40
	(59)	0.30	99.10
			to

⊕ Check: \rightarrow add All back side reading =

add All fore side reading =

the calculated difference b/w two reading

than add All rise =

add All fall =

difference b/w rise and fall

$$\text{Check } EBS - EF_s = \text{Last R.L} - \text{1st R.L.}$$

$$= E_{\text{Rise}} - E_{\text{Fall}}$$

2000-2020 → 73

Problem: → In running fly levels from a BM of RL 120.75 the following readings were obtained

BS = 0.85 1.285 1.182 0.965 0.49
 FS = 0.555 1.150 1.945 1.755 -

60

from the last position of the instrument seven ^{page} at 10m interval are to be set out on a uniform descending gradient of 1 in 50. The first page is at RL 120.00m. Work out the staff readings for setting the top of pages. Fall the level book and carry out arithmetic checks

Solution:-

Points	BS	IS	FS	Rise	Fall	RL
1	0.85		-			120.750
2	1.285		0.555	0.295		121.045
3	1.182		1.150	0.135		121.180
4	0.965		1.945		0.763	120.417
5	0.49		1.755		0.790	119.627
6		0.117		0.373		120.00
7		0.317			0.20	119.80
8		0.517			0.20	119.60
9		0.717			0.20	119.40
10		0.917			0.20	119.20
11		1.117			0.20	119.00
12					0.20	118.80
check	Σ BS = 4.792	Σ IS = 1.317	Σ FS = 6.735			

Seven pages are to set
each at distance = 10m
at gradient 1 in 150 pages

(61)

$$= 10 \times \frac{1}{150} = 0.0667 \text{ m}$$

The 1st page A.L = 120.0m

Check (1) $IS = EFS - EBS = 6.722 - 4.772$
 $= 1.95m$

(2) $RL = NP.L - \text{Last RL}$
 $= 120.750 - 119.20$
 $= 1.95$

(3) $E_{\text{rise}} + E_{\text{fall}} =$
 $-0.603 + 2.75 = 1.95m$

∴ than ok Ans

← 0 →

14442-2) (time at 2000)
 Problem (HW)

(62)

problem → fill the missing data of a level book

point	BS	IS	FS	Rise	Fall	R.L.
1	3.125 ←			∧	∧	123.60 (J)
2	(A) 2.265 ←		(B) 1.80	1.325		125.005
3		2.32 →			0.055	124.95 (K)
4		(C) 1.92 →		0.40 (F)		125.350
5	(H) 1.04 ←		2.655	(G) 0.735		124.615 (L)
6	1.620 ←		3.205		2.165	122.45 (M)
7		3.625 →		(I) 2.005		120.445 (N)
8			(E) 1.40	2.145 (D)		122.590

$EB = 8.05$ $EF = 7.14$ $ER = 3.87$ $EF = 4.96$

Solution

$$J = 125.005 - \text{Rise } (1.325)$$

$$J = 123.60$$

$$B = 3.125 - 1.325 = 1.80$$

$$A = 2.32 - 0.055 = 2.265$$

$$K = 125.005 - 0.055 = 124.95$$

$$F = 125.350 - 124.95 = 0.40$$

Rise

$$C = 2.32 - 0.40 = 1.92$$

$$G = 1.92 - 2.655 = -0.735 \text{ (Fall)}$$

$$L = 125.35 - 0.735 = 124.615$$

$$D = 3.205 - 2.165 = 1.04$$

$$M = 124.615 - 2.165$$

$$M = 122.45$$

$$H = 1.620 - 3.625 = -2.005 \text{ (Fall)}$$

$$N = 122.45 - 2.005 = 120.445$$

$$I = 122.59 - 120.445 = 2.145 \text{ (Rise)} \quad (63)$$

$$E = 3.625 - 2.145 = 1.48$$

check =

$$\textcircled{1} \text{ EF}_S - \text{EB}_S \Rightarrow 9.14 - 8.05 = 1.09$$

$$\textcircled{2} \text{ EF} - \text{ER} \Rightarrow 4.96 - 3.87 = 1.09$$

$$\textcircled{3} \text{ 1st PL} - \text{Last PL} = 123.68 - 122.590 = 1.09$$

than 0.19 any

Problem: \Rightarrow following consecutive readings were taken from dumpy level.

BS $\boxed{6.25}$, 4.92, 6.52, $\textcircled{9.35}$ FS
 BS $\textcircled{4.62}$, $\textcircled{3.50}$, $\textcircled{1.23}$, 3.97
 IS $\textcircled{6.8}$, $\textcircled{1.83}$ BS 3.52, 2.30
 IS $\textcircled{1.50}$, $\textcircled{2.40}$ BS 4.25, $\textcircled{3.50}$ FS

64

level was shifted after 4th, 6th, 9th and 13th reading. IF R.L. of 1st point - BM = 100.00
 Fill the level book and find out - R.L. of different points.

Solution: \Rightarrow

Point	BS	IS	FS	Rise	Fall	R.L.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						