Atolagbe Abdulbasit Suleiman

17/ENG03/011

Civil Engineering

QUESTION 1

1. Rise and fall method

Advantages

1. You can check your calculations three times thus ensuring accuracy.
2. There is a check on the reduced level of the intermediate point.

Disadvantages

1. It is laborious to carry out.
2. Reduction of level takes more time.

Height of collimation

Advantages

1. it is simple and easy.
2. Visualization is not necessary regarding the nature of the ground.

Disadvantages

1. Errors in the intermediate reduced level cannot be detected.
2. it is not as accurate as rise and fall method.
3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| B.S | I.S | F.S | H of C | R.L | Distance | Remark |
| 0.771 |  |  | 122.771 | 121 | 10 |  |
| 0.802 |  | 1.52 | 121.053 | 120.251 | 20 | C.P |
|  | 2.311 |  |  | 118.742 | 30 |  |
| 3.580 |  | 1.990 | 122.643 | 119.063 | 40 | C.P |
|  | 1.220 |  |  | 121.423 | 50 |  |
|  | 3.675 |  |  | 118.968 | 60 |  |
| 2.408 |  | 4.020 | 121.031 | 118.623 | 70 | C.P |
|  | 0.339 |  |  | 120.692 | 80 |  |
| 0.780 |  | 0.157 | 121.654 | 120.874 | 90 | C.P |
|  | 1.535 |  |  | 120.119 | 100 |  |
|  | 1.955 |  |  | 119.699 | 110 |  |
|  | 2.430 |  |  | 119.224 | 120 |  |
|  | 2.985 |  |  | 118.669 | 130 |  |
| 1.155 |  | 3.480 | 119.329 | 118.174 | 140 | C.P |
|  | 1.960 |  |  | 117.369 | 150 |  |
|  | 2.365 |  |  | 116.964 | 160 |  |
| 0.935 |  | 3.640 | 116.624 | 115.689 | 170 | C.P |
|  | 1.045 |  |  | 115.579 | 180 |  |
|  | 1.630 |  |  | 114.994 | 190 |  |
|  |  | 2.545 |  | 114.079 | 200 |  |

Check=R.L at first point –R.L at last point=6.921

QUESTION 2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chainage(m) | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 |
| Offset length(m) | 0 | 2.65 | 3.80 | 3.75 | 4.65 | 3.60 | 5.00 | 5.80 | 6.10 | 5.85 |

Using Mid-ordinate rule:

A=$Σ$hd

h1= $\frac{0+2.65}{2}$=1.325m

h2= $\frac{2.65+3.80}{2}$=3.225m

h3= $\frac{3.80+3.75}{2}$=3.775m

h4= $\frac{3.75+4.65}{2}$=4.2m

h5= $\frac{4.65+3.60}{2}$=4.125m

h6= $\frac{3.60+5.00}{2}$=4.3m

h7= $\frac{5.00+5.80}{2}$=5.4m

h8= $\frac{5.80+6.00}{2}$=5.9m

h9= $\frac{6.00+5.85}{2}$=5.925m

$$Σh=1.325+3.225+3.775+4.2+4.125+4.3+5.4+5.9+5.925$$

$Σh=$38.175m

d=30m

A=$Σhd$

= $38.175×30$

A= $1145.25m^{2}$

Using average ordinate rule

A=$\frac{ndΣO}{n+1}$

n=9

d=30

$$ΣO=0+2.65+3.80+3.75+4.65+3.60+5.00+5.80+6.10+5.85$$

$ΣO=$41.2m

A=$\frac{9×30×41.2}{9+1}$

A=$112.4m^{2}$

Using trapezoidal rule

A=$d(\frac{0\_{1}+0\_{n }}{2}+0\_{2}+0\_{3}+0\_{4}............0\_{n-1})$

$$d=30$$

A=$30(\frac{0+5.85}{2}+2.65+3.80+3.75+4.65+3.60+5.00+5.80+6.10)$

A=$30(38.275)$

A=$1148.25m^{2}$

Using Simpson's rule

$$A=\frac{d }{3 }\left[\left(0\_{1}+0\_{n}\right)+4\left(0\_{2}+0\_{4}+.........0\_{n-1}\right)+2\left(0\_{3}+0\_{5}........0\_{n-1}\right)\right]$$

$$d=30$$

Note: Last offset was removed because number of offsets were even

$$A=\frac{30}{3 }\left[\left(0+6.10\right)+4\left(2.65+3.75+3.60+5,80\right)+2\left(3.80+4.65+5.00\right)\right]$$

$$A=962m^{2}$$

Calculating for last offset using trapezoidal rule

A=$d(\frac{0\_{1}+0\_{n }}{2}+0\_{2}+0\_{3}+0\_{4}............0\_{n-1})$

$$A=30\left[\frac{6.40+5.85}{2}\right]$$

$$A=183.75m^{2}$$

Therefore $ΣA=962+183.75$

$$A=1145.75m^{2}$$

