**IDOWU OLAGOKE**

**17/ENG03/025**

**CIVIL ENGINEERING**

**CVE 310**

**SURVEY**

**1a.)**

 **Methods of levelling**

* Rise and fall method
* Height of culmination method

 **RISE AND FALL METHOD**

**Advantages**

* It is easy to spot errors.
* There is a check on the RL of the intermediate points
* Errors in the intermediate RLs can be detected as all the points are correlated
* There are three checks on the accuracy of RL calculation
* This system is suitable where there are no intermediate sights

**Drawbacks**

* it is tedious
* Visualization is necessary regarding the nature of the ground

**HEIGHT OF CULIMINATION METHOD**

**Advantages**

* It is faster than rise and fall method
* There are two checks on the accuracy of RL calculation
* This system is suitable for longitudinal leveling where number of intermediate sights
* Visualization is not necessary regarding the nature of the ground

**Drawbacks**

* There is no check on the RL of the intermediate sight
* Errors in the intermediate RLs cannot be detected.

**1b.)**

Rl =110+matric no=110+25=135

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **B.S** | **I.S** | **F.S** | **H OF C** | **R.L** | **DISTANCE** | **REMARKS** |
| 0.771 |  |  | 135.771 | 135 | 0 | RL |
| 0.802 |  | 1.52 | 135.053 | 134.251 | 10 | CP |
|  | 2.311 |  |  | 132.742 | 20 |  |
| 3.580 |  | 1.990 | 136.643 | 133.663 | 30 | CP |
|  | 1.220 |  |  | 135.423 | 40 |  |
|  | 3.675 |  |  | 132.968 | 50 |  |
| 2.408 |  | 4.020 | 135.031 | 132.623 | 60 | CP |
|  | 0.339 |  |  | 134.692 | 70 |  |
| 0.780 |  | 0.157 | 132.654 | 134.874 | 80 | CP |
|  | 1.535 |  |  | 134.119 | 90 |  |
|  | 1.955 |  |  | 133.699 | 100 |  |
|  | 2.430 |  |  | 133.224 | 110 |  |
|  | 2.985 |  |  | 132.669 | 120 |  |
| 1.155 |  | 3.480 | 133.329 | 132.174 | 130 | CP |
|  | 1.960 |  |  | 131.369 | 140 |  |
|  | 2.365 |  |  | 130.964 | 150 |  |
| 0.935 |  | 3.640 | 130.624 | 129.689 | 160 | CP |
|  | 1.045 |  |  | 129.579 | 170 |  |
|  | 1.630 |  |  | 128.994 | 180 |  |
|  |  | 2.545 |  | 128.079 | 190 |  |
| $Σ$**bs=10.431** |  | $Σ$**fs=17.352** |  |  |  |  |

$Σ$**fs-**$ Σ$**bs=RL@first –RL@last**

**17.352-10.431=135-128.079**

**6.921 = 6.921**

RL=HC + Staff readings

Rl(1) =110+matric no=110+25=135

Hc(1)=135+0.771=135.771

RL(2) = 135.771-1.52 =134.251

HC (2)= 134.251 +0.802=135.053

RL (3) =135.053-2.311 = 132.742

RL(4) = 135.053-1.990 =133.063

 HC(4) = 133.063+3.580 = 136.643

RL(5) = 136.643-1.220=135.423

RL (6) = 136.643 -3.673 =132.968

RL(7) = 136.643 – 4.020 =132.623

HC (7) = 132.623 + 2.408 = 135.031

RL (8) = 135.031-0.339 = 134.692

RL (9) = 135.031-0.157 = 134.874

HC (9) = 134.874 + 0.780 = 135.654

RL (10) = 135.654 – 1.535 = 134.119

RL (11) =135.654-1.955 =133.699

RL(12) =135.654-2.430 =133.224

RL (13) = 135.654 – 2.985 = 132.669

RL (14) = 135.654 - 3.480 =132.174

HC (14) = 132.174 + 1.155 = 133.329

RL(15) = 133.329 -1.960 =131.369

RL (16) =133.329 -2.365 = 130.964

RL (`17) = 133.329-3.640 = 129.689

HC (17) = 129.689 +O.935 =130.624

RL (18) =130.624-1.045 =129.579

RL (19) =130.624 – 1.630 =128.994

RL (20) = 130.624 – 2.545 = 128 .079

**2a.)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 $ΣA=962+183.75$

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

**2b.)**

**Characteristics of contours**

1. All points on a contour have the same elevations.
2. Flat ground is indicated where the contour are widely separated and the steep are shown where the contour lines draw close to each other.
3. A series of closed contour lines on a map represents a hill, if the higher values are inside.

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1. A series of closed contour lines on a map indicates a depression, if the higher values are outside.

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1. Contour lines crosses a bridge or a valley at right angle. If higher values are inside the bend in the contour it represents a ridge while if higher values are outside the bend it represents a valley.

 