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17/ENG03/021

ASSIGNMENT

QUESTION 1

1a. The difference between Height of Collimation Method (HCM)  and Rise and Fall Method (RFM) are as follows:

HCM :It is more rapid and saves a considerable time and labour.
RFM : It is laborious as the staff reading of each station is compared to get a rise or fall.

HCM : It is well adopted for reduction of levels for construction work such as longitudinal or cross-section levelling operations.
RFM : It is well adopted for determining the difference in levels of two points where precision is required.

HCM :  There is no check on reduction of R.L. of intermediate stations.
RFM : There is a complete check on the reduction of RL of the intermediate stations.

HCM : There are only two arithmetical checks i.e. the difference between the sum of the fore sights must be equal to be the difference in R.L. of the last station and first station.
RFM : There are three arithmetical checks i.e the difference between the sum of the back sights and the sum of fore sights must be equal to the difference between the sum of the rises and the sum of the falls as well as it must also be equal to the difference in RL of the last station and first station.

HCM : Errors if any in intermediate sights are not detected.
RFM : Errors in intermediate sights are noticed as these are used for finding out rises and falls.

1B RL=110+matric No.=110+21=131

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| B.S | I.S | F.S | H OF C | R.L | DISTANCE | REMARKS |
| 0.771 |  |  | 130.771 | 131 | 0 | RL |
| 0.802 |  | 1.52 | 130.053 | 129.251 | 10 | CP |
|  | 2.311 |  |  | 127.742 | 20 |  |
| 3.580 |  | 1.990 | 131.643 | 128.063 | 30 | CP |
|  | 1.220 |  |  | 130.423 | 40 |  |
|  | 3.675 |  |  | 127.968 | 50 |  |
| 2.408 |  | 4.020 | 130.031 | 127.623 | 60 | CP |
|  | 0.339 |  |  | 129.692 | 80 |  |
| 0.780 |  | 0.157 | 130.654 | 129.874 | 90 | CP |
|  | 1.535 |  |  | 129.119 | 100 |  |
|  | 1.955 |  |  | 128.699 | 110 |  |
|  | 2.430 |  |  | 128.224 | 120 |  |
|  | 2.985 |  |  | 127.669 | 130 |  |
| 1.155 |  | 3.480 | 128.329 | 127.174 | 140 | CP |
|  | 1.960 |  |  | 126.369 | 150 |  |
|  | 2.365 |  |  | 125.964 | 160 |  |
| 0.935 |  | 3.640 | 125.624 | 124.689 | 170 | CP |
|  | 1.045 |  |  | 124.579 | 180 |  |
|  | 1.630 |  |  | 123.994 | 190 |  |
|  |  | 2.545 |  | 123.079 | 200 |  |
| $Σ$=10.431 |  | $Σ$=17.352 |  |  |  |  |

QUESTION 2

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

1. A contour line must never simply end, except at the edge of the map.
2. A contour line may never intersect other contour lines. Overhanging cliffs are the only exception.
3. Concentric circles of contour lines indicate a hilltop or mountain peak.
4. Concentric circles of hatched contour lines indicate a closed depression.
5. A valley is an elongated depression in the landscape that is formed by the action of water (V-shaped) or carved out by glaciers (U-shaped). Valley bottoms are represented by "U" or "V" shaped contour lines with their closed end pointing towards higher elevation.





