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**MATRIC NO: 17/ENG03/027**

**ENGINEERING SURVEYING – CVE 310**

**QUESTION 1**

- a) The two methods of levelling include;
- I. The Rise & Fall Method,
  - II. The Height of Collimation Method.

**Rise and Fall Method;**

- Advantage - Effective checks can be performed and confirmed using the reduced levels and with the rise and fall of the instrument.
- Disadvantage – The rise and fall method tends to become tedious on longer roads and wider areas of a site.

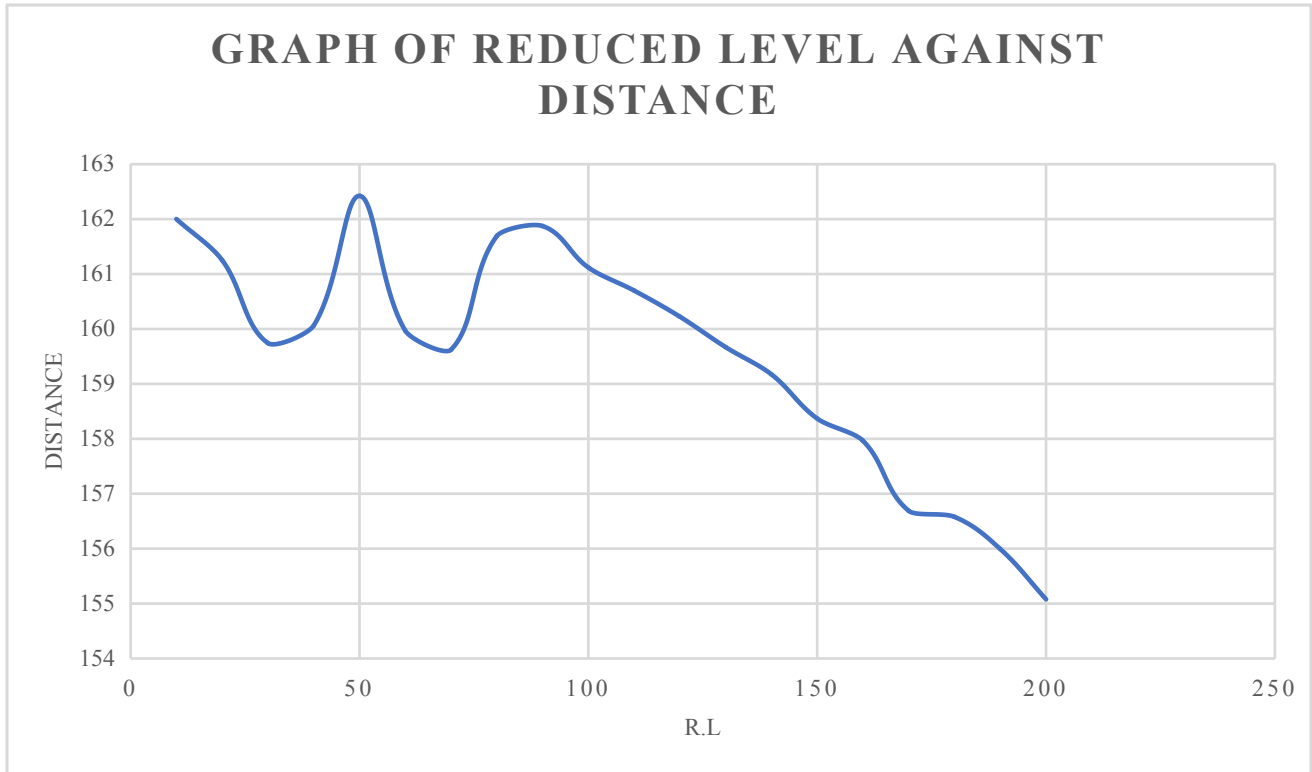
**Height of Collimation Method;**

- Advantage – It is faster to perform the height of collimation method compared to the rise and fall method.

- Disadvantage – It is more susceptible to errors and effective checks are only confirmed using the reduced levels.

b) Using Height of Collimation Method

B.S	I.S	F.S	H OF C	R.L	DISTANCE	REMARK
0.771			137.0711	137.0000	10	O.B.M
0.802		1.520	136.3531	135.5511	20	C.P
	2.311			134.0200	30	
3.580		1.990	137.9431	134.3631	40	C.P
	1.220			136.7231	50	
	3.675			133.0481	60	
2.408		4.020	136.3311	133.9231	70	C.P
	0.339			135.9921	80	
0.780		0.157	136.9541	136.1741	90	C.P
	1.535			135.4191	100	
	1.955			134.9991	110	
	2.430			134.5241	120	
	2.985			133.9691	130	
1.155		3.480	134.6291	133.4741	140	C.P
	1.960			132.6691	150	
	2.365			132.2641	160	
0.935		3.640	131.9241	130.9891	170	C.P
	1.045			130.8791	180	
	1.630			130.2941	190	
		2.545		129.3791	200	
10.431		17.352				



## QUESTION 2

a)

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

### USING MID-ORDINATE RULE;

A=hd

$$h_1 = 1.325\text{m}$$

$$h_2 = 3.225\text{m}$$

$$h_3 = 3.775\text{m}$$

$$h_4 = 4.2\text{m}$$

$$h_5 = 4.125\text{m}$$

$$h_6 = 4.3\text{m}$$

$$h_7 = 5.4\text{m}$$

$$h_8 = 5.9\text{m}$$

$$h_9 = 5.925\text{m}$$

$$38.175\text{m}$$

$$d = 30\text{m}$$

$$A =$$

=

$$A =$$

$$\therefore A = 0.11453 \text{ hectares}$$

### USING AVERAGE ORDINATE RULE;

$$A = \sum_{i=1}^n y_i \Delta x$$

$$n = 9$$

$$\Delta x = 30$$

$$41.2 \text{ m}$$

$$A = \sum_{i=1}^9 y_i \times 30$$

$$A =$$

$$\therefore A = 0.11124 \text{ hectares}$$

### USING TRAPEZOIDAL RULE;

$$A =$$

$$A =$$

$$A =$$

$$A =$$

$$\therefore A = 0.11483 \text{ hectares}$$

## **USING SIMPSON'S RULE**

**NOTE:** The last offset was removed because number of offsets were even

Calculating for last offset using **trapezoidal rule;**

A=

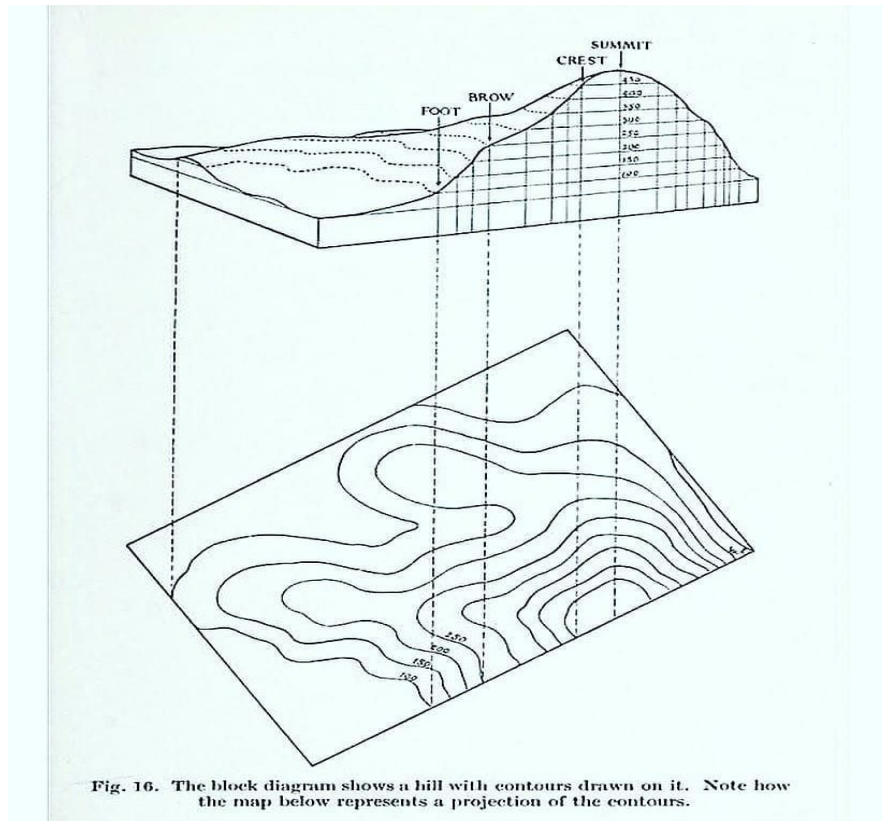
Therefore

$$\therefore A = 0.11458 \text{ hectares}$$

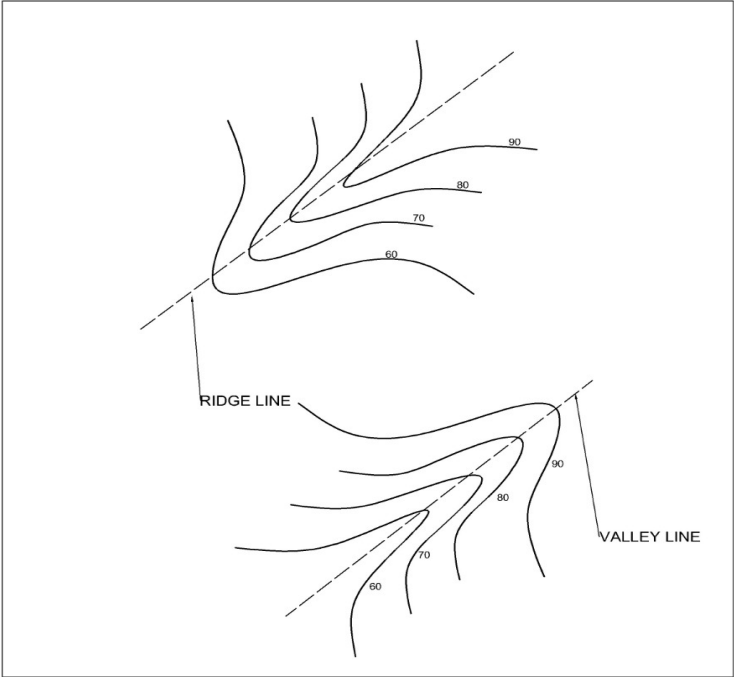
### b) **CHARACTERISTICS OF CONTOURS**

1. On a contour map, A Uniform slope is indicated where the contour lines are uniformly spaced and a plain surface is indicated when the contour

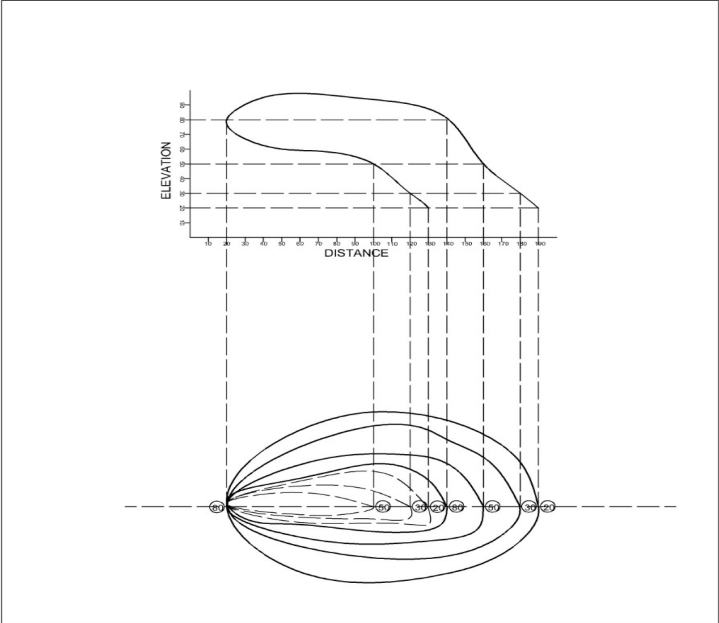
lines are straight parallel and equally spaced



2. Contour lines crosses a ridge or a valley at approximate right angles. If the higher values are inwards to the bend or loop in the contour map it represents a ridge and if the higher values are outwards to the bend it represents a valley.



3. Contour lines can not merge or cross one-another on a contour map except in the case of an overhanging cliff where the full perimeter of the base is only partially visible from the top.





4. A series of closed contours on a map indicates a depression if the higher values are outwards as shown.
5. A series of closed contours on a map indicates a hill if the higher values are inwards as shown.

