

Question 1: (10 Marks)

Put True (✓) or False (x):

Clinometer is used to determine a direction of a line with the North.	(x)	.1
Surveying is geodetic when area of survey is larger than 50 km ² .	(✓)	.2
Hydrographic surveying deals with determining elevations of points.	(x)	.3
Determining areas of parcels and land divisions are examples of route surveying.	(x)	.4
The shortest distance method can be used to erect a perpendicular in the field using a tape.	(x)	.5
The main reason of random errors in surveying measurements is referred to human operator.	(x)	.6
Foresight reading is the first staff reading taken just after setting up the level instrument.	(x)	.7
Trigonometric leveling is a kind of leveling using a theodolite.	(x)	.8
Higher staff reading at a point means higher reduced level of it.	(x)	.9
Blunder errors can be corrected at office without field re-measuring.	(x)	.10

Question 2: (15 Marks)

A 30-m tape was calibrated under a tension of 7 kg and a temperature of 20°C while fully supported. When carefully checked, the tape was found to be 29.995 m long. In the field, it was used under a tension of 6 kg and a temperature of 30°C while fully supported. A line is measured along a gentle slope. The gradient of the line was measured with an Abney level and found to be 5° 30'. The slope distance was recorded as 140.125 m. Knowing that the tape weighed 0.4 kg, $E = 2050000 \text{ kg/cm}^2$, cross sectional area of 3.87 mm². Determine the correct horizontal length of the line.

$$① C_T = 0.0000116 (T - T_0) * L_m = 0.0000116 (30 - 20) * 29.995 = 3.48 * 10^{-3} \text{ m}$$

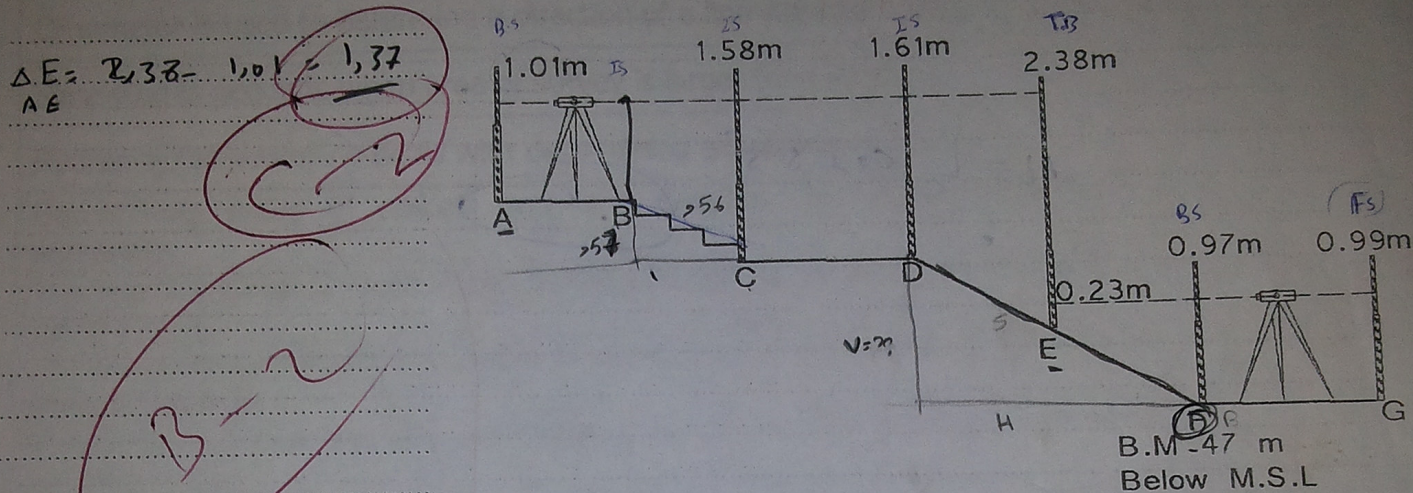
$$② C_P = \frac{(P - P_0) * L_m}{A * E} = \frac{(6 - 7) * 29.995}{2050000 * 10^2 * 3.87 * 10^{-6}} = -1.4531 \text{ m}$$

$$③ C_b = \frac{(L_s - L_0) * L_m}{L_0} = \frac{(29.995 - 30) * 29.995}{30} = -4.99 * 10^{-3}$$

$$④ C_s = \text{Zero}$$

Question 3: (15 Marks)
If you know that the point **F** is a bench mark with an elevation (**- 47 m**) (i.e. Below M.S.L):

- Calculate the Reduced level of point A and E.
- Find the Reduced level of point B If you know that B above point C with 4 stairs (14 cm)
- Calculate the vertical distance between point D and point F. $4 \times 14 = 10^{-2}$



Point	Bs	IS	Fs	rise	Fall	HI	RL	netg
A	1,301	1,101	1,101			4	4931	493
B	1,37	1,58			47	B.M		
C		1,58						
D	1,3	1,611			103	48,44	48,41	
E	2,38	1,58	1,23	1,38		46	4838	T.p
F	1,97	1,97				46,26	47	B.M
G		1,99	1,99		22	47,02	47,2	

low rise and feel

checks

$\# \text{ of BS} = \# \text{ of } F_3$ ✓

2 -

$$\Sigma B_s - \Sigma F_s = 145A \text{ PL} - 115A \text{ PL}$$
$$3,35 - 1,24 = -47,2 - 49,31$$

2, 11

-477- x 2,11 BEST WISHES