Practical No: 08 **Measure vertical angle using Transit Theodolite.**

I. Practical Significance:

Theodolite is the precision instrument for measuring the vertical angle in the vertical planes. Generally, vertical angles are required to measure when the vertical heights or elevation are needed to determine.

II. Industry/Employer Expected Outcome(s):

- Measurement of vertical angle with accuracy.

III. Course Level Learning Outcome (COs):

- CO3 - Undertake survey using Theodolite for preparing a plan of the given terrain.

IV. Laboratory Learning Outcome (LLO):

- LLO 8.1:- Use transit theodolite to measure Vertical angle.

V. Relevant Affective Domain related Outcome(s):

- Using Safe behaviors effectively.
- Maintain high standards of hygiene.
- Efficient application of tools, equipment's and machinery.
- Professional and ethical standards.

VI. Relevant Theoretical Background:

Generally, the vertical angles with theodolite are needed to determine in case of tachometry. The vertical height of the ground or reduced level of hilly area can be easily get determined with the help of vertical angle measurements. Theodolite is the instrument which enable the surveyor to measure the angle with accuracy.

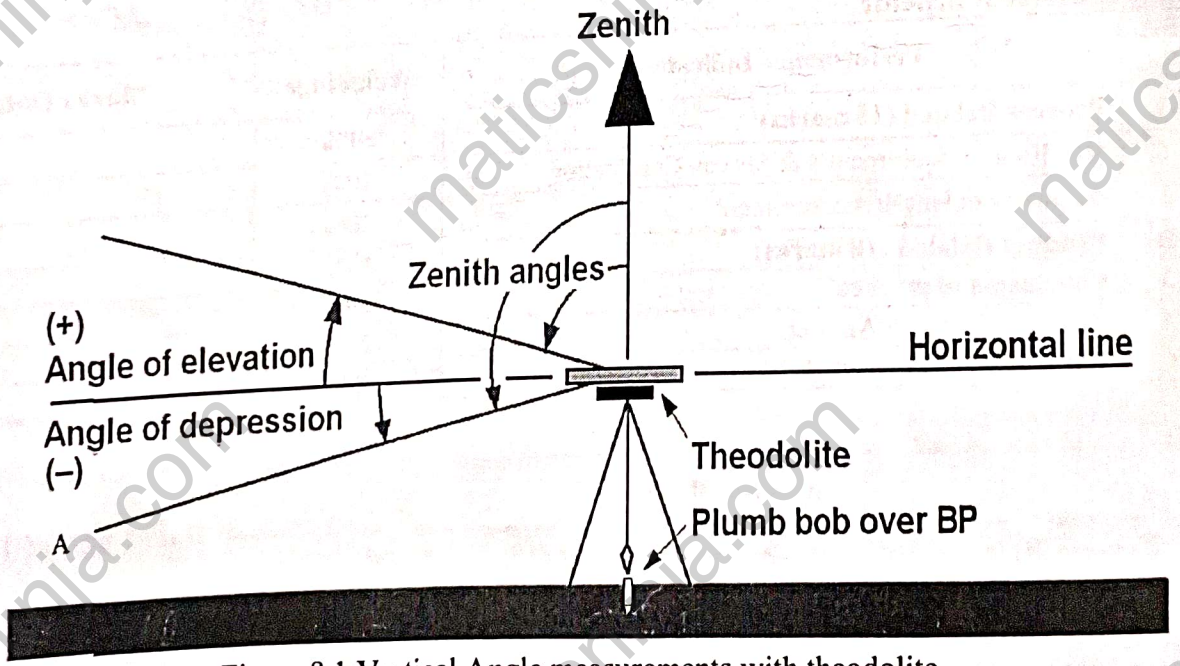

Figure 8.1 Vertical Angle measurements with theodolite.

X. Observation Table: Face left

Sr. No	Station	Object	Face	Readings on Verniers						Mean of Verniers			Angle			Mean Angle			Remark
				C			D												
				°	I	II	°	I	II	°	I	II	°	I	II	°	I	II	
1	A	B		30°	15'	20"	30°	15'	30"	30°	15'	25"	30°	15'	25"	80°	15'	25"	
3	A	C		45°	30'	10"	45°	30'	00"	45°	30'	05"	45°	30'	05"	45°	30'	05"	
5	A	D		60°	45'	30"	60°	45'	40"	60°	45'	35"	60°	45'	35"	60°	45'	35"	
7	B	A		330°	15'	10"	330°	15'	20"	330°	15'	15"	30°	15'	15"	30°	15'	10"	
9	B	C		315°	30'	00"	315°	30'	10"	315°	30'	05"	45°	30'	05"	45°	30'	00"	

Face right.

Sr. No	Station	Object	Face	Readings on Verniers						Mean of Verniers			Angle			Mean Angle			Remark
				C			D												
				°	I	II	°	I	II	°	I	II	°	I	II	°	I	II	
2	A	B		210°	14'	50"	210°	15'	00"	210°	14'	55"	30°	14'	55"	30°	15'	10"	
4	A	C		225°	29'	50"	225°	30'	00"	225°	29'	55"	45°	29'	55"	45°	30'	00"	
6	A	D		240°	14'	20"	240°	14'	30"	240°	14'	25"	60°	14'	25"	60°	45'	30"	
8	B	A		150°	14'	40"	150°	14'	50"	150°	14'	45"	30°	14'	45"	30°	15'	00"	
10	B	C		135°	29'	50"	135°	30'	00"	135°	29'	55"	45°	29'	55"	45°	30'	00"	

XI. Result:

The Verticle angles between the observed objects were determined acurately using the transit theodolite

XII. Interpretation of Results:

The measured Verticle angles provide the necessary data for calculating elevations and performing

XIII. Conclusions:

The practical demonstarted the successful measurment of Verticle angle.

XIV. Practical Related Questions:

1. Explain the function of vertical clamp screw and vertical tangent screw.
2. What is angle of depression and angle of elevation?

Space for Answer

Q. 1 ⟶ ?

Ans:- In a theodolite, the Vertical clamp screw holds the tele scope in a Vertical position, and the Vertical tangent screw makes fine adjustment to the telescopes vertical position.

Makes find adjustment to the telescopes Vertical position.

used to slowly transit the telescope after it's clamped.

used to bring the crosshairs of the telescope exactly on the point for measuring vertical angles.

Q.2 ⟶ ?

Ans:- Angle of elevation:- The angle formed by the line of sight with the horizontal when the object is above the horizontal level is called the angle of elevation.

Angle of depression:- The angle formed by the line of sight with the horizontal when the object is below the horizontal level is called the angle of depression.

XV. Assessment Scheme

Sr. No.	Performance Indicators	Weightage	Marks Obtained
A.	**Process Related (15 marks)**	**60%**	
1.	Handling of equipment's & Survey Conduction	40%	
2.	Accuracy in length measurement.	20%	
B.	**Product Related (10 marks)**	**40%**	