Practical No: 07 **Measure Horizontal angle by using Transit Theodolite by Method of Repetition**

I. Practical Significance:

Plotting open traverse on the field by using the horizontal angles and lengths of lines. Method of repetition is the method which provides the accuracy in measurement of angles.

II. Industry/Employer Expected Outcome(s):

- Determining the horizontal angle with accuracy.
- Plotting the plans/maps on the ground.

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 7.1:- Use transit theodolite to measure Horizontal angle by method of Repetition.

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:

Traversing can be done with the use of theodolite. With face left and face right position of theodolite, error can be minimized in angle measurement. The method of repetition is the method where error in angle measurement can reduced at high level. Theodolite is the instrument which enables surveyor to measure the least horizontal angle with high precision.

VII. Required Resources:

Sr. No.	Resource required	Particulars	Quantity
01	Transit theodolite with tripod stand	As per IS Standard	1 nos.
02	Peg	Wooden	3 nos
03	Ranging rods	2m length	2 nos
04	Measuring Tape	30 m	1 nos.
05	Hammer	As per specification	1 nos.

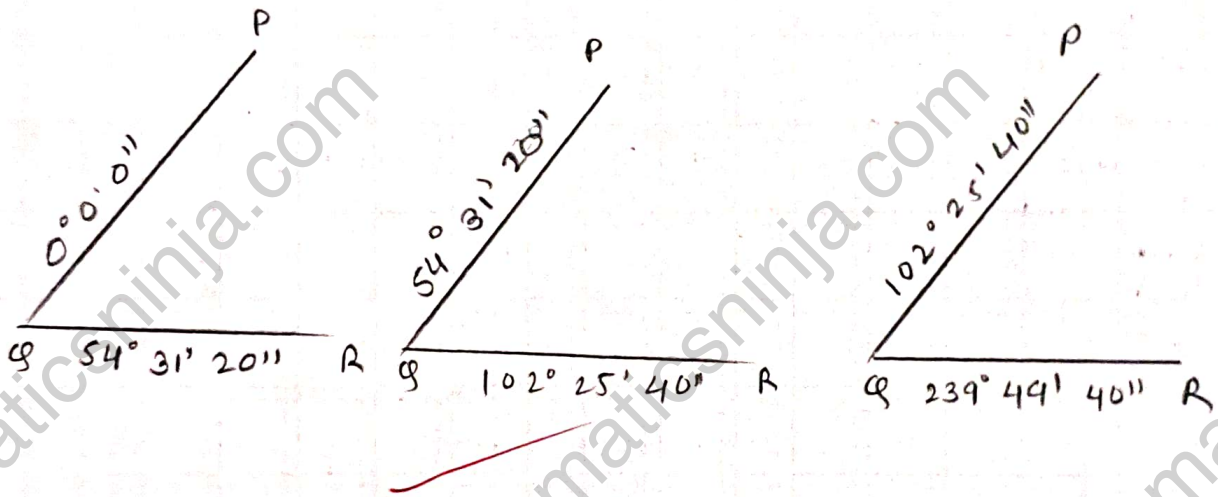
VIII. Precautions to be followed:

1. Precise Temporary adjustment of the theodolite.
2. Bisect the ranging rod of station point accurately.
3. Read the Vernier's accurately.
4. Record the reading properly.

IX. Procedure:

1. First collect the all instruments as per mentioned in point no VII from the survey lab.
2. Set the theodolite over the station point Q and do the temporary adjustment of theodolite.

3. Remove the parallax by properly focusing the object glass.
4. Set the horizontal circle of Vernier A at 00° 00'00'' and Vernier B at 180° 00' 00'' by using upper tangent screw and fix the upper clamp.
5. After this keep the lower clamp loose and bisect the ranging rod of station P and fix the upper and lower clamp both.
6. With face left position of theodolite unclamp the upper screw only and rotate the theodolite to bisect the ranging rod of station R.
7. Clamp the upper lower screw and record the reading of Vernier A and B.
8. Now unclamp the lower screw only and rotate the theodolite and again bisect the ranging rod of station P and clamp the lower screw.
9. Now unclamp the upper screw and rotate theodolite to bisect the ranging rod of station R and then clamp upper screw and record the reading of Vernier A and Vernier B.
10. Repeat the procedure again for third time with same face left only.
11. Again do the same procedure of repetition with face right.
12. Average reading of face left and face right will give the accurate reading of angle PQR.
13. Return back the instrument to survey store.



X. Observation Table: face left

Sr. No	Station	Object	Face	Readings on Verniers						Mean of Verniers			Angle			Mean Angle			Remark
				A			B												
				°	I	II	°	I	II	°	I	II	°	I	II	°	I	II	
1	Q	P		0	0	0	0	0	0	0	0	0							
2		R		54°	31'	20"	30°	20'	00"	54°	31'	20"	54°	31'	20"	54°	31'	20"	
3				102°	25'	40"	25°	40'	00"	102°	25'	40"	102°	25'	40"	102°	25'	40"	
4				239°	49'	40"	49°	40'	00"	239°	49'	40"	137°	24'	00"	137°	24'	00"	
5																			

Surveying (312339) Face right

Sr. No	Station	Object	Face	Readings on Verniers						Mean of Verniers			Angle			Mean Angle			Remark
				A			B												
				°	I	II	°	I	II	°	I	II	°	I	II	°	I	II	
1	9	P		0	0	0	0	0	0	0	0	0							
2		R		53°	31'	40"	30°	40'	00"	54°	31'	40"	54°	31'	40"	54°	31'	40"	
3				102°	26'	00"	26°	0'	0"	102°	26'	0"	47°	54'	20"	47°	51'	20"	
4				239°	49'	40"	49°	40'	0"	239°	49'	40"	137°	23'	40"	137°	23'	5c"	

XI. Result:

$\angle PQR = 137^\circ\ 24'\ 00''$

XII. Interpretation of Results:

By using transit theodolite by method of repetition use have to find out horizontal angle

XIII. Conclusions:

horizontal angle by transit theodolite by method of repetation $137^\circ 24' 00''$

XIV. Practical Related Questions:

1. Explain the face left and face right position of transit theodolite.
2. Why the observations are made through face right and face left position?

Space for Answer

Q. 1 ⟶ ?

Ans:- In a transist theodolite face left refers to the position where the Verticle circle of the instrument is on the observe's left side when taking a reading, while face right means the Verticle circle is positioned on the observe's right side.

Q. 2 ⟶ ?

Ans:- In Surveying observations are made through both face right and face left positions on a theodolite to effectively eliminate or minimize instrumental errors particularly those related to the alignment of the telescope axis, by taking readings from diffrent oriental and averaging them out there by increasing the overall accuracy of the measurment.

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%	