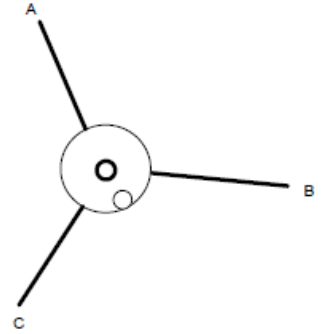




### Homework Assignment No. 9 Theodolite and Angle Measurement

#### Part A- Mark the correct answer for the following:

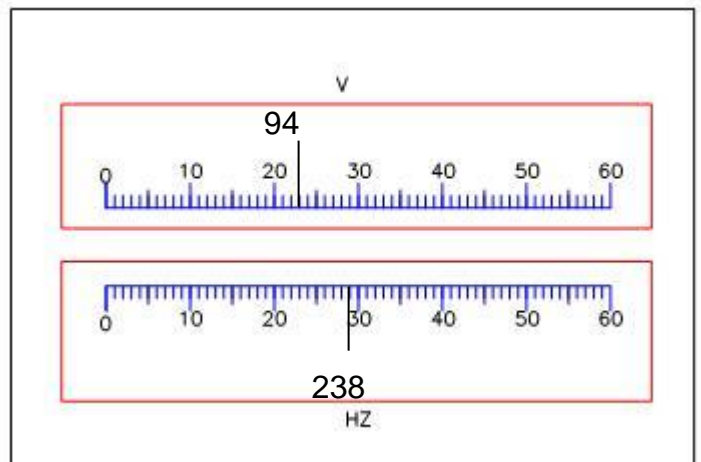
1. What device is used to center a modern theodolite over a point?  
a. Alidade    b. optical plummet    c. plumb bob    d. horizontal circle
2. In the next figure, the circle represents a circular bubble level and the three lines legs of a tripod. Which leg should you adjust to try and center the bubble?  
a. A    b. B    c. C    d. None of these
3. centering is to:  
a. adjust vertical axis of theodolite to pass through occupied point  
b. adjust vertical axis vertically and pass through occupied point  
c. adjust optical plummet over occupied point.  
d. adjust cross hair to bisect object.
4. Circular bubble for theodolite should be adjusted using:  
a. foot screws.    b. Optical plummet    c. Tribrach    d. Tripod legs.
5. Which of the following angles is not measured by Theodolite:  
a. zenith angle    b. vertical angle    c. slope angle    d. horizontal angle
6. Zenith angle is:  
a. measured from north direction    b. measured from horizontal plane.  
c. measured from vertical line.    d. measured from vertical plane to another vertical plane.
7. A vertical angle is:  
a. measured horizontally from the horizon    b. measured from the zenith  
c. measured up or down from the horizon    d. the magnetic deviation from true north
8. When leveling the theodolite, after adjusting the longitudinal bubble in two positions at right angles to each other, why do you check the bubble again following a swing of the telescope by  $180^\circ$  ?  
a. to check the horizontal plane.  
b. To check the longitudinal bubble axis to be perpendicular to vertical axis.  
c. To check vertical axis.  
d. None of these.
9. If face left zenith reading for point B measured by theodolite is  $93^\circ 21' 28''$  , the face right zenith reading for the same point assuming no error is:  
a.  $86^\circ 38' 32''$   
b.  $93^\circ 21' 28''$   
c.  $266^\circ 38' 32''$   
d.  $03^\circ 21' 28''$



10. if face left horizontal reading for theodolite is  $30^{\circ} 25' 12''$  and the theodolite is rotated clockwise to observe second point in face left and the reading is  $150^{\circ} 30' 16''$ . If theodolite is rotated anticlockwise, the face left reading of second point is:  
 a.  $150^{\circ} 30' 16''$ .    b.  $330^{\circ} 30' 16''$ .    c.  $209^{\circ} 29' 44''$ .    d.  $120^{\circ} 05' 04''$ .
11. if face left horizontal reading for theodolite is  $120^{\circ} 25' 16''$  and the difference between face left and face right (FL-FR)  $180^{\circ} 01' 22''$  the face right reading of the point is:  
 a.  $150^{\circ} 30' 16''$ .    b.  $330^{\circ} 30' 16''$ .    c.  $209^{\circ} 29' 44''$ .    d.  $120^{\circ} 05' 04''$ .
12. if face left horizontal reading for theodolite is  $120^{\circ} 25' 16''$  and the difference between face left and face right (FL-FR)  $180^{\circ} 01' 22''$  the face left correct reading of the point is:  
 a.  $150^{\circ} 30' 16''$ .    b.  $330^{\circ} 30' 16''$ .    c.  $209^{\circ} 29' 44''$ .    d.  $120^{\circ} 05' 04''$ .
13. if face left zenith reading for theodolite is  $91^{\circ} 25' 16''$  and the sum of face left and face right (FL+FR)  $360^{\circ} 03' 22''$  the face left correct reading of the point is:  
 a.  $150^{\circ} 30' 16''$ .    b.  $330^{\circ} 30' 16''$ .    c.  $209^{\circ} 29' 44''$ .    d.  $120^{\circ} 05' 04''$ .
14. While using a theodolite, you sight on a point Q and read an angle of  $245^{\circ} 13' 41''$ . You want to turn a clockwise angle of  $156^{\circ} 06' 12''$  in order to set point R. What angle must you read on your theodolite in order to properly set point R? Show a sketch of the points.  
 a.  $156^{\circ} 06' 12''$     b.  $336^{\circ} 06' 12''$     c.  $89^{\circ} 07' 29''$     d.  $41^{\circ} 19' 53''$     e. None of these

15. The readings of vertical and horizontal readings respectively are

- a.  $238^{\circ} 00' 29''$  &  $94^{\circ} 00' 22''$   
 b.  $94^{\circ} 00' 22''$  &  $238^{\circ} 00' 29''$   
 c.  $94^{\circ} 22' 00''$  &  $238^{\circ} 29' 00''$   
 d.  $238^{\circ} 29' 00''$  &  $94^{\circ} 22' 00''$   
 e. None of these



In measuring a zenith angle with a theodolite the following readings were observed:

- 1L =  $91^{\circ} 14' 26''$   
 2L =  $91^{\circ} 14' 25''$   
 1R =  $268^{\circ} 45' 28''$   
 2R =  $268^{\circ} 45' 31''$

16. What is the best value for the zenith angle?

- a.  $91^{\circ} 14' 26''$     b.  $91^{\circ} 14' 27''$     c.  $91^{\circ} 14' 28''$     d.  $91^{\circ} 14' 29''$

**Part B- Answer the followings:**

**1. In standard table format compute the horizontal and vertical angles for the given observations.**

POINT																
HORIZONTAL																
CIRCLE																
POINT	FACE LEFT			FACE RIGHT			DIFFERENCE			REDUCED DIR.			FINAL ANGLES			REMARKS
A	332	28'	00"	152	32'	00"										
B	45°	16'	00"	225°	12'	00"										
VERTICAL																
CIRCLE																
POINT	FACE LEFT			FACE RIGHT			SUM			REDUCED FL			REDUCED FR			FINAL ANGLE
A	89°	02'	00"	271°	04'	00"										
B	95	07	00	264	59	00										