

## Sheet #2

**Note: You are required to submit the answers in a report within one week (hand writing)**

1. It is required to determine the horizontal distance between points  $A$  and  $B$  by stadia method. A theodolite at  $A$  is used to sight a level rod at  $B$  while the telescope is **horizontal**. The rod readings are  $u = 2.86\text{m}$ ,  $l = 1.46\text{ m}$ , If the stadia interval factor  $K = 100$ , what is the horizontal distance  $H_{AB}$ ? If elevation of point  $A$  is  $-18.0\text{ m}$ ,  $hi_A = 1.56\text{ m}$ , Compute elevation of  $B$ .
2. A theodolite is used to determine the horizontal distance  $H_{AB}$  and the elevation of point  $B$ . the following stadia readings were taken: Zenith angle  $z = 80^\circ$ ,  $u = 2.82\text{m}$ ,  $r = 2.02\text{ m}$ ,  $l = 1.22\text{m}$ . If  $Elev_A = 550\text{ m}$ , telescope height  $hi_A = 1.58\text{m}$ , compute the horizontal distance  $H_{AB}$  and Elevation of point  $B$ .
3. A theodolite provided with stadia hairs is used to determine the horizontal distance  $H_{AB}$  and the elevation of point  $B$ . the following stadia readings were taken  $1.76$ ,  $1.03$ ,  $0.30\text{ m}$  on a vertical rod. If the vertical angle is  $12^\circ 38'$ , find the horizontal distance  $H_{AB}$  between the instrument and the rod. Find also the elevation of the point where the rod is positioned, if the elevation at the instrument station is  $55.12\text{ m}$ . Known that  $K = 100$  and  $e = 38\text{ cm}$  and  $hi = 1.65\text{ m}$ .
4.  $A$ ,  $B$  and  $C$  are three points, the following observations were taken from point  $A$  to  $B$  and  $C$  for the purpose of determining the two constants of the tacheometric instrument ( $K$  and  $e$ ). From  $A$  the vertical rod at point ( $B$ ) reads  $2.47$ ,  $1.70$ ,  $0.93$  and rise angle equals  $11^\circ 29'$ . Also from point ( $A$ )

the vertical rod at point (C) was observed and the readings were: 1.79, 1.14, 0.49 and down angle of  $7^{\circ} 42'$ . If the distances  $H_{AB}$  and  $H_{AC}$  were 148.31m and 128.08m respectively. Find the tachometric constant (K) and the additional constant (e). Calculate also the difference in elevations between (B) and (C).

**Good Luck**