



This exam measures the following ILOS: a-5 , a-13, b-17, c-13 , c-14, d-1

(Answer by sketch as possible)

Question (1) (25)%

- a) Readings were taken on a vertical staff held at points *A*, *B* and *C* with a tacheometer has constant is 100. If the horizontal distances from instrument to staff were respectively 45.9, 63.6 and 89.4 m, and the vertical angles likewise +5°, +6° and -5°, calculate the staff intercepts. If the mid-hair reading was 2.100 m in each case, what was the difference in level between *A*, *B* and *C*?
- b) A theodolite has a multiplying constant of 100. When set 1.35 m above station *B*, the following readings were obtained.

Station	Sight	Horizontal circle	Vertical circle	Stadia readings (m)
<i>B</i>	<i>A</i>	28° 21' 00"		
<i>B</i>	<i>C</i>	82° 03' 00"	20° 30'	1.140 2.292 3.420

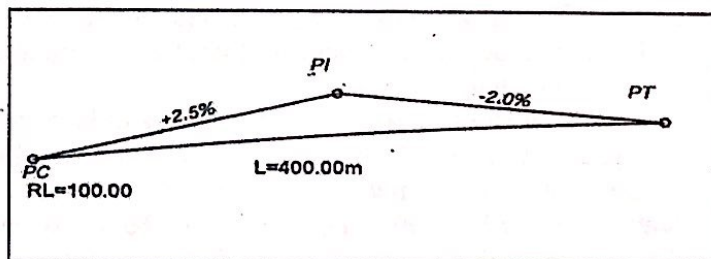
The coordinates of *A* are 163.86 E , 0.0 N , and those of *B*, 163.86 E, 118.41 N. Find the coordinates of *C* and its height above datum if the level of *B* is 27.3 m

Question (2) (20) %

- a) A Circular curve is to be set out so that it is tangential to three straight lines *AB*, *BC* ,*CD*. The bearing of these straight lines are 34 ° , 74 ° , 124 ° , the length of the line *BC* =210.50 m. Calculate the radius and the length of the curve, Set out the curve by coordinates from the long chord.
- b) A Compound curve *ABC*, radius of curve *AB* equal 400 m. and coordinates of *A* (200,400), *C* (536, 593) . The bearing of the first tangent is N25° 30' E, and the bearing of the second tangent is N76° 30' W. Determine the coordinates of point *B* and the length of the second tangent.

Question (3) (15) %

- a) Compare between observation and condition methods of adjustments
- b) What type of the curve and calculate the reduced levels at 50 m intervals along the curve.

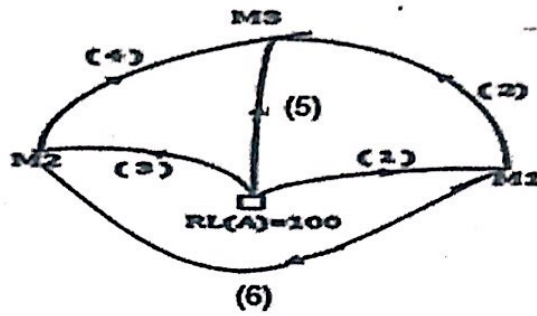


If the point *M* lies at 20 m distance from *pc* then compute reduced level of *M*.

Question (4) (25) %

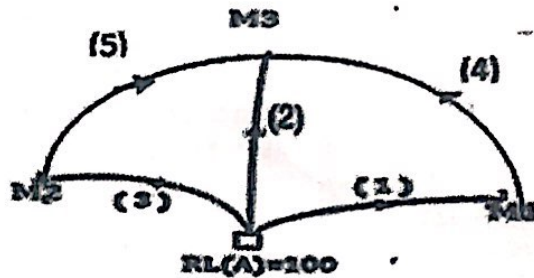
a) For the level net shown in figure ,Write down in only matrix form by two methods

Line (m.)	Length (m.)	Elev. Difference (m.)
1	4	+ 1.05
2	4	- 0.95
3	2	+ 2.10
4	2	- 1.95
5	1	+ 0.10
6	3	+ 0.05



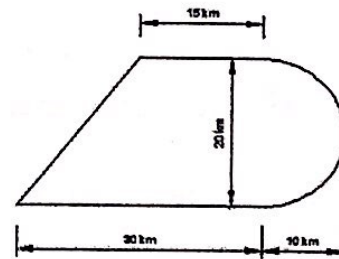
b) Compute the values of unknowns by Observation equation for the opposite figure In case of unit weight

Routes	ΔH
1	5.16
2	11.57
3	5.41
4	1.04
5	10.58



Question (4) (15) %

- The images of points A and B appear on two overlapping vertical photographs. The flying height above datum was 4050 ft and the air base is 2410 ft. the focal length of the camera is 6-in. the coordinates are measured of the left photo as $x_a = 2.10$ in, $x_b = 3.50$ in, $y_a = 2.00$ in and $y_b = -1.05$ in. also, of the right-hand photo, $x_{1a} = -2.25$ and $x_{1b} = -1.17$. Find the length of the line AB and the elevation of points A and B.
- A pair of overlapping vertical photographs was taken from a flying height of 5000 m above ground with a 152.4 mm focal length camera having a 17.78 cm square format, if the photos were taken with 60 percent end lap. Flight line coordinates for points a and b in the first photo were measured as $x_a = -56$ mm, $y_a = 43$ mm, $x_b = 38$ mm, $y_b = -22$ mm, if the elevations of points A and B are 110 and 280 m respectively. Calculate flight line coordinates for points a and b in the second photo and the horizontal length AB?
- Aerial photography is to be taken for an area of land as shown in figure 1. The focal length of the camera to be used is 6 in where focal plane dimensions are 7'' by 9'', the required scale for photo 1:18000. Calculate the number of flying lines, the number of photos per one flying line and the total number of photos required to cover the whole area taking into account that the end lap is not less than 60% and the sidelap is not less than 25%.



Good Luck

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