



(Answer by sketch as possible)

(This exam measured with ILOS)

Question (1) (30)%

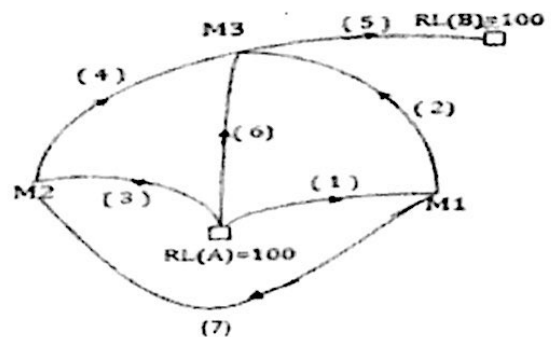
- If y is the vertical distance between tangent and curve, a is multiplying coefficient and x is the distance to the point measured from the start of curve. Prove that : $y = a x^2$.
- Two straights AP and QC meet at an inaccessible point I. A circular curve of 500 m radius is to set out joining the two straights. The following data were collected $\angle APQ = 157^\circ 22'$, $\angle CQP = 164^\circ 38'$, $PQ = 200$ m. Calculate the necessary data for setting out the curve by coordinates from tangent if the distances between points = 20 m. and the chainage of P is (57.17) chain.
- The following reading were taken by a theodolite from station B to A, C and D. If the line BA has bearing of $28^\circ 46'$ and the instrument constant is 100. Find the slope and bearing of line CD.

Target	H.C.R	V. Angle	Staff Reading		
			Top	Center	Bottom
A	$301^\circ 10'$				
C	$152^\circ 36'$	$-4^\circ 00'$	1.044	2.283	3.522
D	$205^\circ 06'$	$3^\circ 30'$	0.645	2.376	4.110

Question (2) (25) %

- 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 $N25^\circ 30' E$, and the bearing of the second tangent is $N76^\circ 30' W$. Determine the coordinates of point B and the length of the second tangent.
- 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
7	4	-2.11

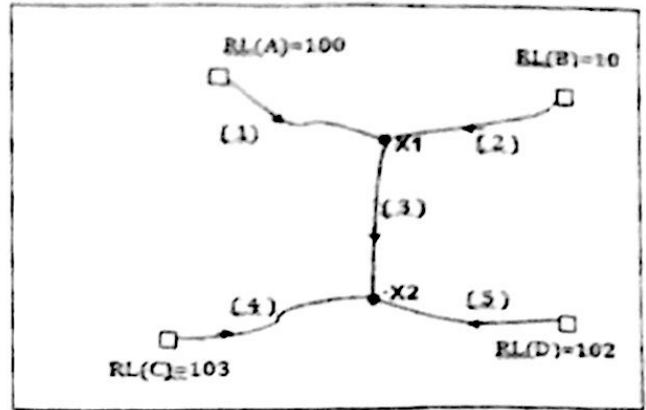


Question (3) (25) %

- a) If the radius and the central angle of the simple curve are (R, θ) , prove that : All the parameters of the simple curve.
- b) Compute the values of unknowns by Observation equation for the opposite figure

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

In case of unit weight



Question (4) (20) %

- 1- Define the following: Aerial photogrammetry, Terrestrial photogrammetry, Principal axis, flying height, focal length and fiducial mark.
- 2- Mention with sketch the Principle components of a single-lens frame camera.
- 3- A distance between two points on a map at a scale of 1:62500 is 32.56 mm. the distance between the same points on a vertical photo taken with a 12 inch focal length camera is 86.20 mm. if both points lie at an elevation of 750 ft, compute the flying height above datum in meter.
- 4- An area that is 12 miles long in the east west direction, and 7 miles wide in the north south direction is to be photographed with a lens having a 12 in focal length. The photograph size is 9*9 in. the average scale is to be 1:12000, effective at an elevation 800 ft above sea level. Overlap is to be 65 % and sidelap is to be at least 30%. An intervalometer will be used to control the interval between exposure, the ground speed of the aircraft is to be 160 mph. the flight lines are in north south direction on an existing map 1:62500. The two outer flight lines are to coincide with the east west boundaries of the area. Determine the data required for flight plan.

Good Luck

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