मजल - 005

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Surveying - I
(113105)

P. Pages : 3

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** questions from each unit.
5. Figures to the right indicate full marks.
6. Use of non-programmable calculator is allowed.

UNIT - I

1. a) The following records refer to an operation involving reciprocal levelling. 8

Instrument at	Staff reading on		Remarks
	A	B	
A	1.155	2.595	Distance AB=500m
B	0.985	2.415	R.L. of A=525.500

Find
a) The true R.L. of B.
b) The combined correction for curvature and refraction.
c) The collimation error.
d) Whether the line of collimation is inclined upwards or downwards.

b) Derive an expression for the correction for curvature, refraction & combined correction. 8

c) i) Write down comparison between collimation plane system & rise and fall method. 4

ii) Define surveying. Explain principle of surveying. 4

UNIT - II

2. a) Explain measurement of horizontal angle by repetition method and error that are eliminated by this process.   8

    b) Explain Gale's traverse table.   8

    c) i)   The lengths and bearings of the lines of a closed traverse are given as follows. Calculate the latitudes and departures of the lines and assign proper signs to them.   4

Line	AB	BC	CD	DA
Length (m)	156.5	178.2	234.8	203.1
Bearing	78°40'	152°32'	251°18'	3°45'

    ii) Explain principal axis of transite theodolite and give the relationship in between them.   4

UNIT - III

3. a) A tacheometer was set up at station P and observations were made to two stations Q and R. The vertical angles to Q and R were $5°30'$ and $1°08'$, respectively. The cross hair readings at Q were 2.105, 2.47 and 2.835 and those at R were 2.215, 2.56 and 2.905. The staff was held vertical in both cases. The instrument constants were 100 and 0.3. The readings from P to a BM of RL 285.35 m was 2.255. The horizontal angle QPR measured was $58°30'$. Find the distance QR, the gradient from Q to R, and the RLS of Q and R.   8

    b) The following observations were made in tacheometric survey.

Inst. Station	Height of axis	Staff Station	Vertical angle	Hair Readings (m)	Remark
A	1.345	BM	– 5° 30'	0.905, 1.455, 2.005	R.L of BM =450.50m
A	1.345	B	+ 8° 0'	0.755, 1.655, 2.555	
B	1.550	C	+ 10° 0'	1.500, 2.250, 3.000	

    Calculate the RLS of A, B and C and horizontal distances AB and BC. The tacheometer is fitted with anallactic lens and the multiplying constant is 100.   8

    c) Derive an expression for the horizontal distance and elevation from tacheometer when the line of sight is inclined & staff vertical.   8

UNIT - IV

4.   a)   What is mean by transition curve ? Explain objective and ideal requirements of transition curve.   8

      b)   Describe the method of setting a simple circular curve by Rankin's deflection angle method.   8

      c)   i)   Explain with neat sketch types of vertical curves.   4

           ii)   Derive the relation between the radius & degree of curve.   4

UNIT - V

5.   a)   What are the errors that may occur in plane table surveying ? Write down the precautions to be taken in plane table surveying.   8

      b)   What are the methods of plane tabling ? Describe any of them with a sketch.   8

      c)   Write short notes on :

           i)   Box sextant.   4

           ii)   Digital planimeter.   4

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