

*Please check whether you have got the right question paper.

- N.B:
1. Questions No.1 is compulsory. Attempt any three out of remaining questions.
 2. Assume any suitable data if required, state the same clearly.
 3. Figures to the right indicate full marks.
 4. Attempt sub-questions in order.

1. Compare any Four :

- a) Digital Level and Auto Level.
- b) Compound Curve and Composite Curve.
- c) Fixed Hair Method and Movable Hair Method.
- d) Transit Theodolite and Digital Theodolite.
- e) Block Contouring and Radial Contouring.

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2. a) In a tacheometric surveying the observations were taken with tacheometer having multiplying constant 100 and additive constant 0.5. Calculate the gradient of line PQ. The staff was held vertical during observations. The RL of station R is 41.800 m.

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Instrument Station	H. I. (m)	Staff Station	Bearing	Vertical Angle	Staff readings (m)
R	1.600	P	85°	+4° 30''	1.000, 1.417, 1.833
		Q	135°	-4° 00'	1.000, 1.657, 2.313

- b) Determine the constant of tacheometer from the following data :

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Distance of staff from vertical axis of tacheometer in m	Readings of stadia wires	
	Lower Wire	Upper Wire
30	1.086	1.383
60	0.924	1.521

- c) Explain how to calculate the RL of top of tower whose base is inaccessible, with two plane method.

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3. a) List various methods of setting out of curves. Explain setting out of curve by offsets from chord produced method.

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- b) Describe various obstacles in laying out of simple curves.

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- c) What is vertical curve? Sketch various types of vertical curves.

6

TURN OVER

4. a) Two straights PQ and QR intersect at a chainage of 4090 m and intersection angle 150° . It is required to set out 4° simple circular curve. Tabulate the necessary data to layout the curve with chord interval of 30 m using Rankine's method of deflection angle. 10
- b) Explain transferring the levels to underground for setting out of a tunnel. 10
5. a) Explain in detail how road project was executed in survey camp? 10
- b) A 0.5% rising gradient meets -0.7% down gradient. The chainage of and RL of intersection points are 550 m and 375 m respectively. Calculate the RLs of the points on the vertical curve using Chord gradient method. The rate of change of grade is 0.1 % per peg. The peg interval is 20m. Tabulate the results. 10
6. Write short notes on (any four) : 20
- a) Tangent correction method.
 - b) GPS and its applications.
 - c) Project Survey for dam.
 - d) Sub-tense bar method.
 - e) Significance of transition curve and its length determination.