



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 100313

Roll No.

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B. Tech.

(SEM. III) (ODD SEM.) THEORY
EXAMINATION, 2014-15
SURVEYING - I

Time : 2 Hours]

[Total Marks : 50

Note : Attempt all questions.

1 Attempt any **four** parts of the following : **3.5×4=14**

- (a) Find the hypotenusal allowance per chain of 30 m length if the angle of slope is 12° 30'.
- (b) The magnetic bearing of a line as observed is 269°. If the local attraction at this point is known to be 5°E and the declination is 15°W, what is the true bearing of the line ?
- (c) What are the fundamental lines and their desired relations in a theodolite.
- (d) Give brief description of total station.
- (e) Differentiate between prismatic compass and surveyor's compass.

- (f) A steel tape was exactly 30 m long at 20°C when supported through out under a pull of 10 kg. A line was measured with this tape under a pull of 15 kg and at a temperature of 32°C and found to be 780 m long. The cross-sectional area of the tape = 0.03 cm², total weight of tape = 0.693 kg, α for steel = 11×10⁻⁶ per °C, E for steel = 2.1×10⁶ kg/cm². Compute true length of line if tape is supported at every 30 m.

2 Attempt any two parts of the following : **6×2=12**

- (a) A tacheometer provided with anallatic lens and having multiplying constant 100 is employed to find the gradient of line PQ from the following observations :

Staff Station	Bearing	Top hair reading	Middle hair reading	Bottom hair reading	Vertical angle
P	345°	0.900	1.772	2.544	+15°
Q	75°	0.750	2.205	3.660	+10°

Calculate the gradient of lines PQ.

- (b) The following are observations in reciprocal levelling :

Instrument near	Staff reading at		Remarks
	A	B	
A	1.825	2.750	Distance AB = 1020 M
B	0.930	1.615	RL of A = 126.325 M

Find true RL of B and combined correction for curvature and refraction.

- (c) Define contour and write characteristics of contour.

3 Attempt any **two** parts of the following : $6 \times 2 = 12$

- (a) Two straight lines AC and CB to be connected by a $3^\circ C$ intersect at a chainage of 2760 m. The WCB of AC and CB are $45^\circ 30'$ and $75^\circ 30'$ respectively. Calculate radius, tangent length, curve length, length of long chord, chainage of point of commencement and tangency.
- (b) State the different methods of calculating length of transition curve.
- (c) Explain Rankine's method of setting out of a circular curve.

4 Attempt any **two** parts of the following : $6 \times 2 = 12$

- (a) Discuss various methods of theodolite traversing.
- (b) Describe various rules to adjust closing error occurring in a closed traverse.
- (c) What is the purpose of a satellite station in triangulation ? Derive an equation to obtain angle at triangulation station with the help of satellite station observation which is inside the triangle.