

Roll No.

OLE-3029

B. Tech. 3rd Semester (Civil Engg.) Examination – April, 2021

SURVEYING

Paper : PCC-CE-207-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is *compulsory*. All questions carry equal marks.

1. Describe the following :

- (a) Difference between plane surveying and geodetic surveying
- (b) Checks on open and closed traverse
- (c) Types of self reading staff
- (d) Balancing of traverse
- (e) Horizontal equivalent
- (f) Use of anallatic lens in tachemeter

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SECTION – A

2. (a) What are offsets ? Briefly explain different offsets with neat sketches. 7
- (b) A 30 m steel tape was standardized at a temperature of 20°C and under a pull of 5 kg. The tape was used in catenary at a temperature of 25°C and under a pull of P kg. The cross-sectional area of tape is 0.02 cm², its weight per unit length is 22 g/m, Young's modulus = 2×10^{-6} per °C. Find the correct horizontal distance, if P is (i) 5 kg, (ii) 11 kg. 8
3. (a) The bearings observed for a closed traverse are given below. Give the corrected bearings. 10

Line	F.B	B.B
AB	191°45'	13°00'
BC	39°30'	222°30'
CD	22°15'	200°30'
DE	242°45'	62°45'
EA	330°15'	147°45'

- (b) What is meridian ? Explain different types of meridian. 5

SECTION – B

4. (a) Briefly describe the different types of levels and staff used in leveling. 5
- (b) The following consecutive readings were taken with a level and a 4-metre leveling staff on a continuously sloping ground at common intervals of 30 m: 0.855 (on A), 1.545, 2.335, 3.115, 3.825, 0.455, 1.380, 2.055, 2.855, 3.455, 0.585, 1.015, 1.850, 2.755, 3.845 (on B). The RL of A was 380.500. Make

entries in a level book and apply the usual checks. Determine the gradient of AB. All units are in meters. 10

5. (a) Derive a relationship for curvature and refraction correction. 5
- (b) The following reciprocal observation were made from two points P and Q : horizontal distance between P and Q = 6996m, Angle of elevation of Q from P = $1^{\circ}56'10''$, Angle of depression of P from Q = $1^{\circ}56'52''$, Height of signal at P = 4.07m, Height of signal at Q = 3.87m, Height of instrument at P = 1.27m, Height of instrument at Q = 1.48m. Find the difference in level between P and Q, given that $R \sin 1'' = 30.88\text{m}$. 10

SECTION – C

6. (a) Briefly describe the different methods of contouring along with sketch. 8
- (b) What are the characteristics of contour lines ? Also describe the methods of interpolation of contours. 7
7. (a) Briefly describe the temporary adjustment of theodolite. 5
- (b) The following observations were taken from stations P and Q.

Line	Length (m)	Bearing
PA	125.0	S $60^{\circ}30'$ W
PQ	200.0	N $30^{\circ}30'$ E
QB	150.5	N $50^{\circ}15'$ W

Calculate the lengths and bearing of AB and also the angles PAB and QBA. 10

SECTION – D

8. (a) Two tangents meet at chainage 1022 m; the deflection angle is 36° . A circular curve of radius 300 m is introduced in between them. Find the following :
- (i) Tangent length
 - (ii) Chainage of the tangent points
 - (iii) Length of the circular curve. 8
- (b) Enumerate different methods of setting out of vertical curve and explain any two methods. 7
9. (a) Describe the different instrument used in tacheometry. 5
- (b) Following readings were taken by a tacheometer with the staff held vertical. The tacheometer is fitted with an anallactic lens and the multiplying constant is 100. Find out the distance AB and the R.L's of A and B. Also find the gradient of the line AB. 10

Instrument at	Height of instrument	Staff station	WCB	Vertical angle	Staff readings (m)	Remarks
O	1.550	A	$30^\circ 30'$	$4^\circ 30'$	1.155, 1.755, 2.355	R. L. of B. M. = 150.00 0
		B	$75^\circ 30'$	$10^\circ 15'$	1.250, 2.000, 2.750	