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 15

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 cm^2, 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°56' 10", Angle of depression of P from Q=1°56'52", Height of signal at P=4.07m, 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 Rsin 1" = 30.88m. 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° 30' W
PQ	200.0	N 30° 30' E
QB	150.5	N 50° 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°30'	4°30'	1.155, 1.755, 2.355	R. L. of B. M. = 150.00 0
		B	75°30'	10°15'	1.250, 2.000, 2.750	