

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023****Subject Code:3134003****Date:16-01-2024****Subject Name:Geomatics Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Briefly describe with sketches any one method of orientation in Plane Table survey. **03**
- (b) Explain the principle of Stadia method. Derive the relation $D = KS+C$ in tacheometry survey. **04**
- (c) Following observations are obtained in tacheometry survey. **07**

From	To	Vertical Angle	Hair readings (m)		
B	A	$-2^{\circ} 42'$	2.10	2.65	3.20
B	C	$+3^{\circ} 15'$	1.92	2.92	3.92

Take $K=100$, $C=0$, $HI=1.5m$, Staff held vertically. Compute lengths BA and BC, and RLs of A & C if RL of B is 122.34m.

- Q.2** (a) Define the followings for theodolite survey: **03**
Plunging, Swinging, Trunnion axis.
- (b) Explain with sketch: Latitude and Departure of survey line. **04**
- (c) Prepare Gale's Traverse Table to adjust the closing error for the following data. **07**

Line	Length (m)	WCB
AB	127	10°
BC	115	150°
CA	82	248°

OR

- (c) Due to some problems with equipment, the length and bearing of one side were not taken for a closed traverse ABCDA. From the available data, compute the length and bearing of the line DA. **07**

Line	Length (m)	Bearing
AB	120.8	N $30^{\circ} 16'$ E
BC	260.1	N $85^{\circ} 27'$ E
CD	167.3	S $37^{\circ} 15'$ E
DA	?	?

- Q.3** (a) Define: Laplace Stations, Well-conditioned Triangle, Eccentric Station. **03**
- (b) Derive the expressions for Trigonometric levelling for the case when base of the object is inaccessible and instrument stations are in the same vertical plane and instrument axes at same elevation, for the elevated object. **04**

- (c) The top (Q) of a chimney was sighted from two stations P and R at same axes level and in one line with Q. The angles of elevation of Q at P and R were $36^{\circ} 31'$ and $20^{\circ} 15'$. The horizontal distance between P and R was 120m and RL of instrument axis is 207.89m. Find the R.L. of Q and the horizontal distance from P to the chimney. **07**
- OR**
- Q.3** (a) Briefly describe the setting out of simple circular curve by Rankine's method. **03**
 (b) Show the various components of simple circular curve on a detailed sketch. Also, compute following values if radius is 320 m and deflection angle is 30° . (i) Length of curve, (ii) Length of Long chord, (iii) Mid Ordinate. **04**
 (c) Two triangulation stations A and B are 75 km apart and have elevations of 250 m and 415 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass nearer the ground than 2 m. The intervening ground may be assumed to have a uniform elevation of 220 m. **07**
- Q.4** (a) What is sounding? Explain with sketches any one equipment used for sounding. **03**
 (b) Explain with example "The Laws of weights". **04**
 (c) The following are the three angles p, q & r observed at a station C closing the horizon, along with their probable errors of measurement. Determine their corrected values. **07**
 $p = 76^{\circ} 10' 10'' \pm 2''$, $q = 137^{\circ} 51' 20'' \pm 4''$, $r = 145^{\circ} 58' 12'' \pm 5''$
- OR**
- Q.4** (a) Explain with sketch various parts of Aerial Camera and their working. **03**
 (b) What is 'Relief Displacement'? How will you obtain it for vertical photograph? **04**
 (c) The scale of an aerial photograph is 1cm=150m. The photograph size is 20cm x 20cm. Determine the number of photographs required to cover an area 15 km x 12 km, if the longitudinal lap is 65% and the side lap is 35%. **07**
- Q.5** (a) Define following terms and show them in a sketch of celestial sphere: Prime vertical, Declination Circle, Azimuth. **03**
 (b) Describe with sketch any one method of determining Latitude of a given space. **04**
 (c) Explain with sketches, step by step procedure of setting out foundation plan of one room building. **07**
- OR**
- Q.5** (a) Briefly discuss about Electromagnetic spectrum. **03**
 (b) Explain with sketches working principle of GPS. **04**
 (c) Explain various applications of Remote Sensing and GIS in Civil Engineering. **07**
