

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2024****Subject Code:3134003****Date:19-07-2024****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) What are the advantages and disadvantages of plane tabling? **03**
- (b) Briefly describe with sketches the temporary adjustment of a vernier transit theodolite. **04**
- (c) Following observations are obtained in tacheometry survey. **07**

From	To	Vertical Angle	Hair Readings		
A	B	+ 3° 20'	1.050	1.650	2.250
A	C	- 2° 10'	2.160	2.960	3.760
A	D	+ 1° 30'	0.375	1.375	2.375

Take $K=100$, $C=0$, H.I. = 1.5 m and R.L. of A = 361.21 m. Staff held vertically. Compute: (i) Lengths AB, AC and AD, & (ii) R. L. of B, C and D.

- Q.2** (a) Define for the theodolite survey: Transiting, Left swing, Departure. **03**
- (b) Explain with sketches any two methods of Plane Table surveying. **04**
- (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	140.8	N 32° 16' E
BC	280.1	S 87° 27' E
CD	187.3	S 39° 15' W
DA	?	?

OR

- (c) Derive the expression for determining horizontal distance and R.L. when line of sight is inclined upward for Tangential Method. **07**
- The vertical angles to vanes fixed at 0.5 m and 3.5 m above the foot of the staff held vertically at a point where + 0° 10' and +1° respectively. Find the horizontal distance and the reduced level of the point, if the level of the instrument axis is 108.24 m above the datum.

- Q.3** (a) Briefly explain following terms of triangulation survey: **03**
Subsidiary Bases, Laplace Stations, Satellite Station.
- (b) Derive the expressions for Trigonometric levelling for the case when base of the object is inaccessible and instrument stations are in same vertical plane with instrument axes at different levels. **04**

- (c) The top (Q) of a chimney was sighted from two stations P and R at different 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 observations at staff held on BM from P and R were 1.25m and 2.5m respectively. The horizontal distance between P and R was 85m and R. L. of BM was 106.28m. Find the R. L. of Q and the horizontal distance from P to the chimney. **07**

OR

- Q.3** (a) What are the objects of Geodetic Triangulation? **03**
 (b) Explain with sketches, signals and towers in triangulation survey. **04**
 (c) How do you determine the inter visibility of triangulation stations? **07**
 Two triangulation stations A and B are 50 km apart and have elevations of 175 m and 265 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass nearer the ground than 3 m. The intervening ground may be assumed to have a uniform elevation of 164 m.

- Q.4** (a) Define: Simple circular curve, Transition curve, Reverse curve. **03**
 (b) Briefly explain with sketches, setting out of simple circular curve by Perpendicular offset from tangent. **04**
 (c) Show the following components of simple circular curve on detailed sketch. Also, calculate their values if radius is 240 m and deflection angle is 30° . **07**
 (i) Tangent Length, (ii) Length of Long Chord, (iii) Length of Curve, (iv) Apex Distance, (v) Mid Ordinate.

OR

- Q.4** (a) Define: Sounding, Systematic error, Most Probable Value. **03**
 (b) Describe with sketches: (i) Sounding Machine, (ii) Fathometer. **04**
 (c) Compute the necessary components of combined curve for the following data: **07**
 Deflection angle = 75° , design speed = 70 kmph, peg interval for cubic spiral transition curve = 20 m and circular curve = 10 m.

- Q.5** (a) Define for Field Astronomy: Celestial sphere, Zenith, Celestial Horizon. **03**
 (b) What is 'Aerial Photogrammetry'? What are its applications? **04**
 (c) Briefly explain with sketches for Aerial Photogrammetry: (i) Relief Displacement, (ii) End Overlap, (iii) Crab, (iv) Drift. **07**

OR

- Q.5** (a) Briefly describe: Remote Sensing, GIS, GPS. **03**
 (b) Discuss the Civil Engineering applications of integrated Remote Sensing and GIS. **04**
 (c) Briefly explain: (i) Total Station, (ii) Setting out of Building Foundation. **07**
