

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023****Subject Code:3140601****Date:07-07-2023****Subject Name:Surveying****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.

- Q.1** (a) Explain various sources of errors in plane tabling. **03**
 (b) Discuss the various special functions of total station. **04**
 (c) Enlist the methods of theodolite traversing. Explain repetition method with figure. **07**

- Q.2** (a) Differentiate between stadia hair method and tangential method of tacheometry. **03**
 (b) Differentiate between plane surveying and geodetic surveying. **04**
 (c) A theodolite traverse survey was conducted and the data obtained is given below. **07**

| Line | AB | BC | CD | DA |
|---------|---------|--------|---------|---------|
| Length | 235.00 | 318.30 | 215.00 | 280.00 |
| Bearing | 338°20' | 82°22' | 167°00' | 259°40' |

Find the magnitude and direction of the closing error if any.

OR

- (c) Derive the expressions for determining horizontal distance and elevation in trigonometric leveling while base of the object is inaccessible and the instrument stations and the elevated object are not in the same vertical plane. **07**
- Q.3** (a) An instrument was setup at A and the angle of elevation of the top of an electric pole BC was 32°20'. The horizontal distance between A and B, the foot of the pole was 380.00m. Determine the RL of top of the pole C, if the staff reading held on a BM (RL 100.00) was 4.145m. with telescope in horizontal plane. **03**
 (b) Define the terms: Face left, Line of collimation, Axis of the telescope and Axis of the altitude level tube. **04**
 (c) Two stations A and B, 80 km apart, have elevations 16 m and 272m above mean sea level respectively. Calculate the minimum height of the signal at B. **07**

OR

- Q.3** (a) Explain orientation of plane table by backsighting with figure. **03**
 (b) Enlist various methods of plane tabling and explain radiation method with figure. **04**
 (c) What are the segments of GPS? Describe them briefly. **07**
- Q.4** (a) Explain types of transition curves. **03**
 (b) Differentiate between cumulative errors and compensating errors. **04**
 (c) The following offsets were taken from a chain line to an irregular boundary line at an interval of 5m. **07**

1.00, 2.60, 3.40, 4.90, 4.70, 3.10, 0.50m

Determine the area between the chain line, the irregular boundary line and the end offsets by the mid-ordinate rule and the average ordinate rule.

OR

- Q.4** (a) Draw a neat sketch showing the elements of a combined curve. **03**
 (b) Discuss how reservoir capacity is determined? **04**
 (c) In case of a simple circular curve, two straight lines intersect at chainage of 1150.50 and the angle of deflection is 60° . If the radius of the curve is 450m, determine tangent distance, length of the curve, chainages of points of curvature and tangency, length of the long chord, degree of curve, apex distance and mid-ordinate. **07**

- Q.5** (a) Differentiate between direct observations and indirect observations. **03**
 (b) What are the requirements for the design of a transition curve? **04**
 (c) In tacheometric survey, derive the expression for horizontal and vertical distances in the fixed hair method when line of sight is horizontal and staff is held vertically. How will you find RL of staff station? **07**

OR

- Q.5** (a) What is reverse curve? Draw a neat sketch showing the elements of a reverse curve. **03**
 (b) Define true error, most probable error, residual error and normal equation. **04**
 (c) To determine the distance between two stations A and B, a tacheometer was setup on a point P on the line AB and the following readings were obtained on a staff vertically held. **07**

| Inst. Station | Staff Station | Vertical Angle | Hair Readings (m) | | |
|---------------|---------------|----------------|-------------------|-------|-------|
| P | A | $+8^\circ 24'$ | 2.225 | 2.605 | 2.985 |
| | B | $-1^\circ 06'$ | 1.640 | 1.920 | 2.200 |

Calculate the horizontal distance AB and RL of B. The constants of instrument are 100 and 0.00. RL of A is 50.000m.
