Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2023

Subject Code:3140601   **Date:11-01-2024**
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)**	List out various methods for the orientation of a plane table and explain any one with the figure.	**03**
	(b)	On which basic principle, EDM is working? For which type of special purposes the total station is used?	**04**
	(c)	Explain temporary adjustments of theodolite.	**07**
Q.2	**(a)**	Explain the basic principle of tacheometry.	**03**
	(b)	Explain the principle and uses of triangulation.	**04**
	(c)	Derive the expressions for determining horizontal distance and elevation in trigonometric leveling while the base of the object is inaccessible, and the instrument axes of both stations are at the same level in the same vertical plane.	**07**
		OR	
	(c)	Define the terms: Face left, Transiting, Line of Collimation, Axis of the telescope, Axis of the plate level, Vertical axis, and Swinging the telescope.	**07**
Q.3	**(a)**	What are the advantages and disadvantages of plane table surveying?	**03**
	(b)	Enlist various methods of plane tabling and explain the radiation method with the figure.	**04**
	(c)	Explain the Global Positioning System (GPS) in detail.	**07**
		OR	
Q.3	**(a)**	Why Trigonometric levelling is an indirect method of levelling?	**03**
	(b)	Calculate the least count of the vernier for the vernier transit theodolite.	**04**
	(c)	Explain various types of opaque and night signals with figures.	**07**
Q.4	**(a)**	Why is a curve provided on highways and railways?	**03**
	(b)	Differentiate between the Trapezoidal rule and Simpson's rule.	**04**
	(c)	How will you find the area of an irregular figure with the help of a planimeter?	**07**
		OR	
Q.4	**(a)**	What is the transition curve? State the requirements of a transition curve.	**03**
	(b)	How will you allocate weights to the field observations?	**04**
	(c)	Derive the formula for the relation between the radius and degree of a curve by Arc definition and Chord definition.	**07**
Q.5	**(a)**	Write the equation to determine the probable error of a single measurement and Mean Square Error.	**03**
	(b)	Define the Angle of deflection, Normal chord, Tangent distance, and Point of curvature for a simple circular curve.	**04**

(c) Differentiate between the Fixed hair method and the Movable hair method. Also, differentiate between the Stadia hair method and the Tangential method. **07**

OR

Q.5 **(a)** Draw a figure of a simple circular curve with all its elements. **03**

(b) What do you mean by Gross errors, Systematic errors, Accidental errors, and Residual errors? **04**

(c) In tacheometric survey, derive the expression for horizontal and vertical distances in the fixed hair method when the staff is held vertically, and the measured angle is that of elevation. How will you find the RL of the staff station? **07**

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