Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – SUMMER 2025

Subject Code:3140601 Date:08-05-2025

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 the orientation by a magnetic needle while performing plane table surveying with the figure.	**03**
	(b)	Discuss electromagnetic spectrum with a neat sketch.	**04**
	(c)	Considering the theodolite, define the following terms: Centering, Transiting, Swinging the telescope, Axis of the plate level, Temporary adjustment, Axis of the telescope, and Line of collimation.	**07**
Q.2	**(a)**	Explain various purposes of the tacheometry survey.	**03**
	(b)	Differentiate between a stadia hair method and a tangential method.	**04**
	(c)	How will you check the accuracy of closed and open traverse?	**07**
		OR	
	(c)	What are the different errors in tacheometry? What are the permissible errors?	**07**
Q.3	**(a)**	What are the advantages and disadvantages of plane tabling?	**03**
	(b)	Enlist various methods of plane tabling and explain the intersection method.	**04**
	(c)	Which are the various equipment used for the measurement of a base- line? Explain Hunter's short base method in detail.	**07**
		OR	
Q.3	**(a)**	What is trigonometric levelling? What are its advantages and disadvantages over direct levelling?	**03**
	(b)	Prepare a list of various uses of theodolite.	**04**
	(c)	On which basic principle GPS is working? Explain satellite constellation.	**07**
Q.4	**(a)**	Draw a neat sketch of a simple circular curve.	**03**
	(b)	Differentiate between the Trapezoidal rule and the Simpson's rule.	**04**
	(c)	How will you find the area of irregular figure with the help of planimeter?	**07**
		OR	
Q.4	**(a)**	Write the advantages of a transit curve.	**03**
	(b)	Explain the methods of correlates. What are its advantages over the normal equation method?	**04**
	(c)	Explain the field procedure for setting out a combined curve.	**07**
Q.5	**(a)**	Enlist the rules for giving weights to the field observations.	**03**
	(b)	Differentiate between plane surveying and geodetic surveying.	**04**
	(c)	How to calculate probable error in measurements from the probability curve of errors?	**07**
		OR	

Q.5	**(a)**	Draw a figure of a compound curve with all its elements.	**03**
	(b)	Write a short note on anallatic lens.	**04**
	(c)	In trigonometric levelling, derive the formulae for the horizontal distance and elevation in the case when the base of the object is inaccessible, instrument stations and objects are in the same vertical plane, and both instrument axes are at the same level.	**07**

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Seat No.: _____ Enrolment No._____

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°24'	2.225	2.605	2.985
	B	-1°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.

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV (NEW) EXAMINATION – SUMMER 2022

Subject Code:3140601 Date:23-06-2022

Subject Name:Surveying

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
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4. **Simple and non-programmable scientific calculators are allowed.**

Q.1 **(a)** List the instruments used in plane tabling and give their uses. **03**

(b) What is principle of plane tabling? State sources of errors during plane tabling. **04**

(c) What is use of planimeter? When will you apply zero circle? How do you find the zero circle? **07**

Q.2 **(a)** What is least count? How will you find least count of an instrument? **03**

(b) Which are the methods of measuring horizontal angles? Briefly describe repetition method. **04**

(c) Length and Bearings for a closed traverse ABCD are given as below. Determine length and bearing of line DA. **07**

Line	Length	W.C.B
AB	390	12º 24’
BC	360	346º
CD	530	328º

OR

(c) Explain closing error in theodolite traverse with sketch and write formula for relative error of closure. **07**

Q.3 **(a)** Define the term probable value and probable error. **03**

(b) Discuss the method of achieving horizontal and vertical control in setting out works. **04**

(c) Enumerate different rules used for calculation of area and discuss in detail the Simpson’s one third rule. **07**

OR

Q.3 **(a)** Differentiate between plane surveying and geodetic surveying. **03**

(b) What do you mean by strength of figure in triangulation work? **04**

(c) What is base line? How is it selected? Describe the procedure of its extension. **07**

Q.4 **(a)** Explain principle of tachometry. **03**

(b) What is tacheometer? Explain the procedure of finding its coefficient in the field. **04**

(c) Derive the expression for horizontal and vertical distances by the fixed hair method when the staff is held vertically & the measured angle is that of elevation. **07**

OR

Q.4 **(a)** What is transition curve? State the requirements of a transition curve. **03**

(b) Derive the equation for degree of curve on the basis of (i) Arc definition (ii) Chord definition. **04**

	(c)	Two tangent intersect at a chainage of 1320.5m. the deflection angle being 24º. Calculate the following quantities for setting out simple circular curve of radius 275m. (i) Tangent length (ii) Length of long chord (iii) length of curve (iv) Chainage of point of commencement and tangency (v) Apex distance (vi) Versed sine of curve.	**07**
Q.5	**(a)**	Explain Electromagnetic spectrum.	**03**
	(b)	Explain working principle of GPS.	**04**
	(c)	What is GPS? Give its uses and application.	**07**
		OR	
Q.5	**(a)**	Explain basic Principle of EDM.	**03**
	(b)	What is GIS? Discuss component of GIS.	**04**
	(c)	What is total station? Describe uses of total station in field of civil engineering.	**07**

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