GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2021

Subject Code:3140601   **Date:31/12/2021**
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)	What is tacheometry? Write its uses.	(3)
Q.1 (b)	Explain with sketches various instruments used in plane table surveying.	(4)
Q.1 (c)	Explain with neat sketch various elements of simple circular curve.	(7)
Q.2 (a)	Explain in brief measurement of horizontal angle using theodolite.	(3)
Q.2 (b)	Explain in brief method of setting out of circular curve by perpendicular offset from the long chord.	(4)
Q.2 (c)	Two tangents intersect at a chainage of 1400 m the deflection angle being 24^0. Calculate the following quantities for setting out a curve of radious 275 m.	(7)
	1. Tangent length 2. Length of long chord 3. Length of curve 4. Chainage of point of commencement and tangency 5. Apex Distance	

OR

Q.2 (c)	Enlist various methods of plane tabling. Explain any one in detail.	(7)
Q.3 (a)	What is balancing of traverse? Enlist various rules for balancing the traverse.	(3)
Q.3 (b)	Explain in detail temporary adjustment of theodolite.	(4)
Q.3 (c)	A traverse survey was conducted and the data obtained is given in below table. Find the magnitude and directions of the closing error if any.	(7)

Line	AB	BC	CD	DA
Length (m)	156.4	178.3	234.9	202.5
Bearing	78^0 42'	152^0 30'	251^0 20'	356^0 12'

OR

Q.3 (a)	Write short note on vertical curve.	(3)
Q.3 (b)	What is trigonometric leveling? What are the advantages and disadvantages over direct levelling.	(4)
Q.3 (c)	Explain in detail Gale's traverse table.	(7)
Q.4 (a)	Discuss in brief instruments used in tacheometry.	(3)
Q.4 (b)	What is transition curve? Write advantages of transition curve.	(4)
Q.4 (c)	Derive the formula for the horizontal distance and elevation when the two instruments are set up in the in the following positions. The base of the object is inaccessible and instrument stations and object are in the same vertical plane.	(7)

	(I)	When both instrument axes are at the same level	
	(II)	When both instrument axes are not at the same level	

OR

Q.4 (a)   Differentiate between plane surveying and geodetic surveying.   (3)

Q.4 (b)   What is triangulation? Explain the principle of triangulation.   (4)

Q.4 (c)   The following offsets are taken from a survey line to a curved boundary line.   (7)

Distance(m)	0	5	10	15	20	30	40	60	80
Offset (m)	2.40	3.70	4.50	5.30	6.00	4.80	5.70	3.80	2.10

Find the area between the survey line, the curved boundary line, and the first and last offsets by (I) The trapezoidal rule and (II) Simpson's rule

Q.5 (a)   Explain the various features of a total station.   (3)

Q.5 (b)   Explain in brief Global Positioning System.   (4)

Q.5 (c)   Derive the horizontal distance formula in the fixed hair method when the staff is held vertically and the line of sight is horizontal. How will you find the R.L. of staff station?   (7)

OR

Q.5 (a)   Write short note on Electronic Digital Theodolite.   (3)

Q.5 (b)   Explain the following terms.   (4)
1. Direct observations   2. Indirect observations   3. Most Probable value
4. Most probable error

Q.5 (c)   What is the weight of a quantity? Discuss various laws of weights.   (7)