

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3134003****Date:26-07-2023****Subject Name:Geomatics Engineering****Time:02:30 PM TO 05:00 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 is 'Orientation of Plane Table'? Briefly describe with sketch any one method of orientation of Plane Table. **03**
- (b) Explain with sketch the principle of Stadia method. Derive the relation $D = KS+C$. **04**
- (c) Following observations are obtained in tacheometry survey. **07**

From	To	Bearing	Vertical Angle	Hair readings (m)		
P	Q	310^0	$+4^0 20'$	1.050	1.650	2.250
P	R	40^0	$+7^0 10'$	2.180	2.980	3.780

Take $K=100$, $C=0$, Staff held vertically. Compute length and gradient of line QR.

- Q.2** (a) Define the followings for theodolite survey: Plunging, Departure, Closing Error. **03**
- (b) How would you determine the horizontal distance by "Horizontal Base Subtense" method? If the included horizontal angle is $6^0 20'$ for the 3 m long subtense bar, then work out the horizontal distance between instrument and bar. **04**
- (c) Due to some problems with equipment, the bearings of two sides were not taken for a closed traverse ABCDEA. From the available data, compute the bearings of the lines DE and EA. **07**

Line	Length (m)	Bearing
AB	250.6	N $38^0 46'$ E
BC	270.1	N $80^0 47'$ E
CD	230.7	S $12^0 15'$ E
DE	260.4	?
EA	285.5	?

OR

- (c) Prepare Gale's Traverse Table to adjust the closing error for the following data. **07**

Line	Length (m)	WCB
AB	220	100^0
BC	205	250^0
CA	162	340^0

- Q.3** (a) Briefly explain following terms for the geodetic surveying: Well-conditioned Triangle, Strength of figure, Eccentric Station. **03**
- (b) Derive the expressions for Trigonometric levelling for the case when base of the object is inaccessible and instrument stations are not in same vertical plane for the elevated object. **04**

- (c) The top (Q) of a chimney was sighted from two stations P and R at very different level and in one line with Q. The angles of elevation of Q at P and R were $36^{\circ} 30'$ and $20^{\circ} 18'$. The angle of elevation from R to a vane 2m above the foot of staff held at P was $14^{\circ} 15'$. The heights of instruments at P and R were 1.6m and 1.5m respectively. The horizontal distance between P and R was 114m and R.L. of R was 106.28m. Find the R.L. of Q and the horizontal distance from P to the chimney. **07**
- OR**
- Q.3** (a) Briefly describe the setting out of simple circular curve by successive bisection of chords. **03**
- (b) Show the various components of simple circular curve on a detailed sketch. Also, compute following values if radius is 200 m and deflection angle is 60° . (i) Tangent length, (ii) Apex Distance, (iii) Mid Ordinate. **04**
- (c) Two triangulation stations A and B are 47 km apart and have elevations of 180 m and 175m 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 152 m. **07**
- Q.4** (a) Define: Systematic error, Accidental error, Most Probable error. **03**
- (b) Discuss with sketch sounding by 'Fathometer'. **04**
- (c) What is MPV? Find MPV of angle A, where $A = 52^{\circ} 10' 20''$ of wt. 2, and $2A = 105^{\circ} 2' 40''$ of wt. 3. **07**
- OR**
- Q.4** (a) Explain with sketch various parts of Aerial Camera and their working. **03**
- (b) Explain following terms with sketch in aerial photogrammetry: Tilted photograph, Principal point, Swing, Azimuth of principal plane. **04**
- (c) From an eccentric station S, 25 m to the west of the main station B, the following angles were measured: Angle BSC = $80^{\circ} 22' 30''$, Angle CSA = $51^{\circ} 30' 26''$. The stations S and C are to the opposite sides of the line AB. Calculate the correct angle ABC if the lengths AB and BC are 5416.3 m and 4730.9 m respectively. **07**
- Q.5** (a) Define following terms and show them in a sketch of celestial sphere: Declination Circle, Azimuth, Hour angle. **03**
- (b) Enlist various methods of fixing true meridian of given place. Describe with sketch any two methods of them. **04**
- (c) What is meant by setting out works? What are the methods to set out building plan? Explain with sketch step by step procedure of any one method. **07**
- OR**
- Q.5** (a) What do you understand by 'Remote Sensing'? What are the applications of remote sensing? **03**
- (b) What is 'GPS'? Explain with sketches its working principle and segments. **04**
- (c) What is 'EDM'? Discuss with sketches the special features and field applications of Total Station. **07**
