

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2019****Subject Code: 2134003****Date: 11/06/2019****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. Support your answer with neat sketches wherever possible.

- Q.1** (a) Briefly explain the followings: Plunging, Latitude, Closed Traverse, Independent coordinates. **04**
- (b) Discuss with sketch temporary adjustment of Vernier transit theodolite. **04**
- (c) Find the magnitude and direction of closing error if any for the following observations of Traverse Survey. **06**

Line	AB	BC	CD	DA
Length (m)	156.4	178.3	234.9	202.5
Bearing	79° 42'	151° 30'	252° 20'	355° 12'

- Q.2** (a) Explain with sketch principle of stadia method and derive the formula $D = KS + C$ **04**
- (b) 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. **10**

Line	Length (m)	Bearing
AB	240.6	N 38° 46' E
BC	260.1	N 80° 47' E
CD	220.7	S 12° 15' E
DE	250.4	?
EA	275.5	?

OR

- (b) Prepare Gale's Traverse Table to adjust the closing error of clockwise traverse for the following data: **10**

Line	Length (m)	Station	Angle	WCB
		P	72° 20' 00"	
PQ	106.2			40° 30' 00"
		Q	50° 9' 00"	
QR	115.7			
		R	56° 40' 00"	
RP	81.5			

- Q.3** (a) Derive the expression for determining horizontal distance and R.L. when line of sight is inclined upward and staff held vertical for Tacheometry Survey. **04**
- (b) Determine the horizontal distance between theodolite station and 6m long horizontal subtense bar perpendicular to line of sight when the included angle is 50°. **04**
- (c) Following observations are obtained in tacheometry survey. **06**

From	To	Bearing	Vertical Angle	Hair readings (m)		
P	Q	300°	+8° 20'	1.050	1.650	2.250
P	R	10°	+10° 10'	2.180	2.980	3.780

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

OR

- Q.3**
- (a) Derive an expression for Trigonometric levelling to determine horizontal distance and top RL of inaccessible object when instrument stations in same vertical plane with elevated object and instrument axes are at different levels. **04**
 - (b) Explain with sketch direct levelling process for steep ground. **04**
 - (c) Find the reduced level of a church spire C from the following observations taken from two stations A and B 70m apart. Angle $BAC = 60^\circ$, Angle $ABC = 50^\circ$, Angle of elevation from A to the top of spire = 22° , Angle of elevation from B to top of spire = 18° , Staff reading from A on B.M. = 2.5m, Staff reading from B on the same B.M. = 0.5m, R.L. of B.M. = 114.20m. Also, determine distances AC and BC. **06**

- Q.4**
- (a) Describe with sketches different types of 'Triangulation Systems' and their suitability. **04**
 - (b) Briefly explain: Well-conditioned triangle, Laplace station, Reduction of center, False station. **04**
 - (c) The altitudes of two proposed stations A and B, 80 km apart are respectively 210 m and 500 m. The intervening obstructions situated at C, 50 km apart from A has an elevation of 300 m. Ascertain if A and B are inter visible, and if necessary, find by how much B should be raised so that the line of sight must nowhere be less than 3 m above the surface of the ground. **06**

OR

- Q.4**
- (a) What is EDM? Briefly explain principle of EDM. **04**
 - (b) Discuss the special features and field applications of Total Station. **05**
 - (c) From an eccentric station S, 30 m to the east of the main station B, the following angles were measured: Angle $BSA = 76^\circ 20' 30''$, Angle $CSA = 50^\circ 10' 26''$. The stations S and A are to the opposite sides of the line BC. Calculate the correct angle ABC if the lengths AB and BC are 5305.3 m and 4805.9 m respectively. **05**

- Q.5**
- (a) What is sounding? Explain with sketch: Sounding Machine, Fathometer. **05**
 - (b) Briefly explain DGPS survey. **04**
 - (c) What is meant by setting out works? What is the procedure of fixing an alignment of Tunnel? **05**

OR

- Q.5**
- (a) Explain with sketches methods of locating sounding. **04**
 - (b) What is LIDAR? Explain its applications in detail. **05**
 - (c) What are the methods to set out building plan? Explain step by step procedure of any one method. **05**
