

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (New) EXAMINATION – WINTER 2018****Subject Code: 2134003****Date: 05/12/2018****Subject Name: Geomatics Engineering****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.

- Q.1 (a) Define (i) Line of collimation (ii) Plunging (iii) Telescope Normal 03
- (b) What is 'Closing Error'? Enlist the different methods of balancing the closing error in a closed traverse. 04
- (c) The bearing of two inaccessible stations A and B taken from station C were $225^{\circ}0'$ and $153^{\circ}26'$ respectively. The coordinates of A and B were as under 07

| Station | Easting | Northing |
|---------|---------|----------|
| A | 300 | 200 |
| B | 400 | 150 |

Calculate the independent coordinate of C.

- Q.2 (a) What is the principle of the subtense bar method of measuring horizontal distances? 03
- (b) List fundamental lines of theodolite and desired relationship between them. 04
- (c) The following observations were taken with a tacheometer at the station P to a staff at Q held normal to the line of sight. If the staff readings are 1.71, 2.64 and 3.57 m, and the angle of inclination is $29^{\circ}30'$, determine the horizontal distance between P and Q. 07
- Also determine the elevation of Q if the line of collimation is at R.L of 200.00 m. Take $k=100$ and $C=0.50$.

OR

- (c) While traversing, a closed traverse ABCD was made. Due to the obstructions it was not possible to observe the bearings of lines BC and CD. Calculate the missing bearings. 07

| Line | Length (m) | W.C.B |
|------|------------|---------------|
| AB | 550 | 60° |
| BC | 1200 | ? |
| CD | 880 | ? |
| DA | 1050 | 310° |

- Q.3 (a) How correction for curvature and refraction is applied in trigonometric levelling? 03
- (b) An instrument was set up at P and the angle of elevation to a vane 4 m above the foot of the staff held at Q was $9^{\circ}30'$. The horizontal distance between P and Q was known to be 2000 m. Determine the R.L of the staff station Q, given that R.L of the instrument axis was 2650.38 m. 04
- (c) Describe briefly the salient features of Total Station and discuss the recent advancements in Total Stations. 07

OR

- Q.3 (a) Explain Electromagnetic Distance Measurement Technique. 03
(b) Discuss setting up and orientation of a Total Station. 04
(c) How do you determine the inter visibility of triangulation stations? 07
Two triangulation stations A and B are 50 km apart and have elevations of 180 m and 210 m 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 160 m.

- Q.4 (a) Explain DGPS briefly. 04
(b) Compare Traverse survey with Triangulation survey 04
(c) Describe with sketches any two methods for setting out of a building foundation plan. 06

OR

- Q.4 (a) Briefly explain : 03
Subsidiary Bases, Satellite station and Well-conditioned Triangle.
(b) Explain the Direct levelling process for steep ground 04
(c) Derive the expression for determining horizontal distance and R.L when line of sight is at an angle of elevation as well as at an angle of depression and Staff held vertical for Tacheometry Survey. 07

- Q.5 (a) What precautions will you like to exercise in measuring a base line? 03
(b) What is sounding? Describe any two methods of locating sounding in hydrographical surveying. 04
(c) Find the reduced level of a church spire C from the following observation 07
taken from two stations A and B, 50 m apart.
Angle of BAC = 60°
Angle of ABC = 50°
Angle of elevation from A to the top of spire = 30°
Angle of elevation from B to the top of spire = 29°
Staff reading from A on bench mark of reduced level 20.00 m = 2.5 m
Staff reading from B to the same bench mark = 0.50 m.

OR

- Q.5 (a) What is Normal Tension in Linear measurements? 03
(b) Explain LIDAR surveying. 04
(c) Calculate latitudes, departures and closing error for the following traverse, and adjust using Bowditch's rule. 07

| Line | Length (m) | Whole Circle Bearing |
|------|------------|----------------------|
| AB | 89.31 | $45^\circ 10'$ |
| BC | 219.76 | $72^\circ 05'$ |
| CD | 151.18 | $161^\circ 52'$ |
| DE | 159.10 | $228^\circ 43'$ |
| EA | 232.26 | $300^\circ 42'$ |