Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016**

**Subject Code:2134003** **Date:06/01/2017**

**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.**

**MARKS**

**Q.1 MCQ** **14**

1 The angle between the prolongation of the preceding line and the forward line of a traverse is called

(A) deflection angle (B) included angle (C.) direct angle (D) none of the above

2 While taking a back sight with a theodolite, the screw which is fastened first is the

(A) upper clamp screw (B) lower clamp screw (C.) Upper tangent screw (D) lower tangent screw

3 The stadia markings are made on

(A) eye piece (B) diaphragm (C.) object glass (D) none of the above

4 The difference between the most probable value of a quantity and its observed value is

(A) true error (B) weighted observation (C.) conditional error (D) residual error

5 Right deflection angle may be directly obtained by setting the instrument to read

(A) zero on back station (B) 180° on back station (C.) 90° on back station (D) 270° on back station

6 The plate bubble in the plate level of a theodolite will move considerably from its central position if the tripod leg is moved

(A) radially inwards (B) radially outwards (C.) in the same direction of the bubble moved (D) in the opposite direction of the bubble moved

7 An open traverse can be checked by

(A) included angles (B) deflection angles (C.) astronomical observations (D) linear measurements

8 The standard accuracy of tacheometric distance determination is

(A) 1:10 (B) 1:100 (C.) 1:500 (D) 1:10000

9 The stadia method in tacheometry is used to determine

(A) horizontal angles (B) vertical angles (C.) horizontal distances (D) horizontal and vertical distances

10 EDM in a total station measures directly

(A) vertical angles (B) horizontal angles (C.) slope distances (D) horizontal distances

11 Setting out is done

(A) prior to the preparation of plans (B) along with the preparation of plans (C.) after the preparation of plans (D) if obstructions are present

12 In a theodolite, a straight line tangential to the longitudinal curve of the level tube at its centre is known as

(A) Tube Centre (B) horizontal (C.) bubble line (D) line of sight

13 To observe an included angle with better accuracy then what is achieved by reading the verniers of a theodolite, the method preferred is

(A) repetition (B) reiteration (C.) double (D) any of these

14 The curvature correction for linear measurement can be applied as

(A) d/2R (B) d/R (C.) $d^2/R$ (D) $d^2/2R$

**Q.2** (a) Explain the basic principal of triangulation survey and triangulation systems. **03**

(b) Draw a neat sketch of a vernier theodolite. Describe its main parts and their functions. **04**

(c) For any hilly road project, describe the survey operations required along with suitable sketch. Also mention the surveying instruments may be used in the said operation. **07**

OR

(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° 10' |
| BC | 219.76 | 72° 05' |
| CD | 151.18 | 161° 52' |
| DE | 159.10 | 228° 43' |
| EA | 232.26 | 300° 42' |

**Q.3** (a) Describe the process of repetition and reiteration. What are the methods of traversing by theodolite? **07**

(b) Define following term with suitable sketch: **07**

Primary setting out points, Secondary Setting Out Points, Temporary Bench Marks, Building Line, Site centerline, Road centerline and Focusing

OR

**Q.3** (a) Define tacheometry. What are the various methods employed in tacheometric survey? Explain the method most commonly used. **07**

(b) Propose setting out work procedure for residential bungalow with suitable plan. **07**

**Q.4** (a) Describe how a total station has brought revolution in surveying. Discuss setting up and orientation of a total station. **07**

(b) A, B and C are stations on a straight level line of bearing 110° 16' 48". The distance AB is 314.12 m and BC is 252.58 m. with instrument of constant height of 1.40 m, vertical angles were successively measured to an inaccessible up station E as follows: **07**

At A: 7° 13' 40"
At B: 10° 15' 00"
At C: 13° 12' 10"
Calculate (a) the height of station E above the line ABC (b) the bearing of the line AE (c) the horizontal distance between A and E.

OR

**Q.4** (a) Discuss in detail about the recent advancements in total stations hardware and onboard software and their usefulness in monitoring structures. **07**

(b) A tacheometer is set up at an intermediate point on a traverse course PQ and the following observation are made on a vertically held staff: **07**

| Staff Station | Vertical Angle | Staff Intercept | Axial hair readings |
|---|---|---|---|
| P | + 8° 36’ | 2.350 | 2.105 |
| Q | +6° 6’ | 2.055 | 1.895 |

**Q.5** (a) Explain how a Subtense bar is used to determine horizontal distances. **03**

(b) For the new airport construction, describe the different stages of surveying operations with suitable sketch. **04**

(c) In an open traverse ABCDE, it is required to fix the midpoint of the line joining A and E. Find the length and bearing of that point from the station C, when the records of the traverse are as follows: **07**

| Line | Length (m) | Bearing |
|---|---|---|
| AB | 130.5 | N 20° 30’ E |
| BC | 215.0 | N 60° 15’ E |
| CD | 155.5 | S 30° 30’ E |
| DE | 120.0 | N 80° 30’ E |

OR

**Q.5** (a) What is drone survey? Explain its applications in different three cases in detail. **03**

(b) What is hydrographic survey? Explain its objectives and applications. **04**

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

| Line | Length (m) | WCB |
|---|---|---|
| AB | 550 | 60° |
| BC | 1200 | ? |
| CD | 880 | ? |
| DA | 1050 | 310° |

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