Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–IV(OLD)• EXAMINATION – WINTER 2016**

**Subject Code:140601** **Date:22/11/2016**

**Subject Name:Advanced Surveying**

**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.**

**Q.1** **(a)** What is tacheometry? Derive an expression for horizontal and vertical distances measurement in the fixed hair stadia method for when the staff held normal and the measure angle is that of depression. **07**

**(b)** To determine the gradient between two points A and B, a tacheometer was setup at "O" and the following observations were taken, keeping the staff held in vertical position. **07**

| Sr No | Staff Position | Vertical Angle | Staff readings (m) |
|---|---|---|---|
| 1 | A | - 6°30' | 1.335, 1.895, 2.460 |
| 2 | B | + 4°00' | 0.780,1.265,1.745 |

If the horizontal angle AOB is 40º30', determine the average gradient between A and B. Take the value of multiplying constant as 100 and that of additive constant as 0. Reduced level of benchmark of station A is 200.30 m.

**Q.2** **(a)** What is meant by orders of triangulation? Explain general specification required for secondary triangulation system. **07**

**(b)** Explain the method of determination of azimuth by observation on circum polar stars. **07**

**OR**

**(b)** Define the following **07**

1. Luminous signals and
2. Opaque Signals

**Q.3** **(a)** Explain the basic principle of EDM. Discuss electromagnetic spectrum with neat sketch. **07**

**(b)** Define the following terms **07**

| | | | |
|---|---|---|---|
| 1. Conditioned Quantity | 2. True Error | 3. Weight | 4. Mistakes |
| 5. Most Probable Value | 6. Residual Error | 7. Observed Value of a quantity | |

**OR**

**Q.3** **(a)** What is mean by normal equations? Explain the method of forming normal equations. **07**

**(b)** Two triangulation stations A and B are 60 kilometres apart and have elevations 240 m and 280 m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 2 metres. The intervening ground may be assumed to have a uniform elevation of 200 metres. **07**

**Q.4** **(a)** Differentiate between: **07**

1. Terrestrial photogrammetry - Aerial photogrammetry
2. Vertical photograph - Oblique photograph

**(b)** What is total station? Describe the salient features of Total Station and use of total station. **07**

**OR**

| | | | |
|---|---|---|---|
| **Q.4** | **(a)** | With the help of neat sketch explain the instrument used in movable hair stadia method of tacheometric surveying. What is the principle of the Subtense bar method of measuring horizontal distances? Explain the construction details of a Subtense bar. | **07** |
| | **(b)** | A straight length of highway AB appears to be 15 cm on a vertical aerial photograph of 12 cm focal length. The corresponding distance on highway on a 1:40,000 topographic map is 6.00 cm. Assuming the average elevation of the terrain as 1500 m above mean sea level. Calculate the flying height of the camera above mean sea level. | **07** |
| **Q.5** | **(a)** | Explain the types of remote sensing and Image interpretation techniques. | **07** |
| | **(b)** | What are the various key components of geographical information system? Enlist various software's used in GIS and explain any one. | **07** |

**OR**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | What do you mean by spatial and non-spatial data used in GIS. Also describe the application of geographical information system. | **07** |
| | **(b)** | What is Global Positioning System? Explain the various segments of GPS. | **07** |

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