

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-IV • EXAMINATION – SUMMER 2013**

**Subject Code: 140601****Date: 07-06-2013****Subject Name: Advanced Surveying****Time: 10:30am – 01:00pm****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) Derive the expression for the horizontal and vertical distances in the fixed hair method when the staff is held vertically and the measured angle is that of elevation. 0  
7

- (b) During the course of a tacheometric survey, the following readings were recorded 0  
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Instrument station	Height of instrument	Staff station	Vertical angle	Staff reading	Remark
O	1.750	BM	- 8° 24'	1.250, 1.600, 1.950	RL of BM=312.670
O	1.650	CP	- 7° 12'	1.430, 1.580, 1.730	CP is change point
P	1.570	CP	+ 9° 36'	1.670, 1.950, 2.230	

The tacheometer was anallatic and the multiplying constant was 100. The staff was held vertical. Calculate the RL of station P.

- Q. 2** (a) What is meant by triangulation? How will you select base line and triangulation stations? Explain strength of figure. 0  
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- (b) Define accidental error, true value, direct observation, conditioned quantity, most probable value, true error, normal equation. 0  
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OR

- (b) What is the principle of E.D.M.? Discuss electromagnetic waves and electromagnetic spectrum. 0  
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- Q. 3** (a) What is spherical triangle? State the properties of spherical triangle. 0  
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- (b) What is latitude of a place? Prove that the altitude of the pole is always equal to the latitude of the observer's position. 0  
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OR

- Q. 3** (a) Define the following terms used in aerial photogrammetry : 0  
7
- (i) Oblique Photograph (ii) Exposure station (iii) Focal length  
 (iv) Principal point (v) Nadir point (vi) Isocentre (vii) Swing.
- (b) Find most probable values of angles A, B and C of triangle ABC from the following observation equations : 0  
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- $A = 60^{\circ} 12' 36''$  ,  $B = 53^{\circ} 46' 12''$  ,  $C = 58^{\circ} 01' 16''$

- Q. 4** (a) Write short note on “ station marks”. 0  
7
- (b) What is tacheometric surveying ? What are the advantages of tacheometric surveying ? Explain various methods of tacheometry. 0  
7

OR

- Q. 4** (a) What is relief displacement? Derive an expression for the relief displacement in a vertical photograph. 0  
7

- (b) In a pair of overlapping vertical photographs, the mean distance between two principal points both of which lie on the datum is 6.375 cm. At the time of photography, the air-craft was 600 m above the datum. The camera has a focal length of 150 mm. In the common overlap, a tall chimney 120 m high with its base in the datum surface is observed. Determine difference of parallax for top and bottom of chimney 07
- Q. 5** (a) What is remote sensing? State how it differs from photogrammetry. Describe energy interaction with atmosphere and earth surface features. 07
- (b) Explain the basic principle of remote sensing. Discuss image interpretation techniques. 07
- OR
- Q. 5** (a) What is Geographical Information System (GIS) ? Explain key components of GIS. List various functions of GIS. 07
- (b) Explain the various applications with suitable examples of Remote Sensing and GIS in civil engineering. 07

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