

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

**Subject Code: 130601****Date: 31-05-2013****Subject Name: Surveying****Time: 02.30 pm - 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) Describe briefly the uses of various accessories of a plane table. **07**  
 (b) Explain clearly the use of planimeter (with sketch) to calculate the area of an irregular figure. **07**

- Q.2** (a) Explain the repetition method to calculate a horizontal angle through a theodolite. **07**  
 (b) Define the following terms clearly **07**  
 (1) Latitude (2) Departure (3) Closing error (4) Balancing of traverse

**OR**

- (b) Define the following terms in relation to theodolite **07**  
 (1) Face left observation (2) Face right observation (3) Transiting (4) Line of collimation (5) Axis of level tube (6) Swinging
- Q.3** (a) Describe resection and intersection method applied to plane table surveying. **07**  
 (b) The following are the values of offsets taken from a chain line to an irregular boundary. Calculate the area included between chain line and irregular boundary by Simpson's rule. **07**

Distance (m)	0	50	100	150	200	250	300	350	400
Offset (m)	10.6	15.4	20.2	18.7	16.4	20.8	22.4	19.3	17.6

**OR**

- Q.3** (a) An instrument was set at P and the angle of depression to a vane 2 m above the foot of staff held at Q was  $5^{\circ}36'$ . The horizontal distance between P and Q was known to be 3000 m. Determine the RL of the staff station Q, given that staff reading on a BM of elevation 436.050 was 2.865 m. **07**  
 (b) Derive the expression for computing the horizontal distance and elevation in trigonometrical levelling while base of the object is inaccessible and instrument axis is at very different level. **07**

- Q.4** (a) Define the following terms in relation to circular curve with a neat sketch. **07**  
 (1) Tangent distance (2) Long chord (3) Deflection Angle (4) Apex distance (5) Mid-ordinate  
 (b) Explain Rankine's method of tangential angle for setting out simple circular curve. **07**

**OR**

- Q.4** (a) Define transition curve (with figure) and its function clearly. What are the requirements of a transition curve? **07**

- (b) A transition curve is required for a circular curve of 200 m radius, the gauge being 1.5 m and maximum super elevation is restricted to 15 cm. The transition is to be designed for a velocity such that no lateral pressure is imposed on the rails and the rate of gain of lateral acceleration is  $30 \text{ cm/sec}^3$ . Calculate the required length of transition curve and design speed. **07**
- Q.5** (a) Describe various methods of locating soundings in hydrographic surveying. **07**  
(b) Explain the procedure of setting out of a bridge. **07**
- OR**
- Q.5** (a) Write short note on with figure **07**  
(1) Compound curve (2) Reverse curve (3) Vertical curve  
(b) Explain the instruments used for taking sounding. **07**

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