

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Remedial Examination May 2011****Subject code: 130601****Date: 30-05-2011****Subject Name: Surveying****Time: 10.30 am – 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) What is hydrographic surveying? Mention the purposes of conducting hydrographic surveying and discuss establishing of horizontal and vertical control points. **07**

(b) Discuss the importance of setting out works and explain the procedure required to set out the foundation of a building on the ground as per plan. **07**

Q.2 (a) Derive the equation to find out the elevation of the object, if the base of the object inaccessible, the instruments stations and elevated object are in same vertical plane and the instrument axes at same level. Also find out elevation of a hilltop based on the following dataset. **07**

Instrument Station	Staff reading on B.M.	Vertical angle to hilltop	R.L. of the B.M. (m)
O ₁	1.545 m	28° 42'	101.505 m
O ₂	1.545 m	18° 06'	

Distance between O₁ and O₂ is 100 m.

(b) Describe various accessories required for Plane table surveying and discuss its functions. Also discuss the steps required for setting up a plane table. **07**

OR

(b) Explain the procedure of Radiation, Intersection and Traversing methods of plane table surveying. **07**

Q.3 (a) List the fundamental lines of a theodolite and explain briefly the desired relationships between these lines. **04**

(b) Discuss Repetition method of horizontal angle measurement using theodolite. **03**

(c) In a closed traverse ABCDEA, the lengths of the lines DE and EA could not be measured due to an obstruction. Determine the lengths from the following data. **07**

Line	Length (m)	Bearing
AB	480	99° 00'
BC	625	31° 05'
CD	470	301° 20'
DE	?	235° 00'
EA	?	153° 25'

OR

Q.3 (a) Define, theodolite traversing and discuss loose needle and fast needle methods of theodolite traversing. **04**

(b) Describe the permanent adjustment of a theodolite to make the vertical axis truly vertical. **03**

- (c) The following data were obtained for a closed traverse ABCDEA which was run in the clockwise direction. 07

Line	Length (m)	Bearing	Included Angle
AB	186	$30^{\circ} 25'$	$\angle A = 118^{\circ} 20'$
BC	164		$\angle B = 82^{\circ} 10'$
CD	303		$\angle C = 137^{\circ} 00'$
DE	162		$\angle D = 73^{\circ} 44'$
EA	240		$\angle E = 128^{\circ} 36'$

Compute corrected consecutive co-ordinates using Gale's traverse table. Use Bowditch's rule for balancing of the traverse.

- Q.4 (a) Derive equation for Trapezoidal and Simpson's rule to find out area of an irregular boundary. 07
- (b) The latitudes and departures of the lies of a closed traverse ABCD are given below. Calculate the area of the traverse by Coordinate method. 04

Line	Latitude (m)	Departure (m)
AB	-164.5	162.1
BC	217.8	59.8
CD	168.1	-105.6
DA	-221.4	-116.3

- (c) Compute the area of the cross-section if the formation width is 10 m, side slope is 1 to 1, average height along the centre-line is 5 m, and transverse slope of the ground is 10 to 1. 03

OR

- Q.4 (a) Discuss Prismoidal formula, Prismoidal correction and Curvature correction for computation of volumes from cross sections. 07
- (b) Area enclosed between the dam and upstream contours at a reservoir site are as follows: 07

Contour level (m)	54	56	58	60	62
Enclosed Area (sq.m)	714	6512	52700	79000	374000

If the bottom level is 54 m and the F.R.L is 62 m, determine the capacity of the reservoir by trapezoidal and prismoidal formula. Also compute prismoidal correction.

- Q.5 (a) Why curves have been required in highways and railways? Draw neat sketch of simple circular curve, compound curve, reverse curve and transition curve and show elements of these curves thereon. 07
- (b) Briefly discuss Rankine's and Two-theodolite method of setting out simple circular curves. 07

OR

- Q.5 (a) Discuss types of transition and vertical curves with neat sketches. Also discuss advantages and requirements of transition curves. 07
- (b) The chainage of the intersection point of two straights is 100 chains + 50 links and the deflection angle is $45^{\circ} 20'$. A circular curve of 250 m radius is to be set out to connect two straights. Calculate the necessary data for setting out the curve by the method of offsets from the chord produced. Length of one chain is 20 m with 100 links and peg interval is 20 m or 1 chain. 07
