Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CE-OLD)/SEM-4/CE-403/2013

2013

SURVEYING - II

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) A theodolite is called a transit theodolite

      a) when its telescope can be revolved to change face

      b) when the telescope can swing

      c) when the telescope can be through 90°

      d) when the telescope is in normal position.

   ii) In a closed traverse, the algebraic sum of departure and latitude must be equal to

      a) 90° b) 180°

      c) 0° d) 270°.

iii) Which of the following corrections are made in case of a reciprocal observations in trigonometric levelling ?

a) Correction due to refraction

b) Axis signal correction

c) Correction due to curvature

d) All of these.

iv) Angular surveying in which both horizontal and vertical positions of a point are obtained by optical means is known as

a) Tacheometry b) Hydrography

c) Topography d) All of these.

v) Total angle of deflection of a transition curve is

a) spiral angle b) spiral angle/2

c) spiral angle/3 d) spiral angle/4.

vi) Setting out a simple curve by two theodolite method does not require

a) angular measurements

b) linear measurements

c) both angular and linear measurements

d) none of these.

vii) Overturning of vehicles on a curve can be avoided by using

a) compound curve b) vertical curve

c) reverse curve d) transition curve.

viii) The horizontal distance obtained tacheometrically is corrected for

a) slope correction

b) temperature correction

c) refraction correction & curvature correction

d) tension correction.

ix) A simple curve is designed by

a) degree of curve

b) radius of curve

c) both (a) & (b) are correct

d) both (a) & (b) are wrong.

x) A transition curve introduced gradually with the

a) direction b) super-elevation

c) gradient d) camber.

xi) The method of tacheometry in which the interval on levelling staff is variable and station hair intercept is fixed is known as

a) movable hair method

b) fixed hair method

c) tangential hair method

d) sub-tense hair method.

xii) If i is the stadia distance, f is the focal length of the objective and d is the distance from the objective to the vertical axis of the instrument, then the multiplying tacheometric correction will be

a) $i \times d/f$ b) $f/i \times d$

c) $f \times i/d$ d) f/i.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Write the methods involving location soundings. What is reduction of sounding ?

3. Write down method of setting out of simple circular curve by two theodolite and tacheometric method.

4. Write stages of Remote Sensing System. What is station pointer ?

5. An instrument was set up at *P* and the angle of elevation to a vane 4 m above the foot of the staff held at *Q* was 9° 30′. The horizontal distance between *P* and *Q* was known to be 2000 m. Determine the R.L. of the staff *Q*. Given that the R.L. of the instrument axis was 2650·80 m.

6. What is tacheometry ? Where is it applied ? What are the methods of tacheometry ? Write only the expressions of the following techeometric survey :

   i) Distance and elevation formula for staff vertical inclined sight

   ii) Distance and elevation formula for staff normal.

7. Determine the gradient from a point *A* to a point *B* from the following observations made with a tachometer fitted with an anallatic lens. The constant of the instrument was 100 and the staff was held vertically.

Instrument Station	Staff point	Bearing	Vertical angle	Staff reading
P	*A*	134°	+ 10° 32′	1·36, 1·915, 2·470
	B	224°	+5° 6′	1·065, 1·885, 2·705

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) The following are the lengths and bearings of the sides of a closed traverse *ABCDE*, the length and bearing of *EA* having been omitted. Calculate the length and bearing of the line *EA*.

Line	Length (m)	bearing
AB	204·0	87° 30′
BC	226·0	20° 20′
CD	187·0	280° 0′
DE	192·0	210° 3′
EA	?	?

b) A tachometer was set up at a station *A* and the readings on a vertically held staff at *B* were 2·255, 2·605 and 2·955. The line of sight being at an inclination of + 8° 24′, another observation of the line of sight being +1° 6′. Calculate the horizontal distance *A* and *B*, the elevation of *B*, if the RL of BM is 418·685 metres. The constants of the instrument are 100 and 3.

9. Two tangents interesect at chainage 1190 m the deflection angle being 36°. Calculate all the data necessary for setting out a curve with a radius of 300 m by

i) deflection angles and

ii) offsets from chords, the peg interval being 30 m.

10. Write in detail about range line & one angle from shore & boat. Write applications of remote sensing.

11. An instrument is set up beside P and the angle of depression to the vane 2 m above the foot of the staff held at Q was $5°36'$. The horizontal distance between P & Q was known to be 3000 m. Determine the R.L. of the station Q. Given, that staff reading on a BM of elevation was 2·865 m.

12. a) What is a transit theodolite ? What are the functions of theodolite ?

    b) What are the different methods of curve settings ? What is transition curve ? Where is such a curve provided ?

13. Briefly write about clothoid and cubic spiral type of transition curve.