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CE 131304

Roll No. of candidate | | | | | | | | | | |

2017

B.Tech. 3rd Semester End-Term Examination

Civil

ENGINEERING SURVEYING — I

Full Marks – 100 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer Question 1 and any *six* from the rest.

1. Choose the correct option : (10 × 1 = 10)

   (a) The intercept of a staff

   (i) is maximum if the staff is held truly normal to the line of sight.

   (ii) is minimum if the staff is held truly normal to the line of sight.

   (iii) decreases if the staff is tilted away from normal

   (iv) increases if the staff is tilted towards normal.

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(b) Closed contours of decreasing values towards their centre, represent

(i) a hill

(ii) a depression

(iii) a saddle or pass

(iv) a river bed.

(c) An imaginary line joining the points of equai elevation on the surface of the earth, represents

(i) contour surface

(ii) contour gradient

(iii) contour line

(iv) level line

(v) none of these

(d) One of the tacheometric constants is additive, the other constant, is

(i) subtractive constant

(ii) multiplying constant

(iii) dividing constant

(iv) indicative constant

(e) Pick up the method of surveying in which field observations and plotting proceed simultaneously from the following

(i) chain surveying

(ii) compass surveying

(iii) plan table surveying

(iv) tacheometric surveying

(f) For true difference in elevations between two points A and B, the level must be set up

(i) at any point between A and B

(ii) at the exact mid point of A and B

(iii) near the point A

(iv) near the point B.

(g) In levelling operation

(i) when the instrument is being shifted, the staff must not be moved

(ii) when the staff is being carried forward, the instrument must remain stationary

(iii) both (i) and (ii)

(iv) neither (i) nor (ii).

(h) The operation of making the algebraic sum of latitudes and departures of a closed traverse, each equal to zero, is known as

(i) balancing the sights

(ii) balancing the departures

(iii) balancing the latitudes

(iv) balancing the traverse.

(i) Plotting of inaccessible points on a plane table, is done by

(i) intersection

(ii) traversing

(iii) radiation

(iv) none of these.

(j) In case of reduction of levels by the height of instrument method,

(i) ΣB.S. $-\Sigma$ F.S. = difference in R.L.S of the first station and last station

(ii) Σ(R.L. + I + F.S.) − first R. L = Σ(H.I. + No. of R.L.s.)

(iii) both (i) and (ii) above

(iv) neither (i) nor (ii).

2. Answer the following : (5 + 10 = 15)

(a) Define reciprocal levelling? Derive expression for the true difference in elevation of two points on opposite banks of a river, obtained from field observations.

(b) The following readings refer to the reciprocal levelling taken with a dumpy level :

Instrument station	Staff reading (m)		Remarks
	A	B	Distance between
A	1.125	1.750	A and B = 900
B	1.015	1.550	RL of A = 240 m

Find :

(i) RL of B.

(ii) Combined correction

(iii) Collimation error

3. (a) Write down a comparison between rise and fall method and height of instrument method of determination of RL. (5)

(b) The following staff readings were observed successively with a level, the instrument having been shifted after third, sixth and eight readings :

2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044 and 2.684 meters. Calculate the R.L. of each point by adopting any method, if the first reading was taken on a bench mark having R.L, of 432.384m. Apply the usual arithmetical check. (10)

4. (a) An embankment of width 10m and side slope 1.5:1 is required to make on a ground which is level in a direction transverse to the centre line. The central height at 40m intervals are as follows :

0.90, 1.25, 2.15, 2.50, 1.85, 1.35 and 0.85

Calculate the volume of earthwork according to

(i) Trapezoidal formula

(ii) Simpson's formula (4 + 4 = 8)

(b) Define horizontal equivalent of a contour map. Explain indirect method of contouring. (2 + 5 = 7)

5. (a) Define Tacheometry. Describe the procedure to determine the constants of a Tacheometer in the field. (2 + 5 = 7)

(b) Find the horizontal distance PQ and the gradient from P to Q from the data given below. (8)

Instrument Station	Staff Station	Vertical angle	Stadia readings
A	P	6°50'	1.355, 2.58, 3.935
	Q	3°30'	0.985, 1.66, 2.335

6. (a) Define transiting and swinging phenomenon related to theodolite traversing. Explain any one method of measurement of horizontal angles by using theodolite. (4 + 5 = 9)

(b) What is meant by closing error? State any two methods of balancing a traverse. (2 + 2 + 2 = 6)

7. (a) The records of a closed traverse is given below with the missing data.

Line	Length (m)	Bearing
AB	100	?
BC	80.5	140°30'
CD	60	220°30'
DA	?	310°15'

Calculate the length of DA and bearing of AB. (10)

(b) Enlist the characteristics of contour with suitable diagram. (5)

8. (a) Define orientation in plane table surveying. What are the various methods of orientation in plane table surveying, explain any one of them. (2 + 5 = 7)

(b) What are the various methods of plane table surveying? Explain any two of them with suitable diagrams. (4 + 4 = 8)

9. Write short notes on any *five* : (5 × 3 =15)

(a) Principle of plane table surveying

(b) Trigonometrical levelling

(c) Combined Corrections

(d) Deflection angle in theodolite traversing

(e) Simpson's rule.

(f) Analactic lens.