53 (CE 301) SURV–I

2017

SURVEYING–I

Paper : CE 301

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Explain the difference between Prismatic and Surveyor's compass with a suitable diagram. 6

   (b) Differentiate between the following — 4+4

   (i) Differential levelling and Reciprocal levelling.

   (ii) Contour interval and horizontal equivalent.

(c) Explain with sketches, the following methods of locating a point by plane table survey — 6

(i) Intersection

(ii) Traversing.

2. (a) What is three-point problem ? How is it solved by Bessel's method. 10

(b) Describe with the help of sketches the characteristics of contours. 10

3. (a) Explain with sketches, the uses of contour maps. 8

(b) Explain different types of Land surveying with suitable examples. 6

(c) Distance between C.I.T. and Bodoland University was measured with a 20*m* chain and found to be 1300*m*. The same was measured with a 30*m* chain and found to be 1278*m*. If the 20*m* chain was 5*cm* too short, what was the error in the 30*m* chain ? 6

4. *(a)* Explain direct and indirect ranging with suitable diagram. 6

(b) Differentiate between the following — 8

(i) True bearing and Magnetic bearing.

(ii) Cumulative and Compensating error.

(iii) Accuracy and Precision.

(iv) Face right and Face left observation.

(c) A steel tape $20m$ long standardised at $20°C$ with a pull of $10kg$ was used for measuring a base line. Find the correction per tape length, if the temperature at the time of measurement was $39°C$ and the pull exerted was $16kg$. Weight of $1cm^3$ of steel = $7{\cdot}86g$, weight of tape = $0{\cdot}8kg$ and $E = 2{\cdot}109\times10^6 kg/cm^2$. Coefficient of expansion of tape per $1°C$ = $11{\cdot}6\times10^{-6}$. 6

5. *(a)* The following bearings were taken in running a compass traverse.

Line	F.B.	B.B.
AB	124°30′	304°30′
BC	68°15′	246°0′
CD	310°30′	135°15′
DA	200°15′	17°45′

At what stations do you suspect local attraction ? Find the correct bearings of the lines and also compute the included angles. 10

(b) What errors are eliminated by repetition method ? How will you set out a horizontal angle by method of repetition ? 6

(c) Define — 4

(i) Benchmark

(ii) Parallax

(iii) Line of collimation

(iv) Level surface.

6. *(a)* The following consecutive readings were taken with a level and 3*m* levelling staff on continuously sloping ground at a common interval of 20*m* :

0·602, 1·234, 1·860, 2·574, 0·238, 0·914, 1·936, 2·872, 1·824, 2·722.

The R.L. of first Peg was 200*m*. Rule out a page of a level field book and enter the above readings. Calculate the reduced levels of the points and also the gradient of the line joining the first and the last points. 10

(b) Explain the temporary adjustments of a transit theodolite. 5

(c) Compare the advantages and disadvantages of plane table surveying with those of chain surveying. 5

7. *(a)* The following notes refer to reciprocal levels taken with one level. 10

Instrument near	**Staff reading on**		**Remarks**
	P	***Q***	
P	1·824	2·748	Distance PQ = 1010*m*
Q	0·928	1·606	R.L. of P = 126·386

Find (a) the true R.L. of Q.

(b) the combined correction for curvature and refraction.

(b) Explain with sketches, the uses of Contour maps. 10