53 (CE 301) SURV-I

2018

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)* Define : 5×2

   (i) Contour gradient

   (ii) Parallax

   (iii) Benchmark

   (iv) Magnetic meridian

   (v) Line of collimation.

(b) The following bearings were observed in running a closed traverse — 10

Line	FB	BB
AB	71°5′	250°21′
BC	115°20′	297°40′
CD	161°35′	340°45′
DE	222°50′	42°10′
EA	300°50′	122°10′

Compute the interior angles and correct them for any observational error. Determine the correct magnetic bearings of the lines.

2. (a) Explain, what do you understand by balancing backsight and foresight. 5

(b) Explain the procedure of Reiteration method in theodolite survey. What are its advantages? 5

(c) The following consecutive readings were taken with a level and 3*m* levelling staff on a continuously sloping ground at a common interval of 20*m*; 0·275; 0·689; 0·956; 0·989; 1·458; 2·384; 0·456; 0·879; 1·498, the R.L. of first point was 30·00*m*. Rule out a page of a level field book and enter the above readings. Calculate the RL of the points by H.I. method and also find the gradient of line joining the first and last point. 10

3. (a) What is Contour? What are the characteristics of contour? 2+6

(b) Explain traversing by plane table surveying with a neat diagram. 6

(c) A 30*m* steel tape was standardised at a temperature of 20°*C* and under a pull of 8*kg*. The tape was used in catenary at a temperature of 25°*C* and under a pull of 10*kg*. The cross-sectional area of the tape was 0·02cm^2. Its weight per unit length was 22*gm*/*m*.

Take $E = 2\times10^6\ kg/cm^2$, $\alpha = 11\times10^6/°C$.

Apply the necessary tape corrections and determine the correct horizontal distance. 6

4. *(a)* Derive the expressions for height and distance of an object by trigonometrical levelling, when object and instrument stations are not in the same vertical plane. 6

(b) Explain *any two* uses of contour map. 4×2

(c) In levelling between two points *A* and *B* on opposite banks of a river, the level was set up near *A* and the staff readings on *A* and *B* were 1·285*m* and 2·860*m* respectively. When the level was set up near *B*, the staff readings on *A* and *B* were 0·850 and 2·235 respectively. Find the true difference of level between *A* and *B*. 6

5. *(a)* Differentiate between the two methods of orienting a plane table and also state which is more accurate. 6

(b) To determine the elevation of the top of a building, the following observations were made :

Instrument Station	Reading on B. M. (*m*)	Angle of elevation	Remarks
A	1·266	10°48′	R.L. of BM = 250*m*
B	1·086	7°12′	

Instrument stations and objects are in the same vertical plane. Find the elevation of the top of the building, if the distance between *A* and *B* was 50*m*. 6

(c) Differentiate between : 4×2

(i) Face left and face right observation

(ii) Accuracy and Precision

(iii) Prismatic and Surveyor's compass

(iv) Alidade and plumbing fork.

6. *(a)* The following bearings were observed in running a closed traverse with a prismatic compass. 10

Line	FB	BB
AB	175°40′	355°40′
BC	82°30′	262°30′
CD	8°20′	188°20′
DE	345°40′	165°40′
EA	265°20′	85°20′

Calculate all the interior angles.

(b) What is the importance of correction for curvature and refraction in geodetic surveying and also derive their formulae? 5

(c) What do you mean by resection in plane table surveying? Explain the procedure of plane tabling by radiation method. 5

7. *(a)* What is closing error in compass traversing? Explain Bowditch's method of correction for closing error. 5

(b) Write down the advantages and disadvantages of plane table surveying. 5

(c) What is two point problem in plane tabling? Write down the procedure. 10
