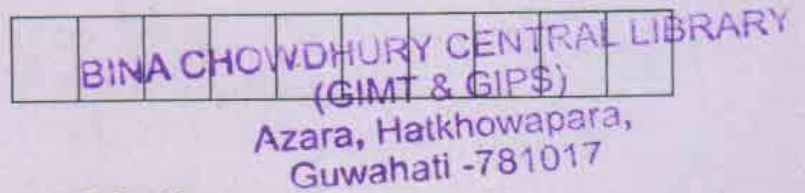


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03/01/20

CE 131304

Roll No. of candidate



2019

B.Tech. 3rd Semester End-Term Examination

ENGINEERING SURVEYING – I

(New Regulation)

Full Marks – 70

Time – Three hours

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

Answer Question No. 1 and any *four* from the rest.

1. Fill in the blanks : (10 × 1 = 10)
- (i) The R.L. of the line of sight in a dumpy level is known as _____
 - (ii) Due to effect of refraction, objects appear _____ than they actually are.
 - (iii) In a hill, the higher values of contour are _____ the loop.
 - (iv) When contours of different elevation cross each other, it indicates an _____
 - (v) _____ is the process of setting the plane table at each successive station parallel to the position it occupied at the previous station.
 - (vi) In plane table surveying, U-fork and plumb bob is required for _____

[Turn over

- (vii) In a closed traverse, algebraic sum of latitudes and departures must be equal to _____
- (viii) An anallactic lens is provided in a tachometer to make the _____ constant zero.
- (ix) Simpson's rule of calculating area holds good and valid when there are _____ number of ordinates.
- (x) In fly leveling, only B.S. and _____ readings are taken with a leveling staff.

2. (a) State any two uses of leveling. (2)
- (b) Differentiate between Height of Instrument (HI) method and Rise/Fall method for calculating the R.L.'s of different points on the ground surface. (5)
- (c) The following consecutive staff readings were taken with a dumpy level :
- 6.210, 4.920, 6.120, 8.420, 9.810, 6.630, 7.910, 8.260, 9.710 and 10.210 m

The dumpy level was shifted after 4th and 6th readings. The B.M. was taken on the first point at a R.L. of 100.000 m. Rule out a page of the answer script as a field level book and fill in all the columns. Use Height of instrument (HI) method to calculate the R.L.'s of all other points. Also apply the arithmetic checks. (8)

3. (a) In order to find the difference in elevation between two points P and Q, a dumpy level was set upon the line PQ, 75 m from P and 1.3 km from Q. The readings on staff kept at P and Q were respectively 1.679 m and 3.648 m. Find the true difference in elevation between P and Q. (5)
- (b) Explain the significance of profile and cross section leveling, citing a suitable example. (6)
- (c) Define contour interval and horizontal equivalent with a neat sketch. (2 + 2 = 4)

4. (a) In a traverse ABCDEFG, the line BA is taken as the reference meridian. The latitudes and departures of the lines of the traverse are given as follows :

| LINE | AB | BC | CD | DE | EF |
|-----------|---------|---------|---------|---------|--------|
| LATITUDE | - 95.20 | - 45.22 | + 47.24 | + 48.55 | +87.78 |
| DEPARTURE | 0.00 | + 58.91 | + 63.74 | - 37.44 | +29.63 |

If the bearing of the leg FG is N 75° 47'W and its length is 71.68 m, find the length and bearing of the line GA of the traverse. (7)

- (b) Define (any four) : transiting, swinging, face left, changing face, traverse, least count of vernier of a theodolite, trigonometrical leveling, independent co-ordinates. (2 × 4 = 8)

5. (a) What is tacheometry? Under what circumstances, tacheometry is applicable in field measurements? State two important features of the tacheometer. (2 + 1 + 2 = 5)

- (b) Two distances of 20 m and 100 m were accurately measured out by a tacheometer and the stadia intercepts were found to be 0.196 m and 0.996 m respectively. Determine the values of tacheometric constants, K and C. (3)

- (c) The tacheometer 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 m, the line of sight being at an angle of + 8°24'. Another observation on the vertically held staff at a BM gave the stadia readings of 1.640, 1.920 and 2.200 m, the inclination of the line of sight being + 1°6'. Calculate the horizontal distance between A and B and the elevation of B, if the R.L. of B.M. is 418.685 m. The tacheometric constants were 100 and 0.3. (7)

6. (a) State and prove Trapezoidal rule of determining area of a plot of land in the context of surveying. (4)
- (b) A series of offsets were taken from a chain line to a curved boundary line at an interval of 15 m in the following order :
0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85 and 6.61 m
Compute the area between the chain line, curved boundary and the end offsets by Simpson's rule. (4)
- (c) What is a deflection angle? How is it measured by a theodolite? Explain. (1 + 4 = 5)
- (d) Name the fundamental lines of a dumpy level. (2)
7. (a) State three applications of a contour map. (3)
- (b) Name two ways of orienting a plane table. Explain the procedure of locating the position of an inaccessible object by the intersection method in the context of plane table surveying. (2 + 5 = 7)
- (c) What is the function of an alidade? Mention the appropriate size of a plane table. (1 + 1 = 2)
- (d) The RL of a factory floor is 120.200 m. Staff reading on floor is 2.160 m and the staff reading when staff is held inverted with bottom touching the tie beam of the roof truss is 4.620 m. Find the height of the tie-beam above the floor. (3)