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B. Tech 3rd Semester Examination

Surveying-I (O.S.)

CE-3003

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five question in all, selecting one question from each of the section A, B, C, D and all the subparts of the questions in section E is compulsory.

SECTION - A

1. A line was measured with a steel tape which was exactly 30m at a temperature of 20°C and a pull of 10kg. The measured length was 1650m. The temperature during the measurement was 30°C and pull applied was 15kg. Find the true length of the line, if the cross-sectional area of the tape was 0.025cm^2. The coefficient of thermal expansion of the material of the tape per °C is 3.5 x 10^{-6} and modulus of elasticity of the material of the tape is 2.1 x 10^6 kg/cm^2. **(20)**

2. (a) Write the classification of surveying based on the instrument used. **(10)**

   (b) Explain with neat sketch the construction of a diagonal scale to represent 1 cm = 5m and show 17.8 m on it. **(10)**

SECTION - B

3. A dummy level was set up midway between two peg points 80m apart. The readings on the staff at two pegs were 3.200m and 3.015m, respectively. The instrument was then moved, by 20m ahead of second peg, in line with two pegs. The respective staff readings were 2.825m and 2.690m. Calculate the staff reading on the two pegs to provide a horizontal line of sight. **(20)**

4. To continue a survey line AB past an obstacle, a line BC 200m long was set out perpendicular to AB, and from C angles BCD and BCE were set out at 60° and 45° respectively. Determine the lengths which must be chained off along CD and CE in order that ED may be in AB produced. Also determine the obstructed length. **(20)**

SECTION - C

5. (a) Explain two point problem and its solution. **(10)**

   (b) Define the following terms used in plane table surveying

   (i) Radiation (ii) intersection **(10)**

6. A theodolite was set up at distance of 90m from a tower. The angle of elevation to the top of the tower was 9° 30' while the angle of dispersion to the foot of the tower was 2° 30'. The staff reading on the bench mark of RL 50.0m with telescope horizontal was 0.82 m. Find the height of tower and RL of the top of the tower. **(20)**

SECTION - D

7. (a) Two distances 50m and 80m are accurately measured out and staff intercepts between outer stadia webs were 0.496 at former distance and 0.796 at the later, the line sights being horizontal. Calculate the tachometric constants. **(15)**

   (b) Write a short note on ‘subtense bar’. **(5)**

8. (a) The sag vertical curve is to be designed for the data given below:

Gradient of tangents: +3% and –2%

Safe stopping distance: 150m

Determine the minimum length of the curve from the consideration of stopping site distance. **(12)**

(b) How do you set a simple curve when the point of intersection is inaccessible? **(8)**

SECTION - E

9. (a) Define the terms line of collimation.

(b) Draw a neat sketch of metric chain showing its various components.

(c) What is meant by local attraction?

(d) Define the terms backsight.

(e) What is well conditioned triangle?

(f) List the errors in plane table surveying.

(g) Sketch the contours for the overhanging cliff.

(h) Define the term horizontal equivalent.

(i) What do you mean by right-hand curve?

(j) Write the functions of transition curve. **(2×10=20)**