



**SCHOOL OF CIVIL ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026**

Programme Name & Branch : B.Tech Civil Engineering
Course Code : BACLE101
Course Name : Digital Surveying
Faculty Name(s) : Dr.N.Vaani
Class Number(s) : VL2025260107162
Date of Examination : 19.8.2025
Exam Duration : 90 minutes

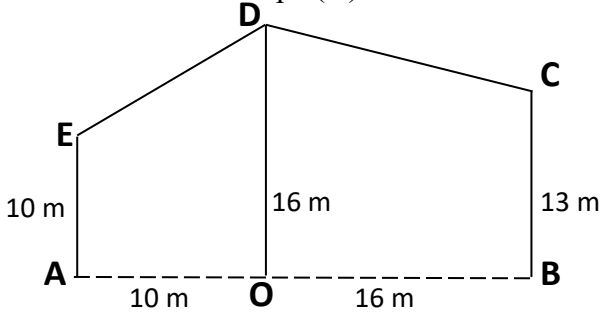
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcome Statements:

CO 1: Understand the traditional surveying and contouring

CO 2: Perform Total station survey and prepare topographic maps

Q. No	Question	M	CO	BL
1.	A surveyor was tasked with finding the area of a five-sided parcel of land, ABCDE. To do this, a baseline was laid along one side, AB and perpendicular offsets were measured from this baseline to the other vertices of the polygon. The surveyor is using a 30 m steel tape whose actual length was determined to be 29.98 m. The tape was calibrated at 20°C and under a tension of 100 N. All offsets and baseline segments were measured in the field at a temperature of 35°C and with an applied tension of 120 N. The recorded field measurements along a baseline AB and edge offsets AE, BC and intermediate offset OD are shown in Fig.1. Determine the corrected area of the plot based on the true measurements after applying required corrections to the baseline and offsets. Use the values given below. Coefficient of thermal expansion for steel (α)= $11.5 \times 10^{-6}/^{\circ}\text{C}$ Modulus of Elasticity of steel (E)= $2.0 \times 10^5 \text{ N/mm}^2$ Cross-sectional area of the tape (A)= 4.0 mm^2  Fig.1.	10	1	3



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2.	In a closed traverse with station points ABCDEF, the fore bearings for the sides were found to be AB= $29^{\circ}45'$, BC= $25^{\circ}48'$, CD= $196^{\circ}12'$, DE= $175^{\circ}24'$, EF= $112^{\circ}18'$ and FA= 30° Calculate the interior angles.	10	1	3
3.	Detail upon the following a) Significance of Face right and Face left observations and two vernier readings in Theodolite. (4 marks) b) Draw rough contour representations that clearly illustrates the following two topographic features i) a steep sloped valley and ii) a gently sloping hill. Use a consistent contour interval of 5 meters starting from elevation of 100 m to 130 m. Also, illustrate the difference between the contour interval and the horizontal equivalent in your contour map. (6 marks)	10	1	2
4.	Following consecutive staff readings were taken with a level along a sloping ground line XY at a regular interval of 20m by using 4m levelling staff. 0.352, 0.787, 1.832, 2.956, 3.758, 0.953, 1.766, 2.738, 3.872, 0.812, 2.325 and 3.137. The Reduced Level (RL) of first station point X is 120.280 m. Rule out a page of level field book and calculate the RL of all the other points and workout the gradient of line XY.	10	1	3
5.	While conducting a total station survey in your lab class, you set up the instrument at a known station and aimed at a prism reflector to determine the horizontal distance between the total station and the prism and vertical distance between the instrument's horizontal axis and the prism. Due to sudden rain in your field, you had to seize the work immediately. However, you observed the following readings before. Slope Distance= 125.00 m Zenith Angle= $85^{\circ}30'00''$ a). Now, with the observed readings, calculate the required values (horizontal and vertical distances as described before). b). With a neat sketch, explain the step-by-step procedure of setting up of instrument and data collection that you have followed for this task from the beginning till you arrived at the aimed values from the observations made.	10	2	2