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# GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR (GIET UNIVERSITY)



B. Tech (Third Semester) Examinations, November – 2024

**23BCVPC23003 – Surveying**

(Civil Engineering)

Time: 3 hrs

Maximum: 60 Marks

**Answer ALL questions**

(The figures in the right hand margin indicate marks)

## PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. State well-conditioned triangle.	CO1	K1
b. How is a station marked on the ground?	CO2	K1
c. Differentiate between isogonic and agonic lines.	CO3	K2
d. What are the fundamental quantities measured using total station?	CO4	K1
e. Define horizontal equivalent.	CO5	K1

## PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. What is meant by chain surveying? Explain the principle on which it is based.	5	CO1	K1
b. The bearings of the lines AB, BC, CD and DE, are 450 30', 1200 15', 2000 30' and 2800 45', respectively. Find angles B, C and D.	5	CO1	K2
(OR)			
c. State the precautions would you take to eliminate the errors in chain surveying.	5	CO1	K1
d. The distance between two stations was 1,200 m when measured with a 20 m chain. The same distance when measured with 30 m chain was found to be 1,195 m. If the 20 m chain was 0.05 m too long, what was the error in the 30 m chain?	5	CO1	K2
3.a. Illustrate the common sources of error in levelling.	5	CO2	K1
b. The following consecutive readings were taken with a levelling instrument at intervals of 20m. 2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255 and 3.630 m. The instrument was shifted after the fourth and eighth readings. The last reading was taken on a BM of RL 110.200 m. Find the RLs of all the points.	5	CO2	K2
(OR)			
c. A 20 m steel tape was standardised at a temperature of 20 <sup>0</sup> C and under a pull of 15 kg. The tape was used in catenary at temperature of 30 <sup>0</sup> C and under a pull of 10 kg. The cross-sectional area of the tape is 0.02 cm <sup>2</sup> , and its total weight is 400 g. The Young's modulus and coefficient of linear expansion of steel are 2.1 x 10 <sup>6</sup> kg/cm <sup>2</sup> and 11 x 10 <sup>-6</sup> per <sup>0</sup> C respectively. Find the correct horizontal distance.	5	CO2	K2
4.a. What is temporary adjustment of a theodolite? Describe the process of such adjustment.	10	CO3	K2

(OR)

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|--|---|-----|----|
| b. Describe the process of measuring the vertical angle by using theodolite.   | 5 | CO3 | K1 |
| c. The following consecutive readings were taken with a levelling instrument at intervals of 20m. 2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255 and 3.630 m. The instrument was shifted after the fourth and eighth readings. The last reading was taken on a BM of RL 110.200 m. Find the RLs of all the points.  | 5 | CO3 | K2 |
| 5.a. Describe in detail about two linear methods for setting out of simple circular curves.  | 5 | CO4 | K1 |
| b. On a railway track of 1.68m width, the design speed is 90km/h. Transition curves are to be provided to join a circular curve with a radius of 500m between straights of the track. If the change of radial acceleration is limited to $0.3 \text{ m/sec}^3$ , determine the following:<br>i. Length of transition needed<br>ii. Shift of circular arc<br>iii. Theoretical super elevation required at the curve | 5 | CO4 | K2 |

(OR)

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| c. A nominal distance of 30m was set out with an 30m steel tape from a mark on the top of one peg to a mark on top of another, the tape being in catering under a pull of 10kg at a mean temperature of $70^\circ\text{F}$ . The top of one peg was 0.25m below the top of another. The top of higher peg was 460 meters above mean sea level. Calculate the exact horizontal distance between the marks on the two pegs and reduce it to mean sea level, if the tape was standardised at a temperature of $60^\circ\text{F}$ , in catering, 5 under a pull of (a) 8 kg, (b) 12 kg, (c) 10kg | 5 | CO4 | K2 |
| d. Describe Height of Instrument Method to determine RL with neat sketches.  | 5 | CO4 | K1 |
| 6.a. Write short notes on map projection systems.  | 5 | CO5 | K1 |
| b. Write briefly about the applications of GPS.  | 5 | CO5 | K1 |
| (OR)   |   |     |    |
| c. Write briefly about the applications of GIS.  | 5 | CO5 | K1 |
| d. Write short notes on topographic maps.  | 5 | CO5 | K1 |

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