

Code No: 153BV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, September/October - 2023

SURVEYING AND GEOMATICS

(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define local attraction. [2]
- b) What do you mean by included and excluded angles? [3]
- c) How do you arrive capacity of reservoirs? [2]
- d) What are the characteristics of contours? [3]
- e) What are the adjustments in traversing? [2]
- f) Explain the fundamental lines in the theodolite. [3]
- g) Define reverse curve and vertical curve. [2]
- h) Write down applications of total stations. [3]
- i) Explain aerial triangulation. [2]
- j) Draw the geometry of aerial photograph. [3]

PART – B**(50 Marks)**

2. Determine the correct length of a line reduced to the mean sea level when the recorded length with a tape hanging in catenary at a tension of 85 N and at a temperature of 22°C is 30.071 m. The difference between the ends is 0.42 m and the site is 2000 m above M.S.L. The tape had been previously standardized in catenary at a tension of 50 N and at a temperature of 27°C, and the distance between zeros was 30.035 m.

Weight of tape	=	7N	
Cross-sectional area	=	3.9 mm ²	
Coefficient of expansion	=	1.15×10^{-5} per °C	
Young's modulus	=	2×10^5 N/mm ²	
Radius of earth	=	6370 km.	[10]

OR

- 3.a) What do you understand by the term well-conditioned triangle? Why is it necessary to have well-conditioned triangles in a chain survey?
- b) A and B are two points 200 m apart on right bank of a river flowing east to west. A tree on the left bank is observed from A and B, and the bearings of the tree are 20° and 330°, respectively, as measured clockwise with respect to the north. Find the width of the river. [4+6]

4.a) Describe both the methods of reducing the levels, and their relative advantages and disadvantages.

b) The following consecutive readings were taken with a dumpy level

1.895, 1.500, 1.865, 2.570, 2.990, 2.020, 2.410, 2.520, 2.960, 3.115.

The level was shifted after fourth, sixth and ninth readings. The R.L. of the first point was 30.500. Rule out a page of your answer book as a level book, and fill all columns.

Use collimation system and apply the usual checks. Indicate the highest and lowest points. [4+6]

OR

5. Explain the method of computation of volume by the:

a) Trapezoidal rule,

b) Prismoidal formula. [5+5]

6.a) What is the check on the accuracy of a closed traverse? What is error of closure? How would you determine it? What is the relative error of closure?

b) Discuss the procedure for the measurement of horizontal angles in a closed traverse by the method of included angles. How does it differ from the method of direct angles? [5+5]

OR

7. Define the following terms:

a) Centring

b) Vertical axis

c) Horizontal axis

d) Line of collimation. [10]

8.a) What is meant by shift of a curve? Derive an expression for the same.

b) Explain the various methods of determining the length of a transition curve. [5+5]

OR

9.a) Explain various applications of Global Positioning System.

b) List and explain various components of Global Positioning System. [5+5]

10. Define the following:

a) Air base.

b) Tilt displacement.

c) Principal point.

d) Isometric parallel. [10]

OR

11.a) Explain with reference to aerial photographs, what is meant by end overlap and side overlap and why they are provided?

b) How do you determine the number of photographs necessary to cover a given area in an aerial survey? [5+5]

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