

**B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER EXAM 2023**  
**Subject: SURVEYING I**

**Part - I**  
**(50)**

Time : Three hours

Full Marks : 100

**Use a separate Answer-Script for each part**

No. of Questions	Answer Question No. 1 and any <i>Three</i> from the rest	Marks
1	<p>Choose the correct alternatives for the following:</p> <p>i. Which of the following accessories is <u>not</u> used in Compass surveying            (a) Alidade (b) Surveyor's compass            (c) Prismatic compass (d) Ranging Rod</p> <p>ii. A scale of 1cm=5m is represented as a RF as            (a) 1:500000 (b) 1:5000000            (c) 1:5000 (d) 1:500</p> <p>iii. Whole Circle Bearing of a line is 310° 25'. Its Reduced Bearing is            (a) S40°25' W (b) N40°25' W            (c) S49°35' W (d) N49°35' W</p> <p>iv. Method of Intersection requires the plane table to occupy at least            (a) One position (b) Two positions            (c) Three positions (d) Four positions</p> <p>v. Principle of Chain Surveying is            (a) Traversing (b) Triangulation            (c) Contouring (d) None of these</p>	[5]
2 (a)	<p>A 30m long tape was standardized at 20°C and under a pull of 100N. A horizontal distance was measured with a pull of 120N applied to the tape at a temperature of 35°C. The tape was supported at the ends. Find the measured horizontal distance. Given, the cross-sectional area of the tape=6mm<sup>2</sup>; total weight of the tape=9.5N; <math>\alpha</math> for steel=12x10<sup>-6</sup>/°C; E for steel= 2.1x10<sup>5</sup> N/mm<sup>2</sup>.</p>	[10]

[ Turn over

## B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER EXAM 2023

## Subject: SURVEYING I

## Part - I

(50)

(b)	What are the two broad types of Surveying based on survey area. Discuss any one type in details.	[5]															
3 (a)	The bearings of a closed traverse are given. Check whether the bearings are correct. If not, correct the bearings by <i>method of bearings</i> .	[10]															
	<table border="1"> <thead> <tr> <th>Line</th> <th>AB</th> <th>BC</th> <th>CD</th> <th>DA</th> </tr> </thead> <tbody> <tr> <td>FB</td> <td>122° 15'</td> <td>66° 00'</td> <td>308° 15'</td> <td>198° 00'</td> </tr> <tr> <td>BB</td> <td>302° 15'</td> <td>243° 45'</td> <td>133° 00'</td> <td>15° 30'</td> </tr> </tbody> </table>	Line	AB	BC	CD	DA	FB	122° 15'	66° 00'	308° 15'	198° 00'	BB	302° 15'	243° 45'	133° 00'	15° 30'	
Line	AB	BC	CD	DA													
FB	122° 15'	66° 00'	308° 15'	198° 00'													
BB	302° 15'	243° 45'	133° 00'	15° 30'													
(b)	Explain <i>Local Attraction</i> in details.	[5]															
4 (a)	Following are the included angles of a traverse. Fore Bearing of line BC is 131°15'. Find out the bearings of the other lines, assuming the work done in a clockwise direction.	[10]															
	<table border="1"> <thead> <tr> <th>Angle</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>Included Angle</td> <td>78° 36'</td> <td>101° 24'</td> <td>96° 45'</td> <td>83° 15'</td> </tr> </tbody> </table>	Angle	A	B	C	D	Included Angle	78° 36'	101° 24'	96° 45'	83° 15'						
Angle	A	B	C	D													
Included Angle	78° 36'	101° 24'	96° 45'	83° 15'													
(b)	What are the two Bearing Systems? Explain any one in details with a neat sketch.	[5]															
5 (a)	With a neat sketch describe the <i>Two Point Problem of Method of Resection</i> in plane table surveying.	[9]															
(b)	With a neat sketch describe the <i>Method of Radiation</i> in plane table surveying.	[6]															

**B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER EXAM 2023**

**SUB: SURVEYING - I**

**PART II  
(50 Marks)**

Use separate answer scripts for each part

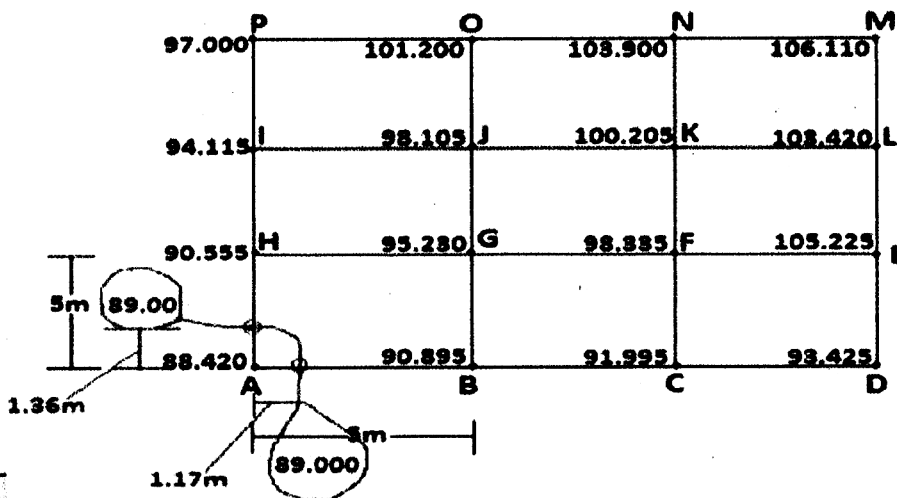
**Q1.** The lengths, bearings and included angles of a closed traverse ABCDA, as observed with a transit theodolite, are given below. Prepare a Gale's traverse table and plot the traverse. While preparing the traverse balance the traverse by Transit Rule and compute the independent co-ordinates of stations, given the co-ordinates of station B as (400 N, 200E). [24]

Line	Length (m)	Included angle	W.C.B.
AB	255	93°18'16"	140°42'00"
BC	656	74°16'25"	
CD	120	123°42'00"	
DA	668	68°41'16"	

**Q2.** The reduced level of a factory floor is 30.00 m and the staff reading on the floor is 1.40 m. The staff reading when held inverted with the bottom touching the Tee-beam of the roof is 3.40 m. Find the height of the beam above the floor. [2]

**Q3.** Calculate the combined correction for curvature and refraction for a distance of: 5 km. [3]

**Q4.** Draw a contour line of 102 m elevation: [5]



**Q5.** Reproduced below is the page in a level book. Fill in the missing data. Apply usual checks. [6]

[ Turn over

Station	B.S. (m)	I.S. (m)	F.S. (m)	Rise (m)	Fall (m)	R.L.	Remarks
1	2.005					430.00	B.M.1
2	1.605		?	0.500			
3		2.315			?		
4	?		1.865	?			
5	2.150		1.835		0.400		

**Q6.** Reciprocal levels were taken with a dumpy level and following observations were recorded:

Instrument Station ↓	Staff reading at station ↓	
	A	B
A	1.851	1.569
B	0.750	0.500

R.L. of station A is known to be 625.055. Calculate the R.L. of station B. [4]

**Q7.** To determine the multiplying constant of a tacheometer, the following observations were taken on a staff held at vertically at distance, measured from the instrument: [6]

Observation	Horizontal distance (m)	Vertical angle	Staff intercept (m)
1	50	+ 0°36'	0.500
2	100	+ 3°48'	1.000
3	150	+ 1°06'	1.500

Or,

The vertical angles to vanes fixed at 1 m and 3 m above the foot of the staff held vertically at a station A were +3°30' and +7°00' respectively. Find the horizontal distance and the reduced level of A if the height of the instrument, determined from observation on to a bench mark is 350 metres above datum. [6]