Ref. No.: Ex/CE/PC/B/T/215/2024(S)

B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER SUPPLEMENTARY EXAM 2024

SUBJECT: SURVEYING I (CE/PC/B/T/215)

Time: 3 hours **Full Marks:100**

(50 Marks for each Part)

Instructions: Use Separate Answer scripts for each part.

Part - I (50 Marks)

Sl. No.	Question	CO	Marks
1	The angles at the stations of a closed traverse ABCDEFA were observed as given below: (a) Adjust the angular error in the observations, if any. (b) Calculate the bearings of the traverse lines in the following systems: i) Whole circle bearing in the sexagesimal system & ii) Quadrantal bearing in the sexagesimal system. (c) Calculate latitudes, departures, and closing error for the above-mentioned traverse, and adjust using Bowditch's rule.	[CO6]	20
2	A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities:	[CO3]	[9]

Internal Angle	Lengths (m)	Whole Circle Bearing
$\angle A = 130°18'45"$	AB = 17.098	AD = 136°25'12"
$\angle B = 110°18'23"$	BC = 102.925	
$\angle C = 99°32'35"$	CD = 92.782	
$\angle D = 116°18'02"$	DE = 33.866	

Side	Length (m)	Azimuth
AB	160	Missing
BC	270	102°36′
CD	125	Missing
DE	310	270°00′

[Turn over

<table>
<tr><td>3. A</td><td>Reproduced below is the page in a level book. Fill in the missing data. Apply usual checks.
<table>
<tr><th>Station</th><th>B.S. (m)</th><th>I.S. (m)</th><th>F.S. (m)</th><th>Rise (m)</th><th>Fall (m)</th><th>R.L.</th><th>Remarks</th></tr>
<tr><td>1</td><td>3.025</td><td></td><td></td><td></td><td></td><td>?</td><td>B.M.1</td></tr>
<tr><td>2</td><td>?</td><td></td><td>?</td><td>1.325</td><td></td><td>125.005</td><td>T.P</td></tr>
<tr><td>3</td><td></td><td>2.320</td><td></td><td></td><td>0.055</td><td></td><td></td></tr>
<tr><td>4</td><td></td><td>?</td><td></td><td></td><td></td><td>125.350</td><td></td></tr>
<tr><td>5</td><td>?</td><td></td><td>2.655</td><td></td><td></td><td></td><td>T.P</td></tr>
<tr><td>6</td><td>1.620</td><td></td><td>3.205</td><td></td><td>2.165</td><td></td><td>T.P</td></tr>
<tr><td>7</td><td></td><td>3.625</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td>?</td><td></td><td></td><td>122.600</td><td>T.B.M</td></tr>
</table></td><td>[CO2]</td><td>[10]</td></tr>
<tr><td>3. B</td><td>The horizontal angle subtended at a theodolite by a subtense bar with vanes 2 m apart is 6'35". (a) Calculate the horizontal distance between the instrument and the bar. (b) Also find the error of horizontal distance if the bar was 3° from being normal to the line joining the instrument and bar stations.</td><td>[CO2]</td><td>[5]</td></tr>
<tr><td>3. C</td><td>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 +8°58′ 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 438.556 metres above datum.</td><td>[CO2]</td><td>[6]</td></tr>
</table>

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B.E. CIVIL ENGINEERING SECOND YEAR FIRST SEMESTER SUPPLEMENTARY EXAM - 2024
Subject: SURVEYING I
Part - II
(50)

Use a separate Answer-Script for each part

<table>
<tr><th>No. of Questions</th><th>Answer All Questions</th><th>Marks</th></tr>
<tr><td>1</td><td>Describe Main Station, Main Survey Line, Tie/Subsidiary Stations, Tie Line, Base Line, and Check Line with a neat sketch.</td><td>[5]</td></tr>
<tr><td>2 (a)</td><td>A 30m Chain was tested before starting the day's work and was found to be 30cm too short. After measuring a length of 1500m, the chain was found to be 20cm too long. After measuring a length of 1200m, the chain was found to be 10cm too short. At the end of the work the chain was found to be 30.20m. Find the true length of the line if total measured length was 5000m, on a sloping ground where the level difference between starting and ending point was 200cm.</td><td>[10]</td></tr>
<tr><td>(b)</td><td>What are the different types of metric chain? Describe any one type of metric chain in details with a neat sketch.</td><td>[5]</td></tr>
<tr><td>3 (a)</td><td>Describe the working principle of a prismatic compass with a neat sketch.</td><td>[5]</td></tr>
<tr><td>(b)</td><td>What is ranging? Describe reciprocal ranging with the help of a neat sketch.</td><td>[5]</td></tr>
<tr><td>(c)</td><td>What is slope correction? Derive the expression for slope correction with a neat sketch.</td><td>[5]</td></tr>
<tr><td>4 (a)</td><td>Find the included angles of a traverse from the RB of the lines given here.
<table>
<tr><th>Line</th><th>AB</th><th>BC</th><th>CD</th><th>DE</th><th>EF</th><th>FA</th></tr>
<tr><td>RB</td><td>N 62° 35' E</td><td>S 85° 15' E</td><td>S 25° 50' E</td><td>S 67° 22' W</td><td>N 82° 30' W</td><td>N 27° 54' W</td></tr>
</table></td><td>[10]</td></tr>
<tr><td>(b)</td><td>Explain Fore bearing and Back bearing of a survey line in details with a neat sketch with respect to WCB and RB systems.</td><td>[5]</td></tr>
</table>