Course Code: 20CE0104 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Surveying & Geomatics (20CE0104) **Course & Branch: B.Tech & CE & AGE**

Year & Sem: II Year & I Sem **Regulation: R20**

UNIT –I

PRINCIPLES OF SURVEYING AND CHAIN & COMPASS SURVEYING

1	a	Briefly explain the principles of surveying?	[L2][CO1]	[6M]
	b	Define surveying and brief about the primary divisions of surveying.	[L1][CO1]	[6M]
2		Explain in detail the classifications of surveying.	[L2][CO1]	[12M]
3	a	What are the duties of a surveyor?	[L1][CO1]	[6M]
	b	Write short notes on types of errors.	[L1][CO1]	[6M]
4	a	Briefly explain the various accessories (any three) in chain surveying.	[L2][CO1]	[6M]
	b	A steel tape was exactly 30 m long at 20°C when supported throughout its length under a pull of 98N. A line was measured with this tape under a pull of 147N and at a mean temperature of 32°C and found to be 780 m long. The cross-sectional area of the tape = 0.03 cm^2, and its total weight = 6.8N. For steel, $\propto$ = 11 X 10^{-6} per ˚C and E for steel = 20.58 X 10^6 N/cm^2. Compute the true length of the line if the tape was supported during measurement at every 30 m.	[L3][CO1]	[6M]
5		What are the different tape correction and how they are applied?	[L1][CO1]	[12M]
6		Explain briefly the obstacles of chaining of a line with neat sketches.	[L2][CO1]	[12M]
7		With neat sketch, explain the prismatic compass by indicating their parts.	[L2][CO1]	[12M]
8		The following bearings were observed in running a closed traverse. At what stations do you suspect local attraction? Find the correct bearings of lines and also compute the included angles.	[L4][CO1]	[12M]

LINE	FORE BEARING	BACKBEARING
AB	71°05’	250°20’
BC	110°20’	292°35’
CD	161°40’	341°40’
DE	220°50’	40°05’
EA	300°50’	121°10’

9	a	Write short notes on dip and declination.	[L1][CO1]	[6M]
	b	What is local attraction and how it is detected and eliminated?	[L1][CO1]	[6M]
10	a	Differentiate between prismatic and surveyor compass.	[L2][CO1]	[6M]
	b	Make a note on bearing and meridian.	[L1][CO1]	[6M]

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UNIT –II
LEVELING AND CONTOURING

<table>
<tr><td rowspan="2">1</td><td>a</td><td>Write short notes on methods of leveling.</td><td>[L1][CO2]</td><td>[6M]</td></tr>
<tr><td>b</td><td>Briefly explain the temporary adjustment of leveling.</td><td>[L1][CO2]</td><td>[6M]</td></tr>
<tr><td rowspan="2">2</td><td>a</td><td>Write short notes on errors in leveling</td><td>[L2][CO2]</td><td>[6M]</td></tr>
<tr><td>b</td><td>Discuss the effects of curvature and refraction in leveling.</td><td>[L2][CO2]</td><td>[6M]</td></tr>
<tr><td rowspan="2">3</td><td>a</td><td>Describe in detail how you will proceed in the field a profile leveling.</td><td>[L2][CO2]</td><td>[6M]</td></tr>
<tr><td>b</td><td>In leveling between two points A and B on opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.642m and 3.228m respectively. The level was then moved and set up near B, the respective staff readings on A and B were 1.086m and 1.664m. Find the true difference level of A and B.</td><td>[L4][CO2]</td><td>[6M]</td></tr>
<tr><td>4</td><td colspan="2">The following staff readings were observed successively with level, the instrument has been moved forward after the second, fourth and eighth readings: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030 and 3.765. The first reading was taken with the staff held upon a benchmark of elevation 132.135m. Enter the readings in level book-form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points.</td><td>[L4][CO2]</td><td>[12M]</td></tr>
<tr><td>5</td><td colspan="2">The following consecutive readings were taken with a dumpy level and 4 m leveling staff on a continuously sloping ground at common intervals of 30 m 0.905 (on A), 1.745, 2.345, 3.125,3.725, 0.545, 1.390, 2.055, 2.955, 3.445, 0.595, 1.015, 1.850,2.655, 2.945(on B). The RL of A was 395.500 m. Tabulate the page of field book and calculate the levels of the points.</td><td>[L4][CO2]</td><td>[12M]</td></tr>
<tr><td>6</td><td colspan="2">The following readings have been taken from a page of an old level book. It is required to reconstruct the page. Fill up the missing quantities and apply the usual checks.
<table>
<tr><th>Station</th><th>BS</th><th>IS</th><th>FS</th><th>Rise (+)</th><th>Fall (-)</th><th>RL</th><th>Remarks</th></tr>
<tr><td>1</td><td>3.125</td><td></td><td></td><td></td><td></td><td>?</td><td>B.M</td></tr>
<tr><td>2</td><td>?</td><td></td><td>?</td><td>1.325</td><td></td><td>125.505</td><td>CP</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>125.850</td><td></td></tr>
<tr><td>5</td><td>?</td><td></td><td>2.655</td><td></td><td>?</td><td>?</td><td>CP</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>CP</td></tr>
<tr><td>7</td><td></td><td>3.652</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>123.090</td><td>T.B.M</td></tr>
</table></td><td>[L3][CO2]</td><td>[12M]</td></tr>
<tr><td rowspan="2">7</td><td>a</td><td>Write short notes on difficulty in leveling.</td><td>[L1][CO2]</td><td>[6M]</td></tr>
<tr><td>b</td><td>Discuss about the interpolation of contour.</td><td>[L2][CO2]</td><td>[6M]</td></tr>
<tr><td>8</td><td colspan="2">Define contour. State the various characteristics of contour lines.</td><td>[L1][CO2]</td><td>[12M]</td></tr>
<tr><td>9</td><td colspan="2">What are the indirect methods of locating a contour? Write about any two methods.</td><td>[L1][CO2]</td><td>[12M]</td></tr>
<tr><td rowspan="2">10</td><td>a</td><td>Mention the uses of contour in civil engineering works?</td><td>[L1][CO2]</td><td>[6M]</td></tr>
<tr><td>b</td><td>Define contour interval, horizontal equivalent and contour gradient.</td><td>[L2][CO2]</td><td>[6M]</td></tr>
</table>

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UNIT –III
THEODOLITE AND TACHEOMETRIC SURVEYING

<table>
<tr><td rowspan="2">1</td><td>a</td><td>Write the temporary adjustments of a theodolite</td><td>[L1][CO3]</td><td>[6M]</td></tr>
<tr><td>b</td><td>How do you measure horizontal angle between two points with the help of a theodolite by repetition method?</td><td>[L2][CO3]</td><td>[6M]</td></tr>
<tr><td>2</td><td colspan="2">With neat sketch, write about the parts of a transit theodolite.</td><td>[L1][CO3]</td><td>[12M]</td></tr>
<tr><td rowspan="2">3</td><td>a</td><td>How do you measure the horizontal angles between various points by reiteration method?</td><td>[L1][CO3]</td><td>[6M]</td></tr>
<tr><td>b</td><td>What are the different errors in theodolite work? How are they eliminated?</td><td>[L1][CO3]</td><td>[6M]</td></tr>
<tr><td>4</td><td colspan="2">Determine the R.L of the top of a temple from the following data. Station A and B are in line with the top of the temple.
<table>
<tr><th>Inst Station</th><th>Reading on BM(m)</th><th>Vertical Angle</th><th>R.L of BM</th></tr>
<tr><td>A</td><td>1.085</td><td>10°48´</td><td rowspan="2">R.L of BM = 150.000m
AB=50 m</td></tr>
<tr><td>B</td><td>1.265</td><td>7°12´</td></tr>
</table></td><td>[L3][CO3]</td><td>[12M]</td></tr>
<tr><td>5</td><td colspan="2">Derive an expression to find the height of an object by double plane method.</td><td>[L3][CO3]</td><td>[12M]</td></tr>
<tr><td rowspan="2">6</td><td>a</td><td>What is an analytical lens? Establish the basic equation for an analytic lens.</td><td>[L1][CO4]</td><td>[6M]</td></tr>
<tr><td>b</td><td>What is tacheometry? What are different systems of tacheometric measurements?</td><td>[L1][CO4]</td><td>[6M]</td></tr>
<tr><td rowspan="2">7</td><td>a</td><td>Find the horizontal and vertical distances by tangential method when both angles are angles of elevation.</td><td>[L3][CO4]</td><td>[6M]</td></tr>
<tr><td>b</td><td>How would you, determine the constants K and C of a Tacheometer.</td><td>[L2][CO4]</td><td>[6M]</td></tr>
<tr><td>8</td><td colspan="2">The following readings were taken by a tacheometer with the staff held vertical. The tacheometer is fitted with Analytic lens and the multiplying constant is 100. Find out the horizontal distance from A to B and the R.L of B.
<table>
<tr><th>Inst. station</th><th>Staff station</th><th>Vertical angle</th><th>Staff readings</th><th>Remarks</th></tr>
<tr><td rowspan="2">A</td><td>BM</td><td>-6º00'</td><td>1.100, 1.580, 2. 060</td><td rowspan="2">R.L. of B.M = 976.000</td></tr>
<tr><td>B</td><td>8°00'.</td><td>0.982, 1.085, 1.188</td></tr>
</table></td><td>[L3][CO4]</td><td>[12M]</td></tr>
<tr><td>9</td><td colspan="2">The vertical angles to vanes fixed at 0.5m and 3.5m above the foot of the staff held vertically at a point were - 00° 30’ and + 10 °12’ respectively. Find the horizontal distance and the reduced level of the point, if the level of the instrument axis is 125.380 meters above datum.</td><td>[L3][CO4]</td><td>[12M]</td></tr>
<tr><td rowspan="2">10</td><td>a</td><td>Determine the values of stadia constants from the following observations.
<table>
<tr><th rowspan="2">Instrument Station</th><th rowspan="2">Staff reading on</th><th rowspan="2">Distances (m)</th><th colspan="2">Stadia readings</th></tr>
<tr><th>Lower</th><th>Upper</th></tr>
<tr><td rowspan="3">O</td><td>A</td><td>150</td><td>1.250</td><td>2.750</td></tr>
<tr><td>B</td><td>200</td><td>1.000</td><td>3.000</td></tr>
<tr><td>C</td><td>250</td><td>0.750</td><td>3.250</td></tr>
</table></td><td>[L3][CO4]</td><td>[4M]</td></tr>
<tr><td>b</td><td colspan="2">Write a note on movable hair method in tacheometric surveying with neat sketch.</td><td>[L1][CO4]</td><td>[8M]</td></tr>
</table>

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UNIT –IV

CURVES

1	a	Write short notes on types of circular curves.	[L1][CO5]	[7M]
	b	Define degree of curve. Derive a relation between the radius and degree of a curve.	[L2][CO5]	[5M]
2	Explain the various elements of a simple curve with a neat sketch.		[L2][CO5]	[12M]
3	a	Define and draw a typical compound curve. Under what circumstance compound curves are provided.	[L2][CO5]	[5M]
	b	Derive the expression for the elements of a compound curve.	[L3][CO5]	[7M]
4	Mention the various methods of setting out of simple curve. Explain with sketch offsets from long chord method in detail.		[L2][CO5]	[12M]
5	With sketch, explain in detail any one method of curve setting by offset from the tangent method.		[L2][CO5]	[12M]
6	Describe with sketch the method of setting a simple circular curve by Rankine's deflection angle method.		[L2][CO5]	[12M]
7	a	Draw a neat sketch of reverse curve and explain it.	[L2][CO5]	[5M]
	b	Briefly explain the field procedure of setting out of curve by two theodolite methods.	[L2][CO5]	[7M]
8	Two tangents intersect at chainage 1250 m. The angle of intersection is 150^0. Calculate all data necessary for setting out a curve of radius 250 m by the deflection angle method. The peg intervals may be taken as 20 m. Prepare a setting out table when the least count of the Vernier is 20". Calculate the data for field checking.		[L4][CO5]	[12M]
9	Two straight lines AC and CB, to be connected by a 3^0 curve, intersect at a chainage of 2760 m. The WCBs of AC and CB are $45^0$30' and $75^0$30' respectively. Calculate all necessary data for setting out the curve by the method of offsets from the long chord.		[L4][CO5]	[12M]
10	A compound curve is made up of two arcs of radii 380 m and 520 m. The deflection angle of the combined curve is 105^0 and that of the first arc of radius 380 m is 58^0. The chainage of the first tangent point is 848.55 m. Find the chainage of the point of intersection, common tangent point, and forward tangent point.		[L4][CO5]	[12M]

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UNIT –V

ELECTRONIC DISTANCE MEASUREMENTS AND TOTAL STATION

1	a	List out and explain the properties of EM waves.	[L2][CO6]	[6M]
	b	State and brief about transit time.	[L1][CO6]	[6M]
2	a	Explain in detail about the infrared type of EDM instrument.	[L2][CO6]	[6M]
	b	Write short notes on total stations.	[L1][CO6]	[6M]
3		Explain with sketch the principle of EDM instrument.	[L2][CO6]	[12M]
4		Briefly explain the types of EDM instrument.	[L2][CO6]	[12M]
5		How will you measure the horizontal angle and vertical angle by using total station?	[L1][CO6]	[12M]
6		Describe in detail about the following EDM instruments. (i) Microwave instrument (ii) Visible light instrument.	[L2][CO6]	[12M]
7	a	Explain about AM and FM modulation.	[L2][CO6]	[6M]
	b	What is modulation? Explain the necessity of modulation.	[L1][CO6]	[6M]
8		Explain in detail about the Wild T-1000 Electronic Theodolite.	[L2][CO6]	[12M]
9		Describe with sketch, the fundamental measurement of angles and distances by total station.	[L2][CO6]	[12M]
10	a	Discuss about the various model available in total station.	[L2][CO6]	[6M]
	b	Write short notes on Global Positional System.	[L1][CO6]	[6M]

Prepared by:
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