

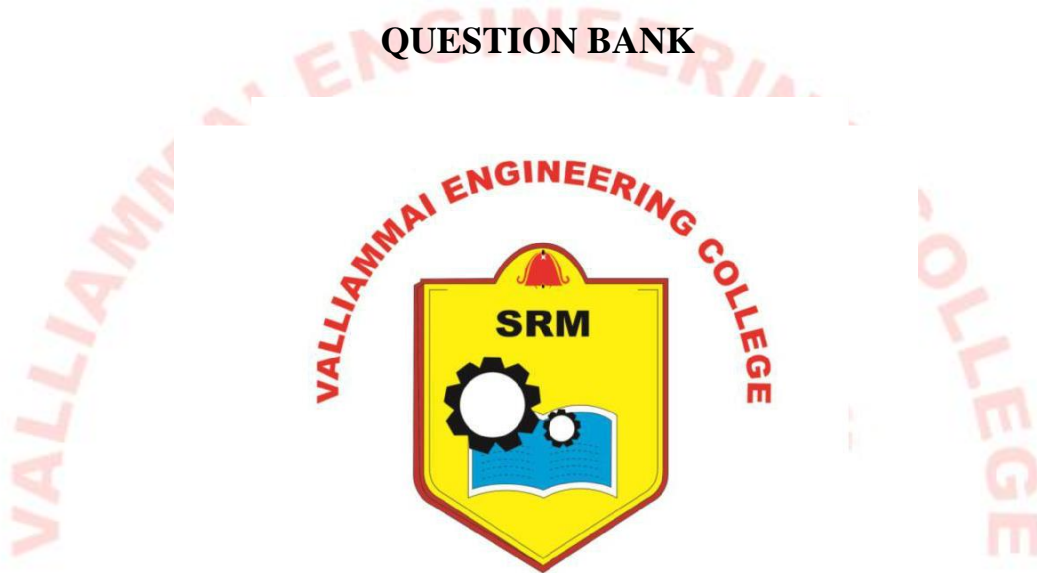
SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK



III SEMESTER

1903303 - SURVEYING

Regulation – 2019

Academic Year 2021 – 22

Prepared by

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Assistant Professor (Sr.G)

UNIT 1- FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING

Classifications and basic principles of surveying - Equipment and accessories for ranging and chaining - Methods of ranging - Compass - Types of Compass - Basic Principles- Bearing – Types - True Bearing - Magnetic Bearing - Levelling- Principles and theory of Levelling – Datum- - Bench Marks – Temporary and Permanent Adjustments- Methods of Levelling- Booking – Reduction - Sources of errors in Levelling - Curvature and refraction.

PART - A

Q.No	Questions	BT	Competence
1.	Define surveying.	BT-1	Remembering
2.	List the different cumulative errors in chain surveying and Tape measurement.	BT-1	Remembering
3.	Tell the length of one link in engineer's chain and Gunter's chain.	BT-1	Remembering
4.	Name the instruments/accessories needed to carry out a chain surveying	BT-1	Remembering
5.	Discuss the applications of Surveying.	BT-1	Remembering
6.	Discuss ranging. Mention its types.	BT-2	Remembering
7.	What is the use of trough compass in plane table surveying?	BT-4	Remembering
8.	Distinguish between Magnetic Dip and Declination.	BT-4	Remembering
9.	Define Levelling.	BT-5	Remembering
10.	Distinguish between true bearing and magnetic bearing.	BT-2	Understanding
11.	Discuss the term bearings and its types.	BT-3	Applying
12.	Calculate the reduced bearing values for the whole circle bearings 150° and 270° .	BT-3	Applying
13.	Change the following whole circle bearing to reduced bearing:(a) $151^\circ 20'$ (b) $332^\circ 40'$.	BT-3	Applying
14.	What is meant by sensitivity of level tube?	BT-2	Remembering
15.	List the different types of leveling staves.	BT-5	Remembering
16.	List out the types of levelling instruments.	BT-2	Remembering
17.	Write about datum.	BT-6	Remembering
18.	Define Benchmark and give its types.	BT-4	Remembering
19.	Evaluate is reduction in leveling? Name the methods.	BT-6	Remembering
20.	Calculate the combined correction for value 6000m & 9000m.	BT-3	Applying

PART – B

1.	(i) What are the basic principles of surveying? Describe it. (ii) Discuss about the different sources of error in chain surveying.	BT-1	Remembering
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2.	(i) Describe the field and office work in chain surveying? (ii) Examine how you will conduct chain survey to measure a land in agriculture field.	BT-1	Remembering																		
3.	(i) Describe the methods of ranging by using a line ranger. (ii) Show the different methods of overcoming difficulties if there are obstacles in chaining and ranging both.	BT-1	Remembering																		
4.	Explain the methods of chaining with neat sketches. While you do chaining to overcome obstacles for chaining and not for ranging?	BT-4	Analyse																		
5.	(i) Prepare a list of accessories required for a chain survey? Explain the functions of each. (ii) With a simple sketch, state the construction and use of a cross staff.	BT-5	Evaluate																		
6.	On a closed compass traverse survey PQRST, following are the observations made with a suspicion of local attraction. <table border="1" data-bbox="232 743 776 1003"> <thead> <tr> <th>Line</th> <th>Fore Bearing</th> <th>Back Bearing</th> </tr> </thead> <tbody> <tr> <td>PQ</td> <td>147° 3'</td> <td>26° 45'</td> </tr> <tr> <td>QR</td> <td>74° 30'</td> <td>253° 00'</td> </tr> <tr> <td>RS</td> <td>41° 30'</td> <td>222° 45'</td> </tr> <tr> <td>ST</td> <td>312° 15'</td> <td>132° 45'</td> </tr> <tr> <td>TP</td> <td>219° 15'</td> <td>39° 15'</td> </tr> </tbody> </table> <p>Identify the station affected with local attraction, include angles and the corrected bearings</p>	Line	Fore Bearing	Back Bearing	PQ	147° 3'	26° 45'	QR	74° 30'	253° 00'	RS	41° 30'	222° 45'	ST	312° 15'	132° 45'	TP	219° 15'	39° 15'	BT-1	Remembering
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TP	219° 15'	39° 15'																			
7.	Evaluate the working principle of prismatic compass in detail.	BT-5	Evaluate																		
8.	Show which stations are affected by local attraction. Work out the correct bearing of closed traverse ABCDEA. <table border="1" data-bbox="323 1220 1049 1522"> <thead> <tr> <th>Line</th> <th>Fore Bearing</th> <th>Back Bearing</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td>190° 30'</td> <td>17° 0'</td> </tr> <tr> <td>BC</td> <td>73° 30'</td> <td>250° 30'</td> </tr> <tr> <td>CD</td> <td>36° 15'</td> <td>214° 30'</td> </tr> <tr> <td>DE</td> <td>266° 45'</td> <td>84° 45'</td> </tr> <tr> <td>EA</td> <td>234° 15'</td> <td>57° 0'</td> </tr> </tbody> </table>	Line	Fore Bearing	Back Bearing	AB	190° 30'	17° 0'	BC	73° 30'	250° 30'	CD	36° 15'	214° 30'	DE	266° 45'	84° 45'	EA	234° 15'	57° 0'		
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9.	The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 meters. Enter the above readings in a page of a level book and evaluate the R.L. of points if the first reading was taken with a staff held on a bench mark of 432.384 m.	BT-3	Applying																		

10.	The following bearing were observed with a compass. Workout the local attraction? Find the correct bearing.																	
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11.	What are the different sources of error in leveling and explain them in detail.	BT-2	Understanding															
12.	Describe the effects of curvature and refraction in leveling and their corrections.	BT-2	Understanding															
13.	Describe the profile leveling and cross sectional leveling.	BT-4	Analyze															
14.	i) Define Bench mark. Describe the different types of bench marks. ii) Compare the rise and fall and line of collimation method in reducing leveling observation.	BT-2	Understanding															

PART-C

1.	The following readings were taken with a dumpy level (a) when the instrument is midway between two pegs A and B, 100 m apart. The staff reading on A = 3.345 m. The staff reading on B = 2.025 m. (b) when the instrument is kept very near A. The staff reading on A = 2.950 m. The staff reading on B = 2.000 m. Is the instrument in adjustment or not? When the instrument is very near to A. What should be the correct reading on staff B?	BT 3	Applying																														
2..	Explain the method of direct and reciprocal ranging in detail. And determine the area for the following observations by (i) Mid Ordinate rule (ii) Average Ordinate rule (iii) Trapezoidal rule	BT 2	Understanding																														
	<table border="1"> <tbody> <tr> <td>Ordinate</td> <td>01</td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td>06</td> <td>07</td> <td>08</td> <td>09</td> </tr> <tr> <td>Distance(m)</td> <td>0</td> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> <td>60</td> <td>70</td> <td>80</td> </tr> <tr> <td>Offset(m)</td> <td>3.25</td> <td>5.60</td> <td>4.20</td> <td>6.65</td> <td>8.75</td> <td>6.20</td> <td>3.25</td> <td>4.2</td> <td>5.65</td> </tr> </tbody> </table>	Ordinate	01	02	03	04	05	06	07	08	09	Distance(m)	0	10	20	30	40	50	60	70	80	Offset(m)	3.25	5.60	4.20	6.65	8.75	6.20	3.25	4.2	5.65		
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3..	Explain the working of a dumpy level with a sketch. What are the various temporary adjustments?	BT 2	Understanding																														
4.	Find out the station affected by the local attraction and work out the corrected bearing of the lines the following are the observed bearing of the lines of a traverse ABCDEA with a compass in a place where	BT 3	Applying																														

local attraction was suspected.					
Line	AB	BC	CD	DE	EA
FB	191°45'	22°15'	22°15'	242°45'	330°15'
BB	39°30'	222°30'	200°30'	62°45'	150°45'

UNIT 2- THEODOLITE AND TACHEOMETRIC SURVEYING

Horizontal and vertical angle measurements - Temporary and permanent adjustments - Heights and distances - Tacheometer - Stadia Constants - Analytic Lens - Tangential and Stadia Tacheometry surveying - Contour – Contouring – Characteristics of contours – Methods of contouring – Tacheometric contouring - Contour gradient – Uses of contour plan and map

Q.No	Questions	BT	Competence
1.	What is meant by balancing in theodolite surveying?	BT-1	Remembering
2.	Define transit.	BT-1	Remembering
3.	List out the steps in temporary adjustments of theodolite surveying.	BT-1	Remembering
4.	What is contour? State the uses of contour.	BT-1	Remembering
5.	Label the fundamental axis of Theodolite.	BT-1	Remembering
6.	List the different field works to be carried out in theodolite traversing.	BT-1	Remembering
7.	Differentiate between latitude and departure.	BT-2	Understanding
8.	Describe about anallactic lens	BT-2	Understanding
9.	Summarize the methods of interpolating contours.	BT-2	Understanding
10.	Discuss few points on contour gradient.	BT-2	Understanding
11.	Discover the reason for taking face left and face right observations.	BT-3	Applying
12.	Illustrate the location and function of plate bubble in a theodolite.	BT-3	Applying
13.	Illustrate the contour lines for hill and a depression	BT-3	Applying
14.	What do you infer about centring of a theodolite?	BT-4	Analysing
15.	Compare theodolite and tacheometer.	BT-4	Analysing
16.	How will you analyze the capacity of the reservoir.	BT-4	Analysing
17.	What if the contour line crosses a valley at right angles or a stream?	BT-5	Evaluate
18.	List the errors which are eliminated in measurement of horizontal angles by repetition method.	BT-5	Evaluate
19.	Summarize the principle of stadia method.	BT-6	Create
20.	Summarize the methods of locating contouring	BT-6	Create

PART-B

1.	Two observations were taken upon a vertical staff by means of theodolite, the reduced level of its trunnion axis being 160.95. In the	BT - 1	Remembering
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	case of the first, the angle of elevation was $4^{\circ}36'$ and the staff reading 0.75. In the case of second observation, the staff reading was 3.45 and the angle of elevation $5^{\circ}48'$. Calculate the reduced level of the staff station and its																	
2.	<table border="1"> <thead> <tr> <th>Instrumentation Station</th> <th>Reading in BM</th> <th>Angle of elevation</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>0.862</td> <td>$18^{\circ} 36'$</td> <td>RL of BM=421.380m</td> </tr> <tr> <td>B</td> <td>1.222</td> <td>$10^{\circ} 12'$</td> <td>Distance B=50m</td> </tr> </tbody> </table> <p>(i) Collect the elevation of the top of a chimney from the following data. Stations A and B and top of chimney are in the same vertical plane. ii) Describe the temporary adjustments of theodolite.</p>	Instrumentation Station	Reading in BM	Angle of elevation	Remarks	A	0.862	$18^{\circ} 36'$	RL of BM=421.380m	B	1.222	$10^{\circ} 12'$	Distance B=50m	BT - 1	Remembering			
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3.	<p>The lengths and bearings of lines of closed traverse ABCDE is given below. Examine the length and bearing of line EA.</p> <table border="1"> <thead> <tr> <th>Line</th> <th>Length, m</th> <th>Bearing</th> </tr> </thead> <tbody> <tr> <td>AB</td> <td>194.1</td> <td>$85^{\circ} 30'$</td> </tr> <tr> <td>BC</td> <td>201.2</td> <td>$15^{\circ} 00'$</td> </tr> <tr> <td>CD</td> <td>165.4</td> <td>$285^{\circ} 30'$</td> </tr> <tr> <td>DE</td> <td>172.6</td> <td>$195^{\circ} 30'$</td> </tr> </tbody> </table>	Line	Length, m	Bearing	AB	194.1	$85^{\circ} 30'$	BC	201.2	$15^{\circ} 00'$	CD	165.4	$285^{\circ} 30'$	DE	172.6	$195^{\circ} 30'$	BT 2	Understanding
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4.	Explain the difference between tangential and stadia tachometry. How will you determine the stadia constants?	BT 2	Understanding															
5.	What is meant by interpolation of contours? Describe the various methods used.	BT-1	Remembering															
6.	Describe the indirect methods of locating contours.	BT-1	Remembering															
7.	<p>From a topography map, the areas enclosed by contour lines for a proposed dam are given below. Estimate the volume of water that can be impounded in this location</p> <table border="1"> <thead> <tr> <th>Contour:</th> <th>300</th> <th>305</th> <th>310</th> <th>315</th> <th>320</th> </tr> </thead> <tbody> <tr> <td>Area enclosed (hectares)</td> <td>20</td> <td>110</td> <td>440</td> <td>930</td> <td>1120</td> </tr> </tbody> </table>	Contour:	300	305	310	315	320	Area enclosed (hectares)	20	110	440	930	1120	BT-2	Understanding			
Contour:	300	305	310	315	320													
Area enclosed (hectares)	20	110	440	930	1120													
8.	What considerations would you have while selecting the contour interval?	BT-4	Analysing															
9.	Summarize on grade contour. How will you locate it (a) on the ground (b) on the map?	BT-5	Evaluate															
10.	An embankment of width 8 m and side slopes 1:5:1 is required to be	BT-3	Applying															

	made on a ground which is leveled in a direction transverse to the centre line. The centre height at 24 m intervals is as follows 0.80, 1.42, 1.90, 2.20, 2.65, 2.20, 2.20, 1.65, 1.30 and 0.90. Calculate the volume of earthwork to be carried out informing the embankment.																	
11.	The lengths and bearings of lines of closed traverse ABCDE is given below. Examine the length and bearing of line EA.	BT-4	Analysing															
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12.	Explain the different between tangential and stadia tachometry. How will you determine the stadia constants?	BT-3	Applying															
13.	Explain which method is applicable when the line of sight is inclined, but staff is held vertically and considering the angle of elevation.	BT – 3	Applying															
14.	Recommend the various methods of horizontal angle using a theodolite.	BT - 6	Create															

PART C

1.	(i) Explain the essential parts of theodolite? (ii) Explain the permanent adjustment of theodolite?	BT 2	Understanding
2.	Calculate the horizontal and vertical distances using tangential tacheometry, when Both the observed angles are angle of elevation and angle of depression.	BT 4	Analysing
3.	Discuss the various characteristics and uses of contours with suitable examples.	BT 2	Understanding
4.	Describe a contour line? What is the importance of contour maps in civil engineering works?	BT 4	Analysing

UNIT 3- CONTROL SURVEYING AND ADJUSTMENT

Horizontal and vertical control – Methods – specifications – triangulation- baseline – satellite stations – reduction to centre- trigonometrical levelling – single and reciprocal observations – traversing – Gale’s table. -Errors Sources- precautions and corrections – classification of errors – true and most probable values - weighed observations – method of equal shifts –principle of least squares - normal equation – correlates- level nets-adjustment of simple triangulation networks.

PART A

1.	Name the equipments used for base line measurement.	BT-1	Remembering
2.	Quote the applications of Gale’s table.	BT-1	Remembering
3.	Describe the satellite station and reduction to centre	BT-1	Remembering
4.	Define most probable value	BT-1	Remembering
5.	State the principle of least square.	BT-1	Remembering
6.	Define correlates	BT-1	Remembering
7.	Distinguish the sag correction and temperature correction	BT-2	Understanding

8.	Summarize the specifications of first order triangulation.	BT-2	Understanding
9.	Distinguish between the observed value and the most probable value of a quantity.	BT-2	Understanding
10.	Discuss the conditioned quantity.	BT-2	Understanding
11.	How to apply the figure adjustment in triangulation?	BT-3	Applying
12.	How to apply the figure adjustment in triangulation?	BT-3	Applying
13.	When do you apply the method of equal shift?	BT-3	Applying
14.	Explain in detail about the weight of an observation	BT-4	Analyzing
15.	Explain normal equations.	BT-4	Analyzing
16.	Compare the Horizontal and Vertical controls in hydrographic surveying.	BT-4	Analyzing
17.	Design a well conditioned triangle.	BT-5	Evaluating
18.	How do you prepare the figure adjustments in triangulation?	BT-5	Evaluating
19.	Compare the systematic and accidental errors.	BT-6	Creating
20.	When would you recommend the triangulation system in surveying projects?	BT-6	Creating

PART B

1.	<p>The following observations were made on a satellite station S to determine angle BAC</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Line</th> <th>Length</th> <th>Line</th> <th>Bearing</th> </tr> </thead> <tbody> <tr> <td>SA</td> <td>9.500M</td> <td>SA</td> <td>0° 00'00"</td> </tr> <tr> <td>AB</td> <td>2950M</td> <td>SB</td> <td>78° 46'00"</td> </tr> <tr> <td>AC</td> <td>3525M</td> <td>SC</td> <td>100° 15'00"</td> </tr> </tbody> </table> <p>Identify the angle BAC.</p>	Line	Length	Line	Bearing	SA	9.500M	SA	0° 00'00"	AB	2950M	SB	78° 46'00"	AC	3525M	SC	100° 15'00"	BT-1	Remembering
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2.	<p>(i) Describe the satellite station and reduction to centre? (ii) Show the expression for reducing the angles measured at the satellite station to centre.</p>	BT-1	Remembering																
3.	<p>Two triangulation stations A and B are 60 km apart and have elevations 240m and 280m. Identify the minimum height of signal required at B so that the line of sight may not pass the ground than 2 metres. The intervening ground may be assumed to have a uniform elevation of 200 metres.</p>	BT-1	Remembering																
4.	<p>Examine the most probable values of the angles A, B, C from the following observations at a station P.</p> <table border="1" style="margin-left: 40px;"> <tbody> <tr> <td>A = 38° 25' 20"</td> <td>Weight 1</td> </tr> <tr> <td>B = 32° 36' 12"</td> <td>Weight 1</td> </tr> <tr> <td>A+B = 71° 01' 29"</td> <td>Weight 2</td> </tr> <tr> <td>A+B+C = 119° 10' 43"</td> <td>Weight 1</td> </tr> <tr> <td>B+C = 80° 45' 28"</td> <td>Weight 2</td> </tr> </tbody> </table>	A = 38° 25' 20"	Weight 1	B = 32° 36' 12"	Weight 1	A+B = 71° 01' 29"	Weight 2	A+B+C = 119° 10' 43"	Weight 1	B+C = 80° 45' 28"	Weight 2	BT-1	Remembering						
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5.	Describe the triangulation adjustment and explain the different conditions	BT-2	Understanding																

	and cases with sketches.												
6.	(i) Explain the general principles of least squares. (ii) Explain the various cases for the determination of most probable value.	BT-2	Understanding										
7.	After measuring the length of a base line, the correct length of the line is computed by applying various applicable corrections. Discuss the following corrections and provide expressions for a) Correction for temperature. b) Correction for pull. c) Correction for sag d) Correction for absolute length e) Correction for slope	BT-2	Understanding										
8.	Show the most probable value of the following. <table border="1" style="margin-left: 20px;"> <tr> <td>A=</td> <td>28° 24' 27.4"</td> </tr> <tr> <td>B=</td> <td>32° 14' 16.3"</td> </tr> <tr> <td>C=</td> <td>51° 18' 18.8"</td> </tr> <tr> <td>A+B=</td> <td>60° 38' 45.6"</td> </tr> <tr> <td>B+C=</td> <td>83° 32' 28.2"</td> </tr> </table>	A=	28° 24' 27.4"	B=	32° 14' 16.3"	C=	51° 18' 18.8"	A+B=	60° 38' 45.6"	B+C=	83° 32' 28.2"	BT-3	Applying
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C=	51° 18' 18.8"												
A+B=	60° 38' 45.6"												
B+C=	83° 32' 28.2"												
9.	(i) How the triangulation systems are classified? (ii) Calculate sag correction for 30 m steel under a pull of 100 N in three equal spans of 10 m each. Weight of one cubic cm of steel = 0.078 N. Area of cross-section of tape = 0.08 sq.cm	BT-3	Applying										
10.	(i) Explain the inter visibility of triangular station? (ii) A tape 20m long of standard length at 29°C was used to measure a line, the mean temperature during measurement being 19°C. The measured distance was 882.10 meters, the following being the slopes : 2°20' for 100m ; 4°12' for 150m; 1°6' for 50m; 7°48' for 200 m; 3°00' for 300 m ; 5°10' for 82.10m; Examine the true length of the line if the coefficient of expansion is 6.5×10^{-4} per degree F.	BT-4	Analyzing										
11.	A 30m steel tape was standardized on the flat and was found to be exactly 30m under no pull at 66°F. It was used in catenary to measure a base of 5 bays. The temperature during the measurement was 92°F and the pull exerted during measurement was 100N. The area of cross-section of the tape was 8mm ² . The specific weight of steel is 78.6KN/m ² . $\alpha = 0.63 \times 10^{-5}$ /°F and $E = 2.1 \times 10^5$ N/mm ² . Invent the true length of the tape.	BT-5	Evaluating										
12.	What is base line? Explain the accessories used to measure the baseline.	BT-6	Creating										
13.	The following are the observed values of the angle A with the	BT-4	Analyzing										

	<p>corresponding weights</p> <table border="1"> <tr> <td>(i)</td> <td>51°20'30''</td> <td>Weight 2</td> </tr> <tr> <td>(ii)</td> <td>51°20'28''</td> <td>Weight 3</td> </tr> <tr> <td>(iii)</td> <td>51°20'29''</td> <td>Weight 3</td> </tr> </table> <p>Examine the following terms:</p> <ul style="list-style-type: none"> ii) the standard deviation iii) the standard error of the weighted mean iiii) the probable error of single observation of weight iiiv) The probable error of the weighted mean 	(i)	51°20'30''	Weight 2	(ii)	51°20'28''	Weight 3	(iii)	51°20'29''	Weight 3		
(i)	51°20'30''	Weight 2										
(ii)	51°20'28''	Weight 3										
(iii)	51°20'29''	Weight 3										
14.	<p>(i) Formulate the normal equations for x, y and z in the following equation of equal weight:</p> $3x + 3y + z - 4 = 0$ $x + 2y + 2z - 6 = 0$ $5x + y + 4z - 21 = 0$ <p>(ii) If the weights of the above equation are 2, 3 and 1 respectively form the normal equations for x, y and z.</p>	BT-5	Evaluating									
PART C												
1.	<p>(i) Discuss the laws of accidental errors</p> <p>(ii) The following are the three angles P, Q and R observed at a station O Closing the horizon along with standard errors.</p> <p>Angle P = 84°15'12" ± 3"</p> <p>Angle Q = 125°13'15" ± 4"</p> <p>Angle R = 150°31'18" ± 5" Predict the corrected angles.</p>	BT-2	Understanding									
2.	Write down the various laws of weight. Explain it.	BT-6	Creating									
3.	<p>i) What are the different layouts of primary triangulation for large countries? Explain it briefly. List out the criteria for selection of the layout of triangles.</p> <p>ii) what are signals? Classify them, enumerate the requirements to be fulfilled by signal.</p>	BT-2	Understanding									
4.	<p>Invent the difference of levels of points P and Q and the R.L. of P from the following data:-</p> <p>(i) Horizontal distance between P and Q = 7118</p> <p>(ii) Angle of depression to P and Q = 1°32'12"</p> <p>(iii) Height of signal at P = 3.87 m</p> <p>(iv) Height of instrument at Q = 1.27 m</p>	BT-6	Creating									

(v) Coefficient of Refraction = 0.		
(vi) $R \sin 1'' = 30.88 \text{ m}$		
(vii) $m = 0.07$		
(viii) R.L of Q = 417.860 m		

UNIT 4- ADVANCED TOPICS IN SURVEYING

Hydrographic Surveying – Tides – MSL – Sounding methods – Three point problem – Strength of fix astronomical Surveying – Field observations and determination of Azimuth by altitude and hour angle methods – .Astronomical terms and definitions - Motion of sun and stars - Celestial coordinate systems - different time systems - Nautical Almanac - Apparent altitude and corrections - Field observations and determination of time, longitude, latitude and azimuth by altitude and hour angle method

PART A			Remembering
1.	What is Hydrographic Survey?	BT-1	Remembering
2.	Define Sounding.	BT-1	Remembering
3.	List the functions of transition curves.	BT-1	Remembering
4.	What is Mean sea level?	BT-1	Remembering
5.	Define the right ascension.(R.A)	BT-1	Remembering
6.	Enumerate the properties of spherical triangle.	BT-1	Remembering
7.	Distinguish between compound and reverse curves.	BT-2	Understanding
8.	Describe the Azimuth.	BT-2	Understanding
9.	Explain Nautical Almanac .	BT-2	Understanding
10.	Discuss about Celestial equator.	BT-2	Understanding
11.	Classify the different equipment's needed for soundings.	BT-3	Applying
12.	Illustrate the methods for determining the latitude of a place.	BT-3	Applying
13.	Write the corrections applied to the observed altitude of sun.	BT-3	Applying
14.	Write the equation of time	BT-4	Analyzing
15.	Differentiate between latitude and co latitude.	BT-4	Analyzing
16.	Compare the relation between right ascension and hour angle?	BT-4	Analyzing
17.	Write a short note on echo-sounding.	BT-5	Evaluating
18.	Summarize about sidereal time.	BT-5	Evaluating
19.	State three point problem in hydrographic surveying.	BT-6	Creating
20.	Conclude about lunar and solar tides.	BT-6	Creating
PART B			
1.	With the help of suitable sketches, describe the following methods of Locating soundings. (i) Location by range and one angle from the shore.	BT-1	Remembering

	(ii) Location by two angles from the shore.								
2.	What is a three point problem in hydrographic surveying? List the Various solutions for the problem? Explain in detail.	BT-1	Remembering						
3.	Describe briefly the different methods of prediction of tides.	BT-1	Remembering						
4.	Enumerate and explain the relationships between the coordinates of celestial sphere.	BT-1	Remembering						
5.	Estimate the hour angle and declination of a star from the following data. <table border="1" data-bbox="219 493 828 667"> <tbody> <tr> <td>Altitude of the star</td> <td>21° 30'</td> </tr> <tr> <td>Azimuth of the star</td> <td>140° E</td> </tr> <tr> <td>Latitude of the observer</td> <td>48° N.</td> </tr> </tbody> </table>	Altitude of the star	21° 30'	Azimuth of the star	140° E	Latitude of the observer	48° N.	BT-2	Understanding
Altitude of the star	21° 30'								
Azimuth of the star	140° E								
Latitude of the observer	48° N.								
6.	(i) Summarize briefly the procedures for setting out compound curve. (ii) How reconnaissance survey is conducted for railway project?	BT-2	Understanding						
7.	i) Explain the correction needed for observation to sun to determine the azimuth of a line.(5) ii) Explain about Nautical Almanac .(5)	BT-2	Understanding						
8.	(i) Classify the different types of tides? Explain any two. (ii) Explain the various sounding methods.	BT-3	Applying						
9.	A, B and C are three visible stations in a hydrographical survey. The computed sides of the triangle ABC are: AB, 1130 m ; BC, 1372 m ; CA, 1889 m. Outside this triangle (and nearer to AC), a station P is established and its position is to be found by three point intersection on A, B and C, the angles APB and BPC being respectively 42°35' and 54°20'. Calculate the distances PA and PC.	BT-3	Applying						
10.	Explain the Tilt Distortion with neat sketch in Photographic method.	BT-3	Applying						
11.	Calculate the Sun's Azimuth and Hour angle at sunset at a place in Latitude 52°N, When its Declination is (i) 20°N and (ii) 14°S	BT-4	Analyzing						
12.	Interpret about the celestial coordinate system.	BT-5	Evaluating						
13.	Conclude about the following i) Equation of time ii) Sidereal time	BT-5	Evaluating						
14.	Infer about equation of time? Show that it vanishes four times a year.	BT-6	Creating						
PART C									
1.	(i) Explain clearly how would you determine the levels at river bed points and fix the position of sounding by use of sextant in a boat.(8) (ii) Derive the expression for correction of refraction to be applied to the	BT-2	Understanding						

	observed or apparent altitudes of celestial body.(8)		
2.	Find the hour angle and declination of star from the following data : Altitude of the star 22° 30' Altitude of the star 145° E Latitude of the observer 49° N.	BT-5	Evaluating
3.	Enumerate the various investigations involved in hydrographic surveying.	BT-6	Creating
4.	Briefly explain the applications of remote sensing.	BT-2	Understanding

UNIT 5- MODERN SURVEYING

Total Station : Advantages - Fundamental quantities measured - Parts and accessories- working principle - On board calculations- Field procedure - Errors and Good practices in using Total Station GPS Surveying : Different segments - space, control and user segments - satellite configuration - signal structure- Orbit determination and representation - Anti Spoofing and Selective Availability - Task of control segment - Hand Held and Geodetic receivers – dataprocessing - Traversing and triangulation

PART A

1.	Define total station?	BT-1	Remembering
2.	List out the errors in total station.	BT-1	Remembering
3.	Define GPS	BT-1	Remembering
4.	State the basics of GPS	BT-1	Remembering
5.	List the different segments of GPS	BT-1	Remembering
6.	Define GPS data processing.	BT-1	Remembering
7.	Discuss about microwave and electro optical system adopted in total station.	BT-2	Understanding
8.	Distinguish between Space and User segment?	BT-2	Understanding
9.	Discuss few points on GPS navigation.	BT-2	Understanding
10.	Explain shortly about Orbit Representation.	BT-2	Understanding
11.	Demonstrate the components of satellite signals.	BT-3	Applying
12.	Write about anti-spoofing.	BT-3	Applying
13.	Write about selective availability?	BT-3	Applying
14.	Explain in short about Satellite Configuration.	BT-4	Analyzing
15.	State the applications of GPS.	BT-4	Analyzing
16.	Explain the term satellite configuration?	BT-4	Analyzing
17.	Write the principles of GPS.	BT-5	Evaluating
18.	How are personal GPS receivers different from survey-grade GPS Receivers? Justify.	BT-5	Evaluating
19.	Compose a short note on Task of control segment	BT-6	Creating
20.	Formulate steps for GPS data processing for establishment of control points .	BT-6	Creating

PART B			
1.	What are the space, control and user segments of GPS and their functions?	BT-1	Remembering
2.	List out the various measurements of GPS. Explain them.	BT-1	Remembering
3.	Briefly explain the Characteristics of GPS Navigation and Satellite navigation?	BT-1	Remembering
4.	List out the features of total station and merits and demerits of total station.	BT-1	Remembering
5.	(i) What are the types of GPS receivers? (ii) Explain the task of control segment in GPS	BT-2	Understanding
6.	(i) Describe briefly about sources of errors in GPS (ii) Explain the hand held receiver and geodetic receiver of GPS.	BT-2	Understanding
7.	Discuss in detail the phase and pulse method.	BT-2	Understanding
8.	Classify the main components of GPS receiver and explain them briefly	BT-3	Applying
9.	Illustrate the fundamental measurement system of total station.	BT-3	Applying
10.	Distinguish between single frequency receivers and Double frequency receivers.	BT-4	Analyzing
11.	Describe in detail about Anti-spoofing and Selective Availability	BT-4	Analyzing
12.	Summarize the Requirements of GPS Signals and explain in brief.	BT-5	Evaluating
13.	Write down the steps involved in GPS data processing.	BT-5	Evaluating
14.	Explain the orbit determination and representation.	BT-6	Creating
PART C			
1.	Explain the various types of GPS devices and their uses.	BT-2	Understanding
2.	Write an Essay on Future of GPS Tracking Systems.	BT-3	Applying
3.	Discuss the emerging Trends in GPS Technology.	BT-5	Evaluating
4.	Elaborate in detail the History of GPS and Technical Specifications of its Orbits	BT-6	Creating