INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING
QUESTION BANK

Course Name	:	Surveying
Course Code	:	A30108
Class	:	II Year
Branch	:	CIVIL ENGINEERING
Year	:	2016-2017
Course Coordinator	:	B. Suresh Civil Engineering Department
Course Faculty	:	B.Suresh Civil Engineering Department

OBJECTIVES

Successful completion of the course will enable the students to:

1. Understand angle and distance measurement; and differential, profile, cross-section, and topographic leveling procedures and apply them to field conditions
2. Prepare proper field notes and data collection approaches
3. Use standard survey tools
4. Understand and apply measurement error, accuracy, precision and techniques to improve accuracy of surveys
5. Work effectively in groups for field survey and data interpretation
6. Analyze and synthesize survey data
7. Understand (introductory level) geographic information systems (GIS)

1. Group - A (Short Answer Questions)

S. No	Question	Blooms Taxonomy Level	Program Outcome
	UNIT-I INTRODUCTION		
1	Define Surveying	Understanding	1
2	State the Principle of surveying	Understanding	1
3	State the two Primary division of surveying	Understanding	1
4	What are the different types of chains	Understanding	1
5	State the types of errors in chain	Understanding	1
6	What are the different types of tapes	Understanding	1
7	What are the different types of compasses	Understanding	1
8	Define Magnetic Bearing	Understanding	2
9	Define True Bearing	Understanding	2
10	Define Arbitary Bearing	Understanding	2
11	Define Magnetic Meridian	Understanding	2
12	Define local attraction	Understanding	2
13	Define magnetic Dip	Understanding	2
14	Define magnetic Declination	Understanding	3
15	What is local Attraction	Understanding	3
	UNIT-II		

LEVELING			
1	Define Leveling	Understanding	4
2	Define level surface	Understanding	4
3	Define horizontal plane	Understanding & remembering	4
4	Define Horizontal line	Understanding & remembering	4
5	Define vertical line	Understanding & remembering	4
6	Define Datum	Understanding & remembering	4
7	Define Bench Mark	Understanding & remembering	4
8	Define Mean Sea level	Understanding & remembering	4
9	State any two methods of levelling	Understanding & remembering	4
10	What are the checks in Rise and Fall method	Understanding & remembering	4
11	What are the checks in height of instrument method	Understanding & remembering	4
12	Define line of collimation	Understanding & remembering	4
13	What is contour interval	Understanding & remembering	4
14	Define contours	Understanding & remembering	4
15	Define contour Gradient	Understanding & remembering	4
UNIT-III COMPUTATION OF AREAS AND VOLUMES			
1	What is a well conditioned triangle	understanding	5
2	What is a ill conditioned triangle	understanding	5
3	What is an equilateral conditioned triangle	understanding	5
4	What is a Base line	Understanding	5
5	What is a tie line	understanding	5

6	What is a check line	Remembering	5
7	Write the formula for an area using mid-ordinate rule	Understanding & remembering	6
8	Write the formula for an area using average ordinate rule	Understanding & remembering	6
9	Write the formula for an area using trapezoidal rule	Understanding & remembering	6
10	Write the formula for an area using simpson's rule	Understanding & remembering	6
11	Write the formula to calculate volume using Meridian distance method	Understanding & remembering	6
12	Write the formula to calculate volume using Double Meridian distance method	Understanding & remembering	6
13	Write the formula to calculate volume using Departure and total latitude method	Understanding & remembering	6
14	Write the formula to calculate volume using Co-Ordinates method	Understanding & remembering	6
15	Write the formula to calculate volume using trapezoidal rule	Understanding & remembering	6
UNIT-IV THEODOLITE			
1	Define transit theodolite	Understanding & remembering	7
2	Define Non-transit theodolite	Understanding & remembering	7
3	Define is vertical axis	Understanding & remembering	7
4	Define horizontal axis	Understanding & remembering	7
5	Define line of sight or line of collimation	Understanding & remembering	7
6	Define axis of level tube	Understanding & remembering	7
7	Define centring	Understanding & remembering	7
8	Define transiting	Understanding & remembering	7
9	Define swinging of telescope	Understanding & remembering	7
10	Define face left observation	Understanding & remembering	8
11	Define face Right observation	Understanding & remembering	8
12	Define telescope normal	Understanding & remembering	8

13	Define telescope inverted	Understanding & remembering	8
14	Define vertical circle of a telescope	Understanding & remembering	8
15	Define trigonometric leveling	Understanding & remembering	8
UNIT-V TACHEOMETRIC SURVEYING			
1	Define Tachometry	Remembering & Understanding	9
2	Write the formula for to calculate horizontal distance if staff held vertical	Remembering & Understanding	9
3	Write the formula for to calculate vertical distance if staff held vertical	Understanding	9
4	What is a simple curve	Understanding	9
5	What is a compound curve	Understanding & remembering	9
6	What is a reverse curve	Understanding	9
7	What is forward tangent	Remembering & Understanding	9
8	What is backward tangent	Remembering & Understanding	9
9	What is long cord in a curve	Remembering & Understanding	9
10	What is point of tangency	Remembering & Understanding	9
11	What is point of intersection	Remembering & Understanding	9
12	What is the main function of a total station	Remembering & Understanding	9
13	What are the demerits in a total station	Remembering & Understanding	9
14	Define GIS	Remembering & Understanding	9
15	Define GPS	Remembering & Understanding	9

2. Group - II (Long Answer Questions)

S. No	Question	Blooms Taxonomy Level	Program Outcome
	UNIT-I INTRODUCTION		
1	What is the Principle of surveying	Understanding & remembering	1
2	Give the classification of surveying in brief based up on Nature of field	Understanding & remembering	1
3	Give the classification of surveying in brief based up on purpose/objectives	Understanding & remembering	1
4	Give the classification of surveying in brief based up on Instruments used	Understanding & remembering	1
5	A 20m chain used for a survey was found to be 20.10 m at the beginning and 20.30 m at the end of the work. The area of the plan drawn to a scale of 1cm= 8m was measured with the help of a planimeter and was found to be 32.56 sq.cm find the true area of the field.	analyze & Apply	2
6	A 30m chain used for a survey was found to be 20.10 m at the beginning and 20.50 m at the end of the work. The area of the plan drawn to a scale of 1cm= 6m was measured with the help of a planimeter and was found to be 32.56 sq.cm find the true area of the field.	analyze & Apply	2
7	A 20m chain was found to be 10cm too long after chaining a distance of 1500m. It was found to be 18 cm too long at the end of the day's work after chaining a total distance of 2900m. Find the true distance if the chain was corrected before the commencement of the work.	analyze & Apply	2
8	A line was measured with a steel tape which is exactly 30m long at 18^0C and found to be 452.343 m. The temperature during measurement was 32^0C. find the true length of the line .Take coefficient of thermal expansion of tape ^{0}C= 0.0000117	analyze & Apply	2
9	The area of the field was found to be 4000m^2 we measured with a chain of 30m length if the length of the chain was 0.11m short. Determine the correct area.	analyze & Apply	2
10	The area of the field was found to be 6000m^2 we measured with a chain of 20m length if the length of the chain was 0.21m short. Determine the correct area.	analyze & Apply	2
11	The distance between the points measured along a slope is 428m find the horizontal distance between them if i) The angle of slope between the points is 8^0 ii) The difference in level is 62m iii) The slope is1 in 4	analyze & Apply	2
12	A steel tape 20 m long standardized at 55^0F with a pull of 10Kg was used for measuring a base line. Find the correction per tape length, if the temperature at the time of measurement was 80^0 F and the pull exerted was 16Kg Take weight of tape as 0.8 Kg and E = 2.109*X10^6 Kg/Cm^2 coefficient of thermal expansion per 1^0 F= 6.2X10^{-6} and area of tape	analyze & Apply	2

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td></td><td>was 0.051sq cm.</td><td></td><td></td></tr>
<tr><td>13</td><td><table><tr><td>Line</td><td>Fore Bearing</td></tr><tr><td>AB</td><td>61^0 12’</td></tr><tr><td>BC</td><td>123^0 24’</td></tr><tr><td>CD</td><td>41^0 02’</td></tr><tr><td>DA</td><td>200^0 14’</td></tr><tr><td>EA</td><td>300^0 30’</td></tr></table>The following bearings were observed with a compass. Calculate the interior angles.</td><td>analyze & Apply</td><td>3</td></tr>
<tr><td>14</td><td><table><tr><td>Line</td><td>Fore Bearing</td><td>Back Bearing</td></tr><tr><td>AB</td><td>71^0 05’</td><td>250^0 20’</td></tr><tr><td>BC</td><td>110^0 20’</td><td>292^0 35’</td></tr><tr><td>CD</td><td>161^0 35’</td><td>341^0 45’</td></tr><tr><td>DA</td><td>220^0 50’</td><td>40^0 05’</td></tr><tr><td>EA</td><td>300^0 50’</td><td>121^0 10’</td></tr></table>The following bearings were observed in running a closed traverse. Determine the corrected magnetic bearing of the line.</td><td>analyze & Apply</td><td>3</td></tr>
<tr><td>15</td><td>The following observations are observed fore-bearing of the line
i) AB 12^0 24’
ii) BC 119^0 48’
iii) CD 266^0 30’
iv) DE 354^0 18’
v) PQ N18^0 00’ E
vi) QR S 12^0 24’ E
vii) RS S 59^0 18’ W
viii) ST N 86^0 12’ W</td><td>analyze & Apply</td><td>3</td></tr>
<tr><td colspan="4">UNIT-II
LEVELLING AND CONTOURING</td></tr>
<tr><td>1</td><td>.
Eight readings were taken with a level in sequence as follows: 1.585, 1.315, 2.305, 1.225, 1.325, 1.065, 1.815 and 2.325. The level was shifted after the third and sixth readings. The second change point was a bench mark of elevation 186.975. Find the reduced levels of the remaining stations. Use the rise and fall method</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>2</td><td>The following staff readings were obtained during a leveling work with the instrument being shifted after the 4^{th}, 7^{th} and 10^{th}. Readings: 2.305, 0.940, 0.865, 1.325, 2.905, 1.185, 1.205, 2.015, 1.365, 0.985 and 1.785. Find the reduced levels of the remaining points if the RL of the second turning point is 100.00</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>3</td><td>The following ten readings were taken with a level, the instrument being shifted after the fifth and eighth readings: 1.315, 0.965, 2.345, 1.1.05, 0.875, 1.155, 1.305, 1.675, 1.345 and 1.875. The RL of the first turning point is 100.000. Find the reduced levels of the remaining points by the height of collimation method.</td><td>analyze & Apply</td><td>4</td></tr>
</table>

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td>4</td><td>Define the terms
i) Level surface
ii) Datum
iii) Bench mark
iv) Mean sea level</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>5</td><td>Explain briefly about the different types of leveling instruments</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>6</td><td>The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eight 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 calculate the R L of points if the first reading was taken with a staff held on a bench mark of 432.384m</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>7</td><td>Classify the different type of errors in leveling</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>8</td><td>The following staff readings were observed successively with level, the instrument having moved after the second, fourth and eight readings 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765 The first reading was taken with the staff held upon a benchmark of elevation 132.135 apply usual checks</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>9</td><td>Write the temporary adjustments of a level</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>10</td><td>The page of an old field book is shown below. Some readings are not clear. Determine these readings from the available data
<table>
<tr><th>Staff 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>P</td><td>0.635</td><td></td><td></td><td></td><td></td><td>215.915</td><td></td></tr>
<tr><td>Q</td><td></td><td></td><td></td><td></td><td>0.680</td><td></td><td></td></tr>
<tr><td>R</td><td></td><td></td><td>0.865</td><td></td><td></td><td></td><td>BM RL 2</td></tr>
<tr><td>S</td><td></td><td>0.785</td><td></td><td>0.430</td><td></td><td></td><td></td></tr>
<tr><td>T</td><td>0.935</td><td></td><td></td><td></td><td>0.320</td><td></td><td></td></tr>
<tr><td>U</td><td></td><td></td><td></td><td></td><td></td><td>215.715</td><td></td></tr>
</table></td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>11</td><td>The following ten readings were taken with a level, the instrument being shifted after the fifth and eighth readings: 1.315, 0.965, 1.345, 1.1.05, 0.875, 1.155, 1.305, 1.675, 1.345 and 1.875. The RL of the first turning point is 100.000. Find the reduced levels of the remaining points by the Rise and fall method.</td><td>analyze & Apply</td><td>4</td></tr>
<tr><td>12</td><td>Write a note on interpolation of contours</td><td>Understanding</td><td>4</td></tr>
<tr><td>13</td><td>Write a note on Uses and advantage s of contours</td><td>Understanding</td><td>4</td></tr>
<tr><td>14</td><td>Write a note on characteristics of contours</td><td>Understanding</td><td>4</td></tr>
<tr><td>15</td><td>Write a note on uses of contour maps</td><td>Understanding</td><td>4</td></tr>
</table>

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td colspan="4">UNIT-III
COMPUTATION OF AREAS AND VOLUMES</td></tr>
<tr><td>1</td><td>Discuss the following methods of computation of area of a tract with straight but irregular boundaries.
i) Mid-ordinate rule
ii) Average - ordinate rule
iii) Trapezoidal rule</td><td>Understanding</td><td>5</td></tr>
<tr><td>2</td><td>The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line 3.25,5.60,4.20,6.65,8.75,6.20,3.25,4.20,5.65 calculate the area enclosed between the survey line , the irregular boundary line , and the first and last offsets, by the application of
i) Trapezoidal rule
ii) Simpson’s rule</td><td>analyze & Apply</td><td>5</td></tr>
<tr><td>3</td><td>A series of offsets were taken from a chain line to a curved boundary line at intervals of 15m in the following order 0,2.65,3.80,3.75,4.65,3.60,4.95,5.85m compute the area between the chain line, the curved boundary line and the end offsets by
i) Trapezoidal rule
ii) Simpsons rule</td><td>analyze & Apply</td><td>5</td></tr>
<tr><td>4</td><td>The following offsets were taken from a chain line to hedge
<table><tr><td>distance</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>120</td><td>160</td></tr><tr><td>offset</td><td>6.4</td><td>10.8</td><td>18.6</td><td>21.2</td><td>9.6</td><td>6.4</td><td>7.5</td></tr></table>Compute the area included between the chain line, the hedge and offset by Simpson’s rule</td><td>analyze & Apply</td><td>6</td></tr>
<tr><td>5</td><td><table><tr><td>distance</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>120</td><td>160</td><td>220</td><td>280</td></tr><tr><td>offset</td><td>6.4</td><td>10.8</td><td>18.6</td><td>21.2</td><td>9.6</td><td>6.4</td><td>7.5</td><td>3.3</td><td>9.6</td></tr></table>The following offsets were taken from a chain line to hedge
Compute the area included between the chain line, the hedge and offset by trapezoidal rule</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>6</td><td>The following offsets were taken from a chain line to hedge
<table><tr><td>distance</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>120</td><td>160</td><td>220</td><td>280</td></tr><tr><td>offset</td><td>9.4</td><td>10.8</td><td>13.6</td><td>11.2</td><td>9.6</td><td>8.4</td><td>7.5</td><td>6.3</td><td>4.6</td></tr></table>Compute the area included between the chain line, the hedge and offset by Simpson’s rule.</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>7</td><td>The following perpendicular offsets were taken from a chain line to a hedge
<table><tr><td>chainage</td><td>0</td><td>15</td><td>30</td><td>45</td><td>60</td><td>70</td><td>80</td><td>100</td><td>120</td></tr><tr><td>offset</td><td>7.6</td><td>8.5</td><td>10.7</td><td>12.8</td><td>10.</td><td>9.5</td><td>8.</td><td>7.9</td><td>6.4</td></tr></table></td><td>Analyze & Apply</td><td>6</td></tr>
</table>

<table>
<tr><th>S. No</th><th>Question</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>0</td><td></td><td></td><td></td><td>6</td><td></td><td>3</td><td></td><td></td><td></td></tr>
</table>
Compute the area included between the chain line, the hedge and offset by Simpson’s rule.
</td><td></td><td></td></tr>
<tr><td>8</td><td>
The following perpendicular offsets were taken from a chain line to a hedge
<table>
<tr><td>chainage</td><td>0</td><td>15</td><td>30</td><td>45</td><td>60</td><td>70</td><td>80</td><td>100</td><td>120</td><td>1</td></tr>
<tr><td>offset</td><td>7.60</td><td>8.5</td><td>10.7</td><td>12.8</td><td>10.6</td><td>9.5</td><td>8.3</td><td>7.9</td><td>6.4</td><td>4</td></tr>
</table>
Compute the area included between the chain line, the hedge and offset by Trapezoidal rule.
</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>9</td><td>
Determine the area of the closed traverse ABCDA by the M.D. method
<table>
<tr><th>Line</th><th>Latitude</th><th>Departure</th></tr>
<tr><td>AB</td><td>+108</td><td>+4</td></tr>
<tr><td>BC</td><td>+15</td><td>+249</td></tr>
<tr><td>CD</td><td>-123</td><td>+4</td></tr>
<tr><td>DA</td><td>0</td><td>-257</td></tr>
</table>
</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>10</td><td>
Determine the area of the closed traverse ABCDA by the D.M.D. method
<table>
<tr><th>Line</th><th>Latitude</th><th>Departure</th></tr>
<tr><td>AB</td><td>+108</td><td>+4</td></tr>
<tr><td>BC</td><td>+15</td><td>+249</td></tr>
<tr><td>CD</td><td>-123</td><td>+4</td></tr>
<tr><td>DA</td><td>0</td><td>-257</td></tr>
</table>
</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>11</td><td>
Determine the area of the closed traverse ABCDA by Departure and total latitude method
<table>
<tr><th>Line</th><th>Latitude</th><th>Departure</th></tr>
<tr><td>AB</td><td>+108</td><td>+4</td></tr>
<tr><td>BC</td><td>+15</td><td>+249</td></tr>
<tr><td>CD</td><td>-123</td><td>+4</td></tr>
<tr><td>DA</td><td>0</td><td>-257</td></tr>
</table>
</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>12</td><td>
Determine the area of the closed traverse ABCDA by Co- ordinate method
<table>
<tr><th>Line</th><th>Latitude</th><th>Departure</th></tr>
<tr><td>AB</td><td>+108</td><td>+4</td></tr>
<tr><td>BC</td><td>+15</td><td>+249</td></tr>
<tr><td>CD</td><td>-123</td><td>+4</td></tr>
<tr><td>DA</td><td>0</td><td>-257</td></tr>
</table>
</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>13</td><td>A railway embankment is 10m wide with side slope 1.5 to1 assume the ground to be level in a direction traverse to the centre line, calculate the volume contained in a length of 120m, the centre height at 20m intervals being in meters 1.2, 4.7, 3.8, 4.0, 1.8, 2.8, 2.5 solve using Prismoidal rule</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>14</td><td>A railway embankment is 10m wide with side slope 1.5 to1 assume the ground to be level in a direction traverse to the centre line, calculate the volume contained in a length of 120m, the centre height at 20m intervals being in meters 2.2, 3.7, 3.8, 2.0, 3.8, 3.8, 2.5 solve using Trapezoidal rule</td><td>Analyze & Apply</td><td>6</td></tr>
<tr><td>15</td><td>A railway embankment is 10m wide with side slope 1.5 to1 assume the</td><td>Analyze &</td><td>6</td></tr>
</table>

S. No	Question	Blooms Taxonomy Level	Program Outcome
	ground to be level in a direction traverse to the centre line, calculate the volume contained in a length of 120m, the centre height at 20m intervals being in meters 1.8, 3.7, 4.8, 4.0, 2.8, 2.8, 3.5 solve using Prismoidal rule	Apply	
	UNIT-IV THEODOLITE		
1	Draw neat sketch of a vernier theodolite. Describe its main parts and their functions	Understanding	7
2	Explain the temporary adjustments of theodolite	Understanding	7
3	Explain the procedure for the reiteration method of measuring horizontal angles.	Understanding	7
4	Explain briefly the methods used to locate details with a theodolite.	Understanding	7
5	Explain the steps involved in measuring horizontal angle with a theodolite.	Understanding	8
6	Explain briefly the possible instrumental errors in theodolite work and the precautions that should be taken to eliminate them.	Understanding	8
7	What is mean by face left and face right of theodolite? How would you change face? What instrumental errors are eliminated by face left and face right observations?	Understanding	8
8	Define the terms i) transit theodolite ii) Non-transit theodolite iii) vertical axis iv) horizontal axis	Understanding	8
9	Define the terms i) transiting ii) swinging of telescope iii) face left observation iv) face Right observation	Understanding	8
10	Define triangulation method in detail	Understanding	8
	UNIT-V TACHEOMETRIC SURVEYING		
1	Write short notes on electronic theodolite	Understanding	9
2	Explain briefly the working principle of electronic theodolite	Understanding	9
3	Describe briefly the advantages of electronic theodolite	Understanding	9
4	Describe briefly the salient features of total station	Understanding	9
5	Explain functioning and capabilities of a total station	Understanding	9
6	Describe briefly the advantages of total station	Understanding	9

S. No	Question	Blooms Taxonomy Level	Program Outcome
7	Write a brief note on GPS.	Understanding	9
8	Explain briefly how GPS works to determine the position coordinates	Understanding	9
9	Write briefly about the applications of GIS.	Understanding	9
10	Write short notes on GIS.	Understanding	9
11	State the type of curves and explain the components of a simple curve	Understanding	9
12	What are the merits and demerits of total station	Understanding	9
13	State the advantages of GPS	Understanding	9
14	State the any two techniques followed in advantage surveying	Understanding	9
15	What are the application of advance surveying	Understanding	9

3. Group - III (Analytical Questions)

<table>
<tr><th>S.No</th><th>QUESTIONS</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td colspan="4">UNIT-I
INTRODUCTION, DISTANCES AND DIRECTION</td></tr>
<tr><td>1</td><td>The length of a line measured with a 20m.chain was found to be 3,200 links.The same, when measured with a 30 m chain was found to be 640 m. If the 20 m chain was ¼ link too long, what was the error in the 30 m chain?</td><td>Apply & evaluate</td><td>1</td></tr>
<tr><td>2</td><td>The fore and back bearings of the lines of a traverse are given below. Correct the
<table>
<tr><td>Line</td><td>Fore Bearing</td><td>Back Bearing</td></tr>
<tr><td>AB</td><td>61^0 12’</td><td>241^0 12’</td></tr>
<tr><td>BC</td><td>153^0 24’</td><td>333^0 24’</td></tr>
<tr><td>CD</td><td>201^0 02’</td><td>21^0 02’</td></tr>
<tr><td>DA</td><td>280^0 14’</td><td>100^0 14’</td></tr>
<tr><td>EA</td><td>20^0 30’</td><td>200^0 20’</td></tr>
</table>
bearings and check the geometrical condition of interior angles</td><td>Apply & evaluate</td><td>1</td></tr>
<tr><td>3</td><td>From the traverse data given below , find closing error if any and its bearing
<table>
<tr><td>Line</td><td>Length in m</td><td>Bearing</td></tr>
<tr><td>PQ</td><td>340.2</td><td>70^0 30’</td></tr>
<tr><td>QR</td><td>350.6</td><td>120^0 45’</td></tr>
<tr><td>RS</td><td>440.8</td><td>223^0 30’</td></tr>
<tr><td>SP</td><td>423.2</td><td>320^0 47’</td></tr>
</table></td><td>Apply & evaluate</td><td>1</td></tr>
<tr><td>4</td><td>To find out the included angles in a closed traverse PQRSTP, the following observations were made with compass. Calculate the included angles after correcting for local attractions.</td><td>Apply & evaluate</td><td>2</td></tr>
</table>

S.No	QUESTIONS	Blooms Taxonomy Level	Program Outcome
	<table><tr><th>Line</th><th>FB</th><th>BB</th></tr><tr><td>PQ</td><td>N $62^0$45'E 45</td><td>S $62^0$15'W</td></tr><tr><td>QR</td><td>N $21^0$00'E</td><td>S $20^0$45'W</td></tr><tr><td>RS</td><td>N$71^0$30'W</td><td>S $71^0$30'E</td></tr><tr><td>ST</td><td>S $39^0$00'W</td><td>N $38^0$00'E</td></tr><tr><td>TP</td><td>S $54^0$30'E</td><td>N $53^0$15'W</td></tr></table>		
5	A 20 –m tape was tested before starting the day's work and found to be 0.02 m short. At the end of the day it was tested again and found to be 0.06 m too long. If the total length measured during the day was 1243.5, find the true length.	Apply & Evaluate	2
6	A chain line ABC crosses a river, B and C being on the near and distant banks respectively. The respective bearings of C and A taken at D, a point 60 m measured at right angles to AB from B are 280^0 and 190^0 , AB being 32 m. Find the width of the river.	Apply & Evaluate	2
7	A survey line PQ intersects a pond at M and H on opposite sides. A line MC, 1000 m long is set out on the left of MH, and second line MD 1200 m long is laid on the right of MH, the points C, H and D being in the same line. CH and HD were then measured and found to be 600 m and 650 m respectively. Calculate the length of MH.	Apply & Evaluate	2
8	P and Q lie on the opposite sides of the river. A line PA, 90 m long is erected perpendicular to PQ. B is fixed on QP produced such that QAB is 90^0. PB is measured and found to be 30m. Determine the distance PQ.	Apply & Evaluate	2
9	Explain the following terms : a)Base line b) check line c) Tie line d) swing offset e) oblique offset f) random line	Understanding	3
10	Explain in a tabular form the differences between a prismatic compass and surveyors compass	Understanding	3
	UNIT-II **LEVELLING AND CONTOURING**		
1	. Eight readings were taken with a level in sequence as follows: 1.585, 1.315, 2.305, 1.225, 1.325, 1.065, 1.815 and 2.325. The level was shifted after the third and sixth readings. The second change point was a bench mark of elevation 186.975. Find the reduced levels of the remaining stations. Use the rise and fall method	Apply & evaluate	4
2	The following staff readings were obtained during a leveling work with the instrument being shifted after the 4^{th}, 7^{th} and 10^{th}. Readings: 2.305, 0.940, 0.865, 1.325, 2.905, 1.185, 1.205, 2.015, 1.365, 0.985 and 1.785. Find the reduced levels of the remaining points if the RL of the second turning point is 0.000	Apply & evaluate	4
3	The following ten readings were taken with a level, the instrument being shifted after the fifth and eighth readings: 1.315, 0.965, -2.345, 1.1.05, 0.875, 1.155, 1.305, 1.675, 1.345 and 1.875. The RL of the first turning point is 100.000. Find the reduced levels of the remaining points by the height of collimation method.	Apply & evaluate	4

<table>
<tr><th>S.No</th><th>QUESTIONS</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>The page of an old field book is shown below. Some readings are not clear. Determine these readings from the available data
<table>
<tr><th>Staff 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>P</td><td>0.635</td><td></td><td></td><td></td><td></td><td>215.915</td><td></td></tr>
<tr><td>Q</td><td></td><td></td><td></td><td></td><td>0.680</td><td></td><td></td></tr>
<tr><td>R</td><td></td><td></td><td>0.865</td><td></td><td></td><td></td><td>BM RL 215.685</td></tr>
<tr><td>S</td><td></td><td>0.785</td><td></td><td>0.430</td><td></td><td></td><td></td></tr>
<tr><td>T</td><td>0.935</td><td></td><td></td><td></td><td>0.320</td><td></td><td></td></tr>
<tr><td>U</td><td></td><td></td><td></td><td></td><td></td><td>215.715</td><td></td></tr>
</table></td><td>Apply & Evaluate</td><td>4</td></tr>
<tr><td>5</td><td>Two stations A and B are 1200 m apart. A level was set up between the two stations 100 m away from A. the readings observed were 1.375 m on A and 2.465 on B. Find the true difference in elevation between A and B.</td><td>Apply & Evaluate</td><td>4</td></tr>
<tr><td>6</td><td>What are contour? Explain uses and characteristics of contours</td><td>Understanding</td><td>4</td></tr>
<tr><td>7</td><td>Describe with the help of sketches, the characteristics of contours.</td><td>Understanding</td><td>4</td></tr>
<tr><td>8</td><td>Describe the various methods of indirect contouring</td><td>Understanding</td><td>4</td></tr>
<tr><td>9</td><td>Explain various methods of interpolation of contours</td><td>Understanding</td><td>4</td></tr>
<tr><td>10</td><td>What is cross-sectioning? What is its importance? How would you draw a longitudinal section and a cross section?</td><td>Understanding</td><td>4</td></tr>
<tr><td colspan="4">UNIT-III
COMPUTATION OF AREAS AND VOLUMES</td></tr>
<tr><td>1</td><td>Draw the sketch of a two level section, and derive an expression for the area of cross-section</td><td>Understanding</td><td>5</td></tr>
<tr><td>2</td><td>Explain the method of computation of volume by the
(i) Trapezoidal’s rule
(ii) Prismoidal rule</td><td>Understanding</td><td>5</td></tr>
<tr><td>3</td><td>How would you determine the capacity of a reservoir from the contour plan</td><td>Understanding</td><td>5</td></tr>
<tr><td>4</td><td>Calculate the side widths and cross-sectional area of an embankment having the following dimensions.
Formation width = 22 m
Side slope = 2 to 1
Centre height = 10 m
Transverse slope = 11 to 1</td><td>Apply & Evaluate</td><td>5</td></tr>
</table>

<table>
<tr><th>S.No</th><th>QUESTIONS</th><th>Blooms Taxonomy Level</th><th>Program Outcome</th></tr>
<tr><td>5</td><td>A road having a formation width of 36m with side slopes of 1 to1 is to be constructed. The details of the two cross-sections A and B, 30 m apart are as follows
<table><tr><th>Section</th><th>Depth of cutting at the centre line</th><th>Side width(W_1)</th><th>Side width(W_2)</th></tr><tr><td>A</td><td>10.0 m</td><td>35 m</td><td>25 m</td></tr><tr><td>B</td><td>6.0 m</td><td>30 m</td><td>22 m</td></tr></table>Determine the volume of excavation by
(a) trapezoidal rule</td><td>Apply & Evaluate</td><td>5</td></tr>
<tr><td>6</td><td>Calculate the volume of embankment of which the cross sectional areas at 20 m interval are as follows use prismoidal rule
<table><tr><td>Distance(m)</td><td>0</td><td>20</td><td>40</td><td>60</td><td>80</td><td>100</td><td>120</td></tr><tr><td>Area (m^2)</td><td>10</td><td>40</td><td>64</td><td>72</td><td>160</td><td>180</td><td>260</td></tr></table></td><td>Apply & evaluate</td><td>5</td></tr>
<tr><td>7</td><td>An embankment is formed on ground which is level transverse to the embankment but has a longitudinal slope of 1 in 30. Three cross-sections 30 m apart have centre line heights of 5.0, 6.0 and 7.0 m, respectively. If side slopes of 2 to1 are used and formation width is 10 m, calculate the volume of the fill by the trapezoidal formula and by the prismoidal formula. Also calculate the prismoidal correction</td><td>Apply & evaluate</td><td>6</td></tr>
<tr><td>8</td><td>A road has a formation width of 12 m and side slopes of 1 to 1 in cut and 2 to 1 in filling. The transverse slope of the ground is 6 to 1. If the depths of excavation at the centre lines of two sections 20 m apart are 0.50 m and 0.80 m respectively, find the volumes of cut and fill. Also determine the prismoidal correction and the corrected volumes.</td><td>Apply & evaluate</td><td>6</td></tr>
<tr><td>9</td><td>Given below are the areas of cut and fill at various chainages of road partly in filling and partly in cutting
<table><tr><th>Chainage in m</th><th>Area of cut (m^2)</th><th>Area of fill(m^2)</th></tr><tr><td>100.0</td><td>-</td><td>175.50</td></tr><tr><td>109.0</td><td>-</td><td>40.15</td></tr><tr><td>120.5</td><td>12.45</td><td>9.64</td></tr><tr><td>128.0</td><td>55.14</td><td>-</td></tr><tr><td>136.0</td><td>185.25</td><td>-</td></tr></table>Compute the volumes of cut and fill in the transitional area from chainage 100.00 to 136.0</td><td>Apply & evaluate</td><td>6</td></tr>
<tr><td>10</td><td>Given below are the areas of cut and fill at various chainages of road partly in filling and partly in cutting
<table><tr><th>Chainage in m</th><th>Area of cut (m^2)</th><th>Area of fill(m^2)</th></tr><tr><td>100.0</td><td>-</td><td>225.50</td></tr><tr><td>109.0</td><td>-</td><td>70.15</td></tr><tr><td>120.5</td><td>22.45</td><td>12.64</td></tr></table></td><td>Apply & evaluate</td><td>6</td></tr>
</table>

S.No	QUESTIONS				Blooms Taxonomy Level	Program Outcome
		128.0	75.14	-		
		136.0	285.25	-		
	Compute the volumes of cut and fill in the transitional area from chainage 100.00 to 136.0					

Prepared by: Mr. B Suresh, Assistant Professor, Civil Engineering

HOD, CIVIL ENGINEERING