# VALLIAMMAIENGINEERINGCOLLEGE

SRM Nagar, Kattankulathur– 603203

## DEPARTMENTOF CIVIL ENGINEERING

## QUESTION BANK

**IVSEMESTER**

**CE6404–SURVEYING**

**Regulation– 2013**

**Academic Year 2017–18**

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**QUESTION BANK**

**(As per Anna University 2013 Regulation)**

**SUBJECTCODE / NAME:** CE6404-SURVEYING - II

**SEM/ YEAR:** IV/II

## UNIT 1-CONTROLSURVEYING

Horizontal and vertical control–Methods–specifications–triangulation-baseline instruments and accessories–corrections–satellite stations–reduction to centre-trigonometrical levelling–single and reciprocal observations– traversing– Gale's table.

## PART A

| Q.NO | QUESTIONS | BTL EVEL | COMPETENCE |
|---|---|---|---|
| 1. | Name the equipments used for base line measurement. | BT-1 | Remembering |
| 2. | List the different types of tape correction. | BT-1 | Remembering |
| 3. | Quote the applications of Gale's table. | BT-1 | Remembering |
| 4. | Describe the satellite station and reduction to centre | BT-1 | Remembering |
| 5. | List the factors to be considered while choosing the site for baseline. | BT-1 | Remembering |
| 6. | Define control surveying. | BT-1 | Remembering |
| 7. | Distinguish the sag correction and temperature correction | BT-2 | Understanding |
| 8. | Summarize the points to be borne in mind while selecting the triangular station. | BT-2 | Understanding |
| 9. | Summarize the specifications of first order triangulation. | BT-2 | Understanding |
| 10. | Discuss few lines about the effect of curvature of the earth | BT-2 | Understanding |
| 11. | Classify traversing. Illustrate with neat sketch. | BT-3 | Applying |
| 12. | How to apply the figure adjustment in triangulation? | BT-3 | Applying |
| 13. | Triangulation networks for covering a large area are composed of | BT-3 | Applying |

<table>
<tr><td></td><td>Anyone or a combination of basic figures arranged as a series of chains or a connected centralized network: Demonstrate any two such arrangements.</td><td></td><td></td></tr>
<tr><td>14.</td><td>Explain the principle involved in second order triangulation.</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>15.</td><td>Explain the main principle involved in triangulation.</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>16.</td><td>Compare the Horizontal and Vertical controls in hydrographic surveying.</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>17.</td><td>Design a well conditioned triangle.</td><td>BT-5</td><td>Evaluating</td></tr>
<tr><td>18.</td><td>Prepare a base line for the survey work and give its definition.</td><td>BT-5</td><td>Evaluating</td></tr>
<tr><td>19.</td><td>Conclude few lines about the trigonometrical levelling.</td><td>BT-6</td><td>Creating</td></tr>
<tr><td>20.</td><td>When would you recommend the triangulation system in surveying projects?</td><td>BT-6</td><td>Creating</td></tr>
<tr><td colspan="4">PART B</td></tr>
<tr><td>1.</td><td>(i)Describe the satellite station and reduction to centre?<br>(ii)Show the expression for reducing the angles measured at the satellite station to centre.</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>2.</td><td>The following observations were made on a satellite station S to determine angle BAC.
<table>
<tr><td>Line</td><td>Length</td><td>Line</td><td>Bearing</td></tr>
<tr><td>SA</td><td>9.500 m</td><td>SA</td><td>0º 00'00"</td></tr>
<tr><td>AB</td><td>2950 m</td><td>SB</td><td>78º 46'00"</td></tr>
<tr><td>AC</td><td>3525 m</td><td>SC</td><td>100º 15'00"</td></tr>
</table>
Identify the angle BAC.</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>3.</td><td>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 2metres.The intervening ground may be assumed to have a uniform elevation of200metres.</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>4.</td><td>Find the R.L of Q from the following observations.<br>(i) Horizontal distance between P and Q =9290m<br>(ii) Angle of elevation from P to Q = 2°06’18”</td><td>BT-1</td><td>Remembering</td></tr>
</table>

| | | | |
|---|---|---|---|
| | (iii) Height of signal at Q =3.96 m<br>(iv) Height of instrument at P =1.25m<br>(v) Coefficient of refraction =0.07<br>R Sin 1" =30.88 m<br>R.L of P =396.58 m | | |
| 5. | 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<br>a. Correction for temperature.<br>b. Correction for pull.<br>c. Correction for sag<br>d. Correction for absolute length<br>e. Correction for slope | BT-2 | Understanding |
| 6. | (i)Discuss the curvature and refraction correction in trigonometrically leveling.<br>(ii)From a satellite station S, 5.8 m from main triangulation station A, the following directions were measured.<br>A=$0^{o}0'0"$;B=$132^{o}18'30"$;C=$232^{o}24'06"$;D=$296^{o}06'11"$;AB =3265.5m;AC =4020.2m; AD=3086.4m.Predict the Directions of AB, AC and AD from the above given data. | BT-2 | Understanding |
| 7. | Discuss the various methods of arranging the triangles and mention the different criteria for the selection of the arrangement of triangles? | BT-2 | Understanding |
| 8. | (i)How the triangulation systems are classified?<br>(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 |
| 9. | From a satellite station S 14m from A, angles measured to three triangulation station are as follows:<br>Angle CSA=32°45'48"<br>Angle BSC=68°26'36"<br>The length of sides AC and AB are 5678m and 1441m.Show the | BT-3 | Applying |

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| | Angle BAC. | | |
| 10. | (i)Explain the inter visibility of triangular station?<br>(ii)A tape 20m long of standard lengthat29˚C was used to measure a line, the mean temperature during measurement being19˚C.The measured distance was 882.10 meters, the following being the slopes:2°20'for100m;4°12'for150m;1°6'for50m;7°48'for 200 m; 3°00'for 300 m ;5°10'for82.10m;Examine the true length of the line if the coefficient of expansion is 6.5 X $10^{-4}$per degree F. | BT-4 | Analyzing |
| 11. | A nominal distance of 30m was set out with a 30m steel tape from a mark on the top of one peg to a mark on the top of another, the tape being in catenary under a pull of 100N and at a mean temperature of 70°F.The top of one peg was 0.25m below the top of the other. The top of the higher peg was 460m above mean sea level. Analyse the exact horizontal distance between the marks on the two pegs and reduce it to means ealevel, if the tape was standardized at a temperature of 60°F in catenary under a pull of (a) 80 N (b)120 N (c) 100 N.<br>Take radius of earth=6370km.<br>Density of tape=7.86g/$cm^3$<br>Section of tape=0.08 sq.cm<br>Co efficient of expansion =6 x$10^{-6}$per 1° F<br>Young's modulus = 2 x$10^7$N/$cm^2$ | BT-4 | Analyzing |
| 12. | A steel standard tape is 30m long at a temperature of 15°C when lying horizontal on ground. Its cross-sectional area is 0.08 $cm^2$and weight is1.8kgf (18N) and coefficient of expansion is 117x$10^{-7}$per°C. The tape is stretched over three supports which are at the same level and at equal intervals. Identify the actual length between the end graduations under the following conditions:-<br>(i) Temperature =25°C<br>(ii) Pull = 18 kgf (180N) | BT-4 | Analyzing |

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| | (iii) E =2.1x$10^6$kgf/$cm^2$(2.1x$10^5$N/$mm^2$) | | |
| 13. | A30m steel tape was standardized on the fiat 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 twas100N.The area of cross-section of the tape was 8$mm^2$.The specific weight of steel is78.6KN/$m^2$.α=0.63x$10^{-5}$F and E=2.1 x$10^5$N/$mm^2$.Invent the true length of the tape. | BT-5 | Evaluating |
| 14. | What is base line? Explain the accessories used to measure the baseline. | BT-6 | Creating |
| | **PART-C** | | |
| 1. | 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.<br>ii).what are signals? Classify them, enumerate the requirements to be fulfilled by signal. | BT-2 | Understanding |
| 2. | The following reciprocal observations were made from two points P and Q:-<br>(i) Horizontal distance between P and Q =6996 m<br>(ii) Angle of elevation of Q at P =1°56'10"<br>(iii) Angle of depression of P at Q =1°56'52"<br>(iv) Height of signal at P =4.07 m<br>(v) Height of signal at Q =3.87 m<br>(vi) Height of instrument at P =1.27 m<br>(vii) Height of instrument at Q =1.48 m.<br>Show and find the difference in level between P and Q and the Refraction correction. Take R sin 1"=30.588m. | BT-3 | Applying |
| 3. | In measuringang les from a triangulation station B, it was found necessary to set the instrument at a satellite station S, due south of the main station B and at a distance of 12.2m from it. The line BS approximately bisects the exterior angle ABC. The angles ASB and BSC were observed to be 30°20'30''and 29°45'6''. When the station B was observed, the angles CAB and ACB were observed | BT-5 | Evaluating |

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| | to be 59°18'26" and 60°26'12" respectively. The sides AC were computed to be 4248.5m from the adjacent triangle. Evaluate the correct value of the angle ABC. | | |
| 4. | Invent the difference of levels of points P and Q and the R.L.of P from the following data:-<br>(i) Horizontal distance between P and Q =7118<br>(ii) Angle of depression to P and Q =1°32'12"<br>(iii) Height of signal at P =3.87 m<br>(iv) Height of instrument at Q =1.27 m<br>(v) Coefficient of Refraction = 0.07<br>(vi) R Sin1" =30.88m<br>(vii) m = 0.07<br>(viii) R.L of Q = 417.860 m | BT-6 | Creating |

## UNIT II-SURVEYADJUSTMENTS

Errors Sources-precautions and corrections–classification of errors–true and most probable values-weighted observations–method of equal shifts–principle of least squares-normal equation–correlates- level nets-adjustment of simple triangulation networks.

## PART A

| Q.NO | QUESTIONS | BTL EVEL | COMPETENCE |
|---|---|---|---|
| 1. | Define most probable value | BT-1 | Remembering |
| 2. | State the principle of least square. | BT-1 | Remembering |
| 3. | Define the term true error. | BT-1 | Remembering |
| 4. | Define correlates. | BT-1 | Remembering |
| 5. | Name the different kinds of error possible in survey work | BT-1 | Remembering |
| 6. | List any four random errors occur in linear measurements. | BT-1 | Remembering |
| 7. | Distinguish between the observed value and the most probable value of a quantity. | BT-2 | Understanding |
| 8. | Differentiate the most probable error from residual error | BT-2 | Understanding |

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| 9. | Distinguish between the true error and residual error | BT-2 | Understanding |
| 10. | Discuss the conditioned quantity. | BT-2 | Understanding |
| 11. | Examine the rules of assigning weightage to the field observations. | BT-3 | Applying |
| 12. | When do you apply the method of equal shift? | BT-3 | Applying |
| 13. | Illustrate with formula the determination of probable error. | 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 conditioned quantity and conditioned equation. | BT-4 | Analyzing |
| 17. | How the true value is modified from the most probable value? | 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. | Compare the Delambre's method and Legendre's method. | BT-6 | Creating |
| | **PART B** | | |
| 1. | (i)Define the following terms<br>(1) True error<br>(2) Residual error<br>(3) Most probable error<br>(ii)The angle of triangle ABC were recorded as follows:<br>A = 77° 14'20" weight 4<br>B = 49° 40'35" weight 3<br>C = 53° 04'52" weight 2<br>Identify the corrected value of the angles. | BT-1 | Remembering |
| 2. | Examine the most probable values of the angles A, B, C from the following observations at a station P.<br>A =38° 25'20" Weight 1<br>B=32° 36'12" Weight 1<br>A+B =71° 01'29" Weight 2<br>A+B+C =119° 10'43" Weight 1<br>B+C =80° 45' 28" Weight 2 | BT-1 | Remembering |
| 3. | Find the most probable values of a angles A, B and C of triangle ABC from the following observation equations: | BT-1 | Remembering |

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|---|---|---|---|
| | A =68°12’36”<br>B=53°46’12”<br>C = 58°01’16” | | |
| 4. | Find the most probable values of the angles A, B and C from the following observations.<br>A = 45° 26’ 48.34”<br>B = 52° 43’24.62”<br>C = 48° 34’22.78”<br>A+B = 98° 10’12.46”<br>B+C = 101° 77’47.68” | BT-1 | Remembering |
| 5. | Describe the triangulation adjustment and explain the different conditions and cases with sketches. | BT-2 | Understanding |
| 6. | (i) Explain the general principles of least squares.<br>(ii) Explain the various cases for the determination of most probable value. | BT-2 | Understanding |
| 7. | Adjust and predict the angle P, Q, R and S which close the horizon.<br>Angle P =100°30’22”Weight 1<br>Angle Q =80°40’10” Weight 2<br>Angle R= 90°20’8” Weight 3<br>Angle S = 88°29’25”Weight 4 | BT-2 | Understanding |
| 8. | The following angles were recorded for a triangle ABC.<br>Angle A = 60° 28’16” weight 4<br>Angle B = 56° 44’40” weight 3<br>Angle C = 60° 46’53” weight 2<br><br>Calculate the correct values of the angles. | BT-3 | Applying |
| 9. | Show the most probable value of the following.<br>A = 28º 24’27.4”<br>B = 32º 14’16.3”<br>C = 51º 18’18.8”<br>A+B = 60º 38’45.6”<br>B+C = 83º 32’28.2” | BT-3 | Applying |

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| 10. | Examine the following given angles closing the horizon at a station and adjust it.<br>A = 122º 05'58.9" Weight 1<br>B = 86º 45'16.4" weight 1<br>C = 72º 50'31.2" weight 3<br>D = 78º 18'16.6" weight 1 | BT-4 | Analyzing |
| 11. | The following observations of 3 angles A, B, C were taken at one station.<br>A=75°32'46.3" Weight 3<br>B=55°09'53.2" Weight 2<br>C= 108°09'28.8" Weight2<br>A+B = 130°42'41.6" Weight 2<br>B+C= 163°19'22.5" Weight 1<br>A+B+C= 238°52'9.8" Weight 1<br>Identify the most probable value of each angle by method of differences. | BT-4 | Analyzing |
| 12. | The following are the observed values of the angle A with the corresponding weights.<br>(i) 51º20'30'' Weight 2<br>(ii) 51º20'28'' Weight 3<br>(iii) 51º20'29'' Weight<br>2.Examinethe following terms:<br>(1) the standard deviation<br>(2) the standard error of the weighted mean<br>(3) the probable error of single observation of weight 3<br>(4) The probable error of the weighted mean | BT-4 | Analyzing |
| 13. | (i)Formulate the normal equations for x,y and z in the following equation of equal weight:<br>3x+3y+z–4 =0<br>x+2y+2z–6 =0<br>5x+y+4z–21 =0<br>ii)If the weights of the above equation are2,3 and1respectively | BT-5 | Evaluating |

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|---|---|---|---|
| | form the normal equations for x,y and z. | | |
| 14. | Construct the normal equations for x,y and z in the following equations<br>4x+2y+z-4 =0<br>3x+3y+2z-8=0<br>5x+2y+4z-21=0<br>(i) For equal weight.<br>(ii) Construct the normal equations of x,y, z with weights are 2,3,1. | BT-6 | Creating |
| **PART C** | | | |
| 1. | (i)Discuss the laws of accidental errors.<br>(ii) The following are the three angles P, Q and R observed at a station O, Closing the horizon along with standard errors.<br>Angle P =84°15'12"± 3"<br>Angle Q =125°13'15"±4"<br>Angle R= 150°31'18" ±5"<br>Predict the corrected angles. | BT-2 | Understanding |
| 2. | The following rounds of angles were observed from a center station to the surrounding station.<br>A =95°43'22"weight 2<br>B= 76°32'39" weight 3<br>C=103°13'44" weight 2<br>D=84°29'50"weight 3<br>In addition to the above angle (A+B) was observed separately as 172°16'16" weight.<br>(i) Solve by using method of correlates.<br>(ii) Determine the most probable value. | BT-3 | Applying |
| 3. | The following are mean values observed in the measurement of 3 Angles α, ù and Û at one station.<br>α=76°42'46.2" Weight 4<br>α+ù =134°36'32.63"Weight3 | BT-5 | Evaluating |

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|---|---|---|---|
| | α+ù+Û=262°18’10.4”Weight1.<br>Evaluate the most probable value of each angle by normal equation method. | | |
| 4. | Write down the various laws of weight. Explain it. | BT-6 | Creating |

## UNIT3-TOTAL STATION SURVEYING

Basic Principle – Classifications -Electro-optical system: Measuring principle, Working principle, Sources of Error, Infrared and Laser Total Station instruments. Microwave system: Measuring principle, working principle, Sources of Error, Microwave Total Station instruments. Comparison on between Electro-optical and Microwave system. Care and maintenance of Total Station instruments. Modern positioning systems – Traversing and Trilateration

## PART A

| Q.NO | QUESTIONS | BTL EVEL | COMPETENCE |
|---|---|---|---|
| 1. | Name the equipment inventory required for a total station. | BT-1 | Remembering |
| 2. | Define EDM | BT-1 | Remembering |
| 3. | List out the types of EDM. | BT-1 | Remembering |
| 4. | Define traverse | BT-1 | Remembering |
| 5. | Define total station surveying | BT-1 | Remembering |
| 6. | What is called trilateration in modern positioning system? | BT-1 | Remembering |
| 7. | Distinguish between triangulation and trilateration. | BT-2 | Understanding |
| 8. | Differentiate between microwave and electro optical system. | BT-2 | Understanding |
| 9. | Discuss The atmospheric and scale corrections factors of total stations | BT-2 | Understanding |
| 10. | Discuss the principle behind the linear distance measurement of a total station. | BT-2 | Understanding |
| 11. | Illustrate the application of traversing. | BT-3 | Applying |
| 12. | Classify the types of accuracy related to total station. | BT-3 | Applying |
| 13. | Show how the sources of errors affect the working condition of a total station. | BT-3 | Applying |

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| 14. | Classify total station surveying. | BT-4 | Analyzing |
| 15. | Explain the principle of electro optical system. | BT-4 | Analyzing |
| 16. | Compare microwave system with electro optical system. | BT-4 | Analyzing |
| 17. | When do you substitute the total station instead of conventional surveying instruments? | BT-5 | Evaluating |
| 18. | Design the fundamental parameters of a total station | BT-5 | Evaluating |
| 19. | What are the precautions to be decided while using a total station? | BT-6 | Creating |
| 20. | How do you decide a total station is set up over a point during the field | BT-6 | Creating |
| | **PART B** | | |
| 1. | Define total station surveying? Describe its working principle. | BT-1 | Remembering |
| 2. | List the components of total station? Describe them briefly and also tell about its care and maintenances. | BT-1 | Remembering |
| 3. | Describe the function and operation of total station. | BT-1 | Remembering |
| 4. | What are the important precautionary measures and maintenance of Total Station instruments? | BT-1 | Remembering |
| 5. | Discuss the different sources of errors for total station | BT-2 | Understanding |
| 6. | Describe the types of traversing and write its application. | BT-2 | Understanding |
| 7. | Discuss about traversing and classical traversing methods. | BT-2 | Understanding |
| 8. | Illustrate the working principle and measuring principle of Electro optical surveying (Total Station) with neat sketches. | BT-3 | Applying |
| 9. | How electronic distance measurement can be classified and explain its uses on total station. | BT-3 | Applying |
| 10. | Explain in detail about the fundamental measurement systems of total station. | BT-4 | Analyzing |
| 11. | Compare Electro optical and Micro wave System. Explain it briefly. | BT-4 | Analyzing |
| 12. | Design the working principle and measuring principle of Micro Wave system with neat sketches. | BT-5 | Evaluating |
| 13. | Categorize salient features of modern total station | BT-5 | Evaluating |

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| 14. | Compare the following<br>(i) Triangulation<br>(ii) Trilateration | BT-6 | Creating |
| **PART C** | | | |
| 1. | Evaluate and compare the accuracy, precision and cost (time expenditure) of two methods of surveying, i.e. GPS and total station. | BT-1 | Remembering |
| 2. | Explain in detail about the measuring principle working principle and sources of error in infrared and laser total station instruments. | BT-4 | Analyzing |
| 3. | Describe in detail the pulse method and phase difference method. | BT-4 | Analyzing |
| 4. | Brief a comparison about microwave systems and electro optical systems also. Bring out the important precautionary measures and maintenance of total station instrument. | BT-6 | Creating |

## UNIT 4-GPS SURVEYING

Basic Concepts - 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 –data processing - Traversing and triangulation.

## PART A

| Q.NO | QUESTIONS | BTL EVEL | COMPETENCE |
|---|---|---|---|
| 1. | Define GPS | BT-1 | Remembering |
| 2. | State the basics of GPS | BT-1 | Remembering |
| 3. | List the different segments of GPS | BT-1 | Remembering |
| 4. | What is meant by Anti spoofing? | BT-1 | Remembering |
| 5. | Define GPS data processing. | BT-1 | Remembering |
| 6. | Why GPS signal is so complicated? | BT-1 | Remembering |
| 7. | Distinguish between Space and User segment? | BT-2 | Understanding |
| 8. | Comparison between Control and Space segment | BT-2 | Understanding |
| 9. | Discuss few points on GPS navigation. | BT-2 | Understanding |

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| 10. | Explain shortly about Orbit Representation. | BT-2 | Understanding |
| 11. | Classify the component of GPS. | BT-3 | Applying |
| 12. | Illustrate the Signal processing in GPS. | BT-3 | Applying |
| 13. | Demonstrate the components of satellite signals. | BT-3 | Applying |
| 14. | Explain in short about Satellite Configuration. | BT-4 | Analyzing |
| 15. | State the applications of GPS. | BT-4 | Analyzing |
| 16. | Classify the types of receiver. | 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. | Construct the sketch of the signal structure. | 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. | What is meant by SAASM? Explain in detail. | BT-1 | Remembering |
| 5. | (i) What are the types of GPS receivers?<br>(ii) Explain the task of control segment in GPS | BT-2 | Understanding |
| 6. | (i)Describe briefly about sources of errors in GPS<br>(ii)Explain the hand held receiver and geodetic receiver of GPS. | BT-2 | Understanding |
| 7. | How the Traversing and Triangulation is to be done Using GPS? Explain. | BT-2 | Understanding |
| 8. | Explain in detail about the signal structure of GPS. | BT-2 | Understanding |
| 9. | Classify the main components of GPS receiver and explain them briefly | 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. | Write the Requirements of GPS Signals? Briefly explain | BT-4 | Analyzing |

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| 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. | Explain in detail the History of GPS and Technical Specifications of its Orbits. | BT-6 | Creating |

## UNIT 5-ADVANCED TOPICS IN SURVEYING

Route Surveying – Reconnaissance – Route surveys for highways, railways and waterways – Simple curves – Compound and reverse curves – Setting out Methods – Transition curves – Functions and requirements – Setting out by offsets and angles – Vertical curves – Sight distances- hydrographic surveying – Tides – MSL – Sounding methods – Three-point problem – Strength of fix – Sextants and station pointer- Astronomical Surveying – field observations and determination of Azimuth by altitude and hour angle methods – fundamentals of Photogrammetry and Remote Sensing

### PART A

| Q.NO | QUESTIONS | BTL EVEL | COMPETENCE |
|---|---|---|---|
| 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. | Enumerate the objectives of route surveys. | BT-1 | Remembering |
| 6. | State the differences between lunar tides and solar tides. | BT-1 | Remembering |
| 7. | Distinguish between compound and reverse curves. | BT-2 | Understanding |
| 8. | Describe the Azimuth. | BT-2 | Understanding |
| 9. | Describe Fathometer. | BT-2 | Understanding |
| 10. | Distinguish between terrestrial and aerial photogrammetry. | BT-2 | Understanding |

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| 11. | Classify the types of curves. | BT-3 | Applying |
| 12. | Classify the different equipment's needed for soundings. | BT-3 | Applying |
| 13. | Illustrate the methods for determining the latitude of a place. | BT-3 | Applying |
| 14. | What do you infer about station pointer? | BT-4 | Analyzing |
| 15. | Classify the instrumental methods for setting out a circular curve | BT-4 | Analyzing |
| 16. | Write the equation of time | BT-4 | Analyzing |
| 17. | Explain the term Right Ascention (R.A). | BT-5 | Evaluating |
| 18. | Write a short note on echo-sounding. | BT-5 | Evaluating |
| 19. | State three point problem in hydrographic surveying. | BT-6 | Creating |
| 20. | Summarize the applications of remote sensing. | BT-6 | Creating |
| | **PART B** | | |
| 1. | With the help of suitable sketches, describe the following methods of locating soundings.<br>(i) Location by range and one angle from the shore. (6)<br>(ii) Location by two angles from the shore.(7) | BT-1 | Remembering |
| 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. | (i) What is Eco Sounding? Explain the Advantages.(8)<br>(ii) Define the term MSL. How it is Established?(5) | BT-1 | Remembering |
| 5. | Estimate the hour angle and declination of a star from the following data.<br>Altitude of the star = $21^o$ 30'<br>Azimuth of the star = $140^o$ E<br>Latitude of the observer = $48^o$ N. | BT-2 | Understanding |
| 6. | (i)Summarize briefly the procedures for setting out compound curve.(7)<br>(ii) How reconnaissance survey is conducted for railway project? (6) | BT-2 | Understanding |
| 7. | Derive the Parallax equation for determining the Height from a pair of Vertical Photographs. | BT-2 | Understanding |
| 8. | (i) Classify the different types of tides? Explain any two. (6)<br>(ii) Explain the various sounding methods.(7) | 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 | BT-3 | Applying |

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| | established and its position is to be found by three point intersection on A, B and C, the angles APB and BPC being respectively $42^{o}35'$ and $54^{o}20'$. Calculate the distances PA and PC. | | |
| 10. | (i) A simple curve is to have a radius of 300m. The tangents intersect at chainage of 1192 m and the deflection angle at intersection is 50.5°. Find the tangent distance, chainage of beginning and end length of long chord, degree of curve and the number of full and sub chord.(8)<br>(ii)Prepare step by step by procedure to set out a transition curve.(6) | BT-3<br><br>BT-4 | Applying<br><br>Analyzing |
| 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. | Explain the Tilt Distortion with neat sketch in Photographic method. | BT-4 | Analyzing |
| 13. | Explain in detail the obstacles to the location of curves. | BT-4 | Analyzing |
| 14. | (i) Write the Applications of Photogrammetry.<br>(ii) What is the Components of Remote sensing? Explain in detail. | BT-6 | Creating |
| | **PART C** | | |
| 1. | Explain the Curve Setting methods using appropriate case studies. | BT-2 | Understanding |
| 2. | Briefly explain the applications of remote sensing. | BT-2 | Understanding |
| 3. | Elaborate the advancements in route surveying of highways/ Water ways/ Railways | BT-5 | Evaluating |
| 4. | Enumerate the various investigations involved in hydrographic surveying. | BT-6 | Creating |

**VALLIAMMAI ENGINEERING COLLEGE**
**DEPARTMENT OF CIVIL ENGINEERING**
**CE6404 - SURVEYING II**

| Unit No. | | BT-1 | BT-2 | BT-3 | BT-4 | BT-5 | BT-6 | Total No. of Questions |
|---|---|---|---|---|---|---|---|---|
| I | Part-A | 6 | 4 | 3 | 3 | 2 | 2 | 20 |
| | Part-B | 4 | 3 | 2 | 3 | 1 | 1 | 14 |
| | Part-C | - | 1 | 1 | - | 1 | 1 | 4 |
| II | Part-A | 6 | 4 | 3 | 3 | 2 | 2 | 20 |
| | Part-B | 4 | 3 | 2 | 3 | 1 | 1 | 14 |
| | Part-C | - | 1 | 1 | - | 1 | 1 | 4 |
| III | Part-A | 6 | 4 | 3 | 3 | 2 | 2 | 20 |
| | Part-B | 4 | 3 | 2 | 2s | 2 | 1 | 14 |
| | Part-C | 1 | - | - | 2 | - | 1 | 4 |
| IV | Part-A | 6 | 4 | 3 | 3 | 2 | 2 | 20 |
| | Part-B | 4 | 4 | 1 | 3 | 1 | 1 | 14 |
| | Part-C | - | 1 | 1 | - | 1 | 1 | 4 |
| V | Part-A | 6 | 4 | 3 | 3 | 2 | 2 | 20 |
| | Part-B | 4 | 3 | 3 | 4 | - | 1 | 14 |
| | Part-C | - | 2 | - | - | 1 | 1 | 4 |

**TOTAL NO.OFQUESTIONS IN EACH PART**

| | |
|---|---|
| PART A | 100 |
| PART B | 70 |
| PART C | 20 |
| TOTAL | 190 |