



**SHRI ANGALAMMAN COLLEGE OF ENGINEERING &
TECHNOLOGY**
(An ISO 9001:2008 Certified Institution)
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DEPARTMENT OF CIVIL ENGINEERING

CE-1205 SURVEYING-I

Unit - I

PART - A

1. What are the different sources of errors in chain surveying?
2. Draw a neat sketch to show – a) Baseline b) Check line c) Tie line d) Offset
3. Differentiate between plane and geodetic surveying.
4. Differentiate between Gunter's chain and Engineer's chain
5. What are the different tape corrections?
6. What are the instruments used for setting right to a chain line?
7. Enumerate the instruments used for measurements of length of survey lines.
8. Distinguish between perpendicular offset and oblique offset, with neat sketches.
9. Distinguish between fore bearing and back bearing.
10. List the various instruments / accessories used in chain surveying.
11. What is a well – conditioned triangle?
12. What are offsets? Name the types.
13. Distinguish between direct ranging and indirect ranging.
14. Name the errors in chaining.
15. Distinguish between check line and tie line.

PART - B

1. **i)** Briefly explain the procedure for recording data in a again survey field book.
ii) Explain the methods of reciprocal ranging.
2. What are the obstacles encountered during a chain survey? Explain how they are overcome.
3. **i)** What is meant by 'Reciprocal Ranging'? How it is achieved?
ii) The observations of a cross staff survey is recorded below. Plot the boundary of the area ACEBFDA to a rough scale and compute its area analytically.-
4. Explain the process of indirect ranging with neat sketches.
5. Explain the reasons for errors and mistakes in chaining.

6.
 - i) Describe the various types of offsets and the method of taking offsets.
 - ii) In a neat sketches of a colony area (selected as an example) show the various features and explain the method of recording the details by conducting a chain survey and entering the details in the field book.
7.
 - i) Explain the various classifications of surveying.
 - ii) A chain line ABC crosses a river. The points B and C are situated in the near by and opposite sides of the river respectively. The bearing of a line BD, perpendicular to AC at B and 50m long is $45^{\circ}20'$. The measured bearing of DC is $264^{\circ}50'$. Find the distance BC.
8.
 - i) What are offsets?
 - ii) How are they taken and recorded?
 - iii) Plot the following cross staff survey and calculate the area.
9.
 - i) What are the different sources of errors in chain surveying? Distinguish between cumulative and compensating errors.
 - ii) Explain the terms: Base line, check line, Tie line, Suring offset, Oblique offset Random line.
10.
 - i) Illustrate with neat sketches, various types of obstacles encountered in chain surveying.
 - ii) Survey line PQ intersects a pond. To overcome these obstacle two stations A and B were taken on either side of the pond. A line AC, 90m long was laid down on the left of AB, and a second line AD, 130m long was laid down on the right of AB. If points C, B and D are on the straight line and $CB = 75\text{m}$ and $BD = 78\text{m}$. Determine the length AB.

Unit - II

PART - A

1. The bearing of line PQ is $N50^{\circ}25'E$, Obtain the bearing of line QP in whole circle bearing system.
2. Explain the terms 'Dip of a magnetic needle' and 'magnetic declination'.
3. Define the following terms: a) True meridian b) Magnetic meridian.
4. What is meant by local attraction?
5. What are the different sources of local attraction?
6. Find the magnetic declination at a place if the magnetic bearing of the sun at noon is a) 184° b) $350^{\circ}20'$
7. What do you understand by quadrantal bearing of a line?
8. What is plane table surveying? When it is preferred?

9. What is meant by local attraction? How is it checked?
10. What is two-point problem?
11. How is graduations marked on a prismatic compass? Why?
12. Define a three point problem?
13. Define magnetic declination.
14. What is whole circle bearing?
15. Define fore bearing and back bearing.

PART – B

1. Explain clearly the two point problem and the method of solving it.
2. Assume that you are required to prepare the map of your college campus by plain table survey. Give the step by step procedure to be adopted.
3. i) What are the sources of errors in compass survey?
ii) Write a note on
a) the earth magnetic fields and dip b) fore and back bearing
4. i) Give in a tabular form the differences between prismatic compass and surveyor's compass.
ii) List the various instruments / accessories used in plane table surveying and mention the purpose / use of each one.
iii) What is 'orientation' in plane table survey? Explain any one method on achieving.
5. Explain the working of surveyor's compass in detail.
6. Explain how you find the area of the polygon by taking bearing from the compass traverse survey with neat sketches?
7. i) State three point problem. Explain Bessel's method of conducting the same.
ii) How is plane table surveying different from other types of surveying? Where is it best suited?
8. Explain the types of errors in traversing. How they are eliminated?
9. Sketch a prismatic compass. Explain how it is used in the preparation of site plan.
10. Explain the different operations involved in working with plane table.

Unit - III

PART – A

1. Define sensitivity of a bubble tube. State any two factors effecting the same.
2. Distinguish between differential leveling and reciprocal leveling.
3. What do you understand by temporary adjustment of a level?
4. Distinguish between a level line and a horizontal line.
5. When reciprocal leveling is preferred?
6. Name four methods of plane tabling.
7. Define bench mark and reduced level.
8. What is back sight?
9. What is profile leveling?
10. List the essential parts of a theodolite.
11. Compare rise and fall method and height of collimation method.
12. Bring out clearly the difference between back sight and fore sight in running the fly level.
13. Define contour.
14. Differentiate between level line and horizontal line.
15. Explain trapezoidal rule for computation of areas.

PART – B

1. i) Describe the method of balancing sight on a slope.
ii) The following readings were taken with a level and a 5m leveling staff on a sloping ground at 20m intervals. Enter the readings in a page of a level book and find the gradient of the line joining the first and the last point. The R.L of the first point is 200.000m. Adopt height of collimation method. 0.380, 1.035, 1.930, 2.850, 3.775, 4.690, 0.625, 2.015, 3.160, 4.890.
2. i) Explain with neat sketches how is leveling done in the following circumstances.
a) Taking level of an overhead point. b) Leveling past a high wall.
ii) The following offsets were taken at 10m intervals from a survey line to an irregular boundary, calculate the area enclosed between the survey line the end offsets and the boundary by trapezoidal method and Simpson's rule. 20.60m, 12.40m, 29.20m, 18.80m, 10.20m.

3. i) Explain with a sketch and illustration, how you would find the available head room in a hall using a leveling instrument and a leveling staff.

ii) Details of the offsets from a survey line are given below. Calculate the area enclosed between the survey line, curved boundary and end offsets by

a) Trapezoidal rule, b) Simpson's rule

Chainage (m)	0	15	30	45	60	80	100
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Offset (m)	3.8	6.2	5.1	6.8	5.6	4.3	4.1
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4. i) Draw hypothetical contours representing a 'hillock' and pond for level between 10m and 20m with a contour interval of 2m.

ii) The following successive staff readings were observed while running a fly level between two points, the instrument having been shifted after the third, fifth and eighth readings. Rule out a page of a level book & enter the readings. Hence find the R.L of each staff point, taking the R.L of the first point as 100.0000. Apply the checks, 1.285; 2.415; 0.780; 1.590; 1.860; 0.590; -1.265; 0.215; 1.155; 2.020.

5. i) The following are the offsets taken at 3m intervals from a Chain line to a curved boundary 2.16m; 1.53m; 1.80m; 1.98m; 1.80m; 1.59m; 1.80m; 2.10m; 2.10m; 2.52m; 2.43m; 2.40m; 2.58m; 2.70m; 2.91m and 3.06m. Compute the area enclosed by the chain line, the curved boundary and the end offsets.

ii) A sailor standing on the deck of a ship just sees the top of the light house is 30m above the sea level and the sailor's eye is 5m above the sea level. Find the distance of the sailor from the light house.

6. i) The following observations were recorded while testing a dumpy level. Comment on the conditions of adjustment of the level. With reference to instrument position at Q determine the correct reading on A and B. Suggest suitable adjustment if necessary.

ii) What is the necessary to balance the sights during a fly leveling?

7. i) Explain how the correction for curvature and refraction are done in the case of leveling.

ii) The following staff readings were taken successively with dumpy level, the instrument having been removed forward after second, fourth and eighth readings. 0.675; 1.255; 2.320; 1.375; 2.940; 3.145; 4.145; 0.120; 1.875; 2.045 and 3.785. The reduced level of the bench mark is 1220.000. Enter the readings in a level book and the levels using the height of collimation method. Apply the usual checks.

8. i) What are the different types of the leveling instruments used in leveling? Bring out the essential differences between them and state which is most preferred & why?
- ii) What do you understand by reciprocal leveling? When is procedure adopted? Explain the concept with a sketch.
9. i) Explain contour and contour interval.
- ii) What are the uses of contour map?
- iii) How will you determine the inter visibility of points from a contour map?
- iv) Explain how you would determine the capacity of a reservoir using a contour map?

Unit - IV

PART – A

1. What do you understand by the name transit theodolite?
2. What are latitudes and departure?
3. Name the two methods of measuring horizontal angles?
4. Define transiting the telescope.
5. Explain the theory of direct leveling.
6. What are the natural errors in leveling?
7. Name the two methods of measuring horizontal angles using a theodolite.
8. What is an analectic lens?
9. Sketch the contour for a) Hill b) lake.
10. What for theodolite are used?
11. State the formula for combined correction in leveling.
12. List out the advantage of method of reiteration.
13. What is non-transit theodolite?
14. Define closing error. How does it occur?
15. What is the use of tangential screw provided for adjustments in a transit theodolite?

PART – B

1. i) Explain the temporary adjustment of a transit theodolite.
- ii) A closed traverse was conducted round an obstacle and the following observations were made work out the missing quantities.

<u>Side</u>	<u>Length</u>	<u>Bearing</u>
AB	?	33°45'

BC	300	86°23'
CD	?	169°23'
DE	450	243°54'
EA	268	317°30'

2. What are 'face left' and 'face right' observations? Why is it necessary to take both these observations?
3. Describe in brief the construction features of a transit theodolite.
4. Write in detail about the following permanent adjustments.
 - i) Adjustment for vertical axis.
 - ii) Adjustment for line of collimation
 - iii) Adjustment for Horizontal axis.
5. Explain the essential part of a transit theodolite with neat sketch.
6. What is the various permanent adjustment of theodolite? Explain in detail.
7. The following data refers to closed traverse table, balance the traverse AB = 250m, BC=123m, CD=256m, DA=108m, $\angle A=95^\circ 24'$, $\angle B=88^\circ 42'$, $\angle C=88^\circ 12'$, $\angle D=88^\circ 06'$. The whole circle Bearing of AB=86°42'.
8. Two stations A and B are fixed on either side of a wood. The following traverse is run from A to B along the side of the wood.

<u>Line</u>	<u>Length(m)</u>	<u>Bearing</u>	<u>Latitude(m)</u>	<u>Departure(m)</u>
AC	438.0	48°24'	+290.8	+327.5
CD	664.0	110°12'	- 229.3	+ 623.2
DB	528.0	152°36'	- 516.6	+ 267.8

Determine the length of AB from the station D a line DE is carried into the woods on a bearing of 108°6' in order to fix an intermediate point E on AB. Find the length of DE.

9. The bearing of a line PQ was impossible to be measured directly. Hence the following observations were made from two stations A and B.

<u>Line</u>	<u>Length(m)</u>	<u>Bearing</u>
AP	126.00	S 65°36' W
AB	314.40	N 24°12' E
BQ	115.50	N 76°48' W

Compute the length and bearing of PQ and the angles APQ and BQP.

10. To determine the elevation of the top of a chimney, the following observations were made.

<u>Station</u>	<u>Read on BM</u>	<u>Angle of elevation</u>
P	2.950 m	28°30'
Q	3.850 m	18°00'

The top of chimney and the station P and Q are in the same vertical PQ is 150m. If the reduced level is 150.000, find the elevation of the top of the chimney.

Unit - V

PART - A

1. What is forward tangent?
2. Define point of curve.
3. What are the aims when undertaking setting out operations?
4. What are the three classes of circular curves?
5. What are shafts? Where are they used?
6. Where are reverse curve employed?
7. State the relationship between radius of curve and the degree of the curve?
8. What are transition curves?
9. Define 'Sight distance'.
10. What is meant by face left observation?
11. What is Resection? List a few methods.
12. What are the elements of a simple curve?
13. What is a route survey? What is its purpose?
14. What did you understand by latitudes and departures?
15. Give the relation between degree of curve and its radius.

PART - B

1. i) Write about the various elements of a simple circular curve.
ii) Explain the method of setting out a simple curve by two theodolites.

2. Determine the offsets to be a setout at a chain interval along the tangents, to locate a 16 chain curve, using by radial offsets method, perpendicular offsets methods and by approximate method.
3. Why to curves become necessary along highway alignment? Bring out the various classifications of highways curves.
4. Write detailed note on i) Surface surveys in tunneling operations ii) Setting out works.
5. Draw a simple circular curve and mark the salient points. Explain the setting out of curve by two theodolites methods.
6. Briefly explain procedure for setting out a tunnel.
7. i) Briefly explain the different method of adjusting a traverse. ii) With a neat sketch show the different parts of a simple circular curve.
8. i) What is transition curve? Why is this used?
ii) What is meant by 3-4-5 rule? How this is applied to a single roomed building?
9. Explain elements of a compound circular curve.