

**DR KALAM POLYTECHNIC COLLEGE,AVANAM**

**DEPARTMENT OF CIVIL**

**SUB CODE/NAME: 31043/SURVEYING II      YEAR/SEM: II/IV**

**UNIT-1**

**PART-A**

1. What is theodolite?
2. What is a transit theodolite?
3. Define parallax.
4. What are the types of traverse?
5. Define transiting.
6. What is a closed traverse?
7. Define latitude.
8. Define swinging.
9. What is a deflection angle?
10. What do you mean by balancing the traverse?
11. What are the types of theodolite?
12. What is meant by consecutive co-ordinates?
13. Define the term face left.
14. What is meant by repetition method measuring horizontal angle?
15. Define departure.
16. Mention any four parts of theodolite.
17. What is meant by telescope inverted?
18. What are the methods of measuring horizontal angle using theodolite?

**PART-B**

1. What are the types of theodolite? Explain them.
2. Define (i) face left (ii) face right (iii) vertical axis.
3. What are latitude and departure?
4. Write Bowditch's rule and transit rule.
5. What is the method of traversing by theodolite?
6. What is consecutive and independent co-ordinates.
7. Explain in detail how to measure the horizontal angle by the method of repetition with a neat sketch.

**PART-C**

1. Explain in detail how to measure the horizontal angle by the method of repetition with a neat sketch. **(APR-13)**

2. The following table gives the length and bearings of a closed traverse ABCDE. The length and bearing of the line EA have been omitted. Calculate the length and bearing of the line EA. **(APR-13 ,APR-14)**

Line	AB	BC	CD	DE	EA
Length(m)	204	226	187	192	?
Bearing	87°30'	20°20'	280°0'	210°30'	?

3. Explain in detail the various temporary adjustments of a theodolite required to be done at every set up. **(OCT-13 ,OCT-14)**
4. The following are the lengths and bearings of a traverse ABCDE. Calculate the independent co-ordinates and its area. **(OCT-13)**

Line	AB	BC	CD	DE	EA
Length(m)	229	131.35	80	199.25	142.60
Bearing	198°50'	282°14'	320°13'	35°13'	104°26'

5. Draw a neat sketch of a transit theodolite with and explain the functions of any five components parts. **(APR-14)**
6. The following table gives the latitude and departure of the sides of a closed traverse ABCD. Using the method of independent co-ordinates calculate area of the traverse. **(OCT-14)**

Line	AB	BC	CD	DA
Latitude	-88.00	+416.10	+7.00	-335.10
Departure	+133.90	+356.90	-14.84	-475.90

7. In a closed traverse PQRST the length and bearing of the PQ could not be measured in the field. Calculate these values from the following given information **(APR-15)**

Line	PQ	QR	RS	ST	TP
Latitude	?	+125	+120	-30	-150
Departure	?	+65	-110	-170	+20

8. Calculate the area of closed traverse ABCD by independent co-ordinates from the following latitude and departure. **(APR-15)**

Line	AB	BC	CD	DA
Latitude	-300	+640	-100	-440

Departure	+450	+110	-380	-180
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9. The latitude and departure of the lines of a closed traverse are given below. Calculate the independent co-ordinates and calculate the area of the traverse.

line	northing	southing	easting	westing
AB	-	157.20	154.80	-
BC	210.50	-	52.50	-
CD	175.40	-	-	98.30
DA	-	228.70	-	109.00

## UNIT-II

### PART-A

1. What is tacheometry?
2. What is an anallatic lens?
3. What are distomats?
4. Mention the instrument used in tacheometry survey?
5. What are the types of stadia techeometry?
6. Write the distance and elevation formulae of stadia techeometry when the staff station is above the line of sight.
7. Write down the distance formula when the telescope of the tacheometer is in horizontal position.
8. Mention any two advantages of analytic lens in a tacheometer.
9. Mention the errors in tacheometric surveying?
10. What is a tacheometer?
11. What are the two constant of a tacheometer?
12. Name the two system of tacheometry.
13. Define staff interrupt.
14. Mention any two instrumental errors in tacheometric surveying?

### PART-B

1. Write short notes the fixed hair method.
2. Write short notes the movable hair method.
3. Write short notes the instrumental error.
4. Write short notes the laboratory measurement.

5. Explain the principle of stadia tacheometry.
6. What are the advantages and disadvantages of using anallatic lens?
7. List out the errors in tacheometry survey.
8. How will you determine the constants of a tacheometric in the field?

### PART-C

1. A tacheometer having a multiplying constant 100 and additive constant 0.30 m was setup over a BM of RL 250.000m and the following readings were taken. Calculate the distance of staff station from instrument station and also their elevation. The height of instrument was 1.415m. **(APR-13)**

staff station	Stadia readings	Vertical angle
A	0.450,1.035,1.620	+5°14'
B	0.860,1.270,1.680	-7°23'

2. Atacheometer fitted with an anallatic lens was used to observe the following. The value of the constant is 100 and the staff was held vertical. Determine the length and gradient of AB. **(APR-13)**

Inst.st ation	Staff station	bearing	Vertical angle	remarks
C	A	320°	+12°	0.905,1.730,2.555
	B	50°	+10°	0.745,2.220,3.650

3. The staff intercepts of 0.585 m and 1.470m were observed on a vertically held staff using a tachometer with telescope horizontal at horizontal distance of 60m and 150m respectively from the centre of the centre of the instrument the instrument set up over a station whose RL is 200.000m .the height of the instrument is 1.200m. the stadia hair are 0.900,1.865,2.830. Calculate the distance and elevation of the staff from the centre of instrument station. **(OCT-13)**
4. A theodolite was set up at X and two observations were taken on a vertically held staff at Y .the angle of elevation to 0.750m and 3.200m readings were 4°30' and 7°45' respectively .calculate the horizontal distance between instrument station and staff station. Also calculate the RL of Y

The RL of BM was 100.00m and the staff reading on BM with horizontal line of sight was 1.560m  
**(OCT-13)**

- Explain in details about system of tachometry. **(APR-14)**
- A tachometer was set up at a station C and the following readings were obtained on a staff vertically held. Calculate the horizontal distance CD and RL of D. When the constants of instrument are 100 and 0.15.**(APR-14)**

Ins. station	Staff station	Vertical angle	Hair readings(m)	Remarks
C	BM	-5°20'	1.500,1.800,2.450	RL of BM=750.50 m
C	D	+8°12'	0.750,1.500,2.250	

- Determine the multiplying constant of a tachometer the following observation were taken on a staff held vertically at distance measured from the instrument.  
**(OCT-14)**

observation	Horizontal distance(m)	Vertical angle	Staff intercept(m)
1.	50	+3°48'	0.500
2.	100	+10°6'	1.000
3.	150	+0°36'	1.500

- Determine the distance between the instrument station (p) and the staff station (Q) from the following data. Height of instrument=1.500m, vertical angle =+4°30', staff readings =0.0645,1.000,1.355,taken C=0,K=100 Also determine the RL of (Q) if RL of (P) IS 200.400.**(OCT-14)**
- Determine the multiplying constant of a tachometer the following observation were taken on a staff held vertically at distance measured from the instrument.

observation	Horizontal distance(m)	Vertical angle	Staff intercept(m)
1.	50	+3°48'	0.500
2.	100	+10°6'	1.000
3.	150	+0°36'	1.500

The focal length of object glass is 20cm and the distance from the object glass to trunnion axis is 10cm.  
**(APR-15)**

- The following observations were made by the tangential method of tacheometry. Determine the horizontal distance OA and the RL of station A if the RL of inst. Of station is 152.850m.  
**(APR-15)**

Inst. station	H.I	Staff station	Vertical angle	Staff reading
O	1.52	A	+5°24'	2.540
O	1.52	A	-1°36'	0.640

- Derive the expressions for horizontal and vertical distance in the fixed hair method when the staff hold normal to the line of sight and the measured angle is that of elevation.
- Derive the expressions for horizontal and vertical distance in the fixed hair method when the staff held vertically to the line of sight and the measured angle is that of elevation.
- A tachometer fitted with an anallactic lens was set up at a station and a following readings were obtained on a vertically held staff.  
Calculate the horizontal distance from A and B and R.L of B.

station	Staff station	Vertical angle	Stadia hair reading(m)	remarks
A	B.M	+2°18'	3.225,3.550,3.875	<b>R.L of B.M=743.565</b>
	B	+8°36'	1.650,2.515,3.380	

### UNIT-III PART-A

- What do you mean by trigonometrical leveling?
- Define remote sensing?
- Define sounding?
- Define hydrographic surveying?
- What to you understand by base accessible?
- List the two methods used to find elevation of objects when the face is inaccessible?

7. What is meant by single plane method?
8. List any three instrument need for sounding?
9. What is meant by accessible object?
10. What is meant by double plane method?
11. Mention any four application of remote sensing.

**PART-B**

12. Write short notes single plane method.
13. Write short notes on double plane method.
14. What are the instruments needed for sounding? And any two explain them.
15. State the uses of hydrographic surveying?
16. What are purposes of sounding?

**PART-C**

1. Determine the RL of the top of a chimney from the following observations. Distance Between A and B in 25m. A and B are in the same vertical plane as the elevated object. **(APR-13)**

Inst. station	Staff reading on BM	Vertical angle	Remarks
A	1.570	+21°52'	RL of BM=148.920M
B	1.260	+21°0'	

2. (i)list out any six applications of remote sensing.  
(ii)briefly describe the steps in hydrographic surveying?**(APR-13)**
3. Determine the RL of the top of a chimney from the following data:

Inst. station	Staff reading on BM	Vertical angle	Remarks
A	0.865m	+18°30'	RL of BM=425.000m AB=50.000M
B	1.225mm	+10°12'	

Station A and B and top the tower are in the same vertical plane.**(OCT-13)**

4. (i)What is photogrammetric surveying? What are the operations involved in it? List the method of photogrammetry.  
(ii) What is hydrographic survey? State any five uses of hydrographicsurveying.  
**(OCT-13)**
5. Determine the RL of the top of a transmission tower from the following observations: **(APR-14)**

Inst.	Staff reading	Vertical	Remarks
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station	on BM	angle	RL of BM=105.000m
A	2.815m	+18°30'	
B	1.865m	+12°40'	

6. (i)Explain in detail, basic process of remote sensing.  
(ii)Write short notes on photogarmetric surveying. **(APR-14)**
7. Determine the RL of the top of the tower from the following observation.

Inst. station	Staff reading on BM	Vertical angle
A	1.730m	+16°42'
B	2.630m	+13°38'

Distance between A and B is 100m. RL of BM is 168.27m.A and B are not in the same plane with top of tower .Horizontal angle at A between B and top of tower is +73°44'.Horizontal angle between A and top of tower at B is +52°08' **(OCT-14,APR-15)**

8. (i)What are the applications of aerial photogrammetric?  
(ii)What are the uses of hydrographic surveying? **(OCT-14)**
9. (i)Explain the application of remote sensing in ocean resources, watershed and environment.  
(ii)What is sounding? Explain the depth measurement equipment and positioning system equipment. **(APR-15)**
10. (i)Explain the methods of remote sensing. (5)  
(ii)Briefly explain the applications of remote sensing. (5)
11. Write short notes on terrestrial and aerial photographs.
12. (i) Briefly write about the applications of photogrammetric surveying.(7)  
(ii)What is the purpose of sounding? (3)

**UNIT-IV**

**PART-A**

1. Define simple curve.
2. Define compound curve.
3. Define reverse curve.
4. Define apex distance.
5. Define horizontal curve.
6. What is normal chord?
7. What is right hand curve?
8. Mention any three types of curve.
9. Write down the formula for tangent length.
10. Write down the formula for rankine's method of deflection angle.
11. What is meant by curve?

12. Write the formula for length of curve.
13. Write the relationship between the degree and radius of a simple circular curve.
14. Calculate the degree of the circular curve if the radius of the curve is 400m.
15. What are the relation between the degree and radius of a simple circular curve?
16. Calculate radius of a circular curve having degree of the curve  $5^\circ$ .
17. Mention any two method of setting out simple circular curve.

#### **PART-B**

1. Define. (i) Point of curve. (ii) Right handed curve and left handed curve.
2. What is the vertical curve? Why is provided?
3. What is the transition curve and objective of transition curve?
4. What are the requirements of a transition curve?
5. What is a transition curve? Where is such a curve provided?
6. Draw neat sketches of different types of curve.
7. How is a curve designated?

#### **PART-C**

1. (i) Write notes on various methods of setting out a simple circular curve.  
(ii) Draw a neat sketch of a simple circular curve and name its various components. **(APR-13)**
2. Calculate the various elements of a simple circular curve of radius 300m connecting two straights intersect at an angle of  $120^\circ$ .  
If the radius of a simple circular curve is 400m and the angle of intersection is  $120^\circ$ , calculate the various elements of the curve. **(APR-13)**
3. (i) List the type's curves with neat sketches. **(OCT-13)**  
(ii) Draw a neat sketch of a simple circular and name its various components.
4. (i) Write down the field procedure for setting out a curve by taking offset from long chord.
5. (ii) Explain in detail about the simple curve. **(OCT-13)**  
A simple curve of radius 14 chains is to be set out by measuring offsets from the tangents at an interval of 0.50 chains. If each chain is 20m, determine the radial offsets and perpendicular offsets. **(APR-14)**
6. (i) Derive the relationship between degree of curve and radius for a unit chord of 30m.  
(ii) Describe the procedure for setting out the curve in the field based on offsets from tangent. **(APR-14)**

7. Two tangents intersect at chainage 1265m with angle of intersection as  $140^\circ$ . If the radius of curve is 300m, calculate the necessary data for setting out the curve by Rankine's method. The pegs are to be driven at 20m intervals.

**(OCT-14)**

8. (i) Write down the field procedure for setting out a curve by taking offset from long chord.  
(ii) Define the term mid ordinate, normal chord and sub chord. **(OCT-14)**
9. Two straight AB and BC meet at a chainage of 3000m. A right handed simple circular curve 300m radius joins them. The deflection angle between the two straight is  $30^\circ$ . Tabulate the necessary data to layout the curve by Rankin's method of deflection angles. Taken the chord interval as 20m. **(APR-15)**
10. Describe the method of setting a circular curve by the method offsets from the chords produced. **(APR-15)**
11. Describe the method of setting a simple circular curve by Rankine's deflection angle method.
12. Two tangents intersect at chainage 1250. The angle of intersection is  $150^\circ$ . Calculate all data necessary for settings out a curve of radius 250m by the deflection angle method. The peg intervals may be taken as 20m. Prepare a setting out table when the least count of the vernier is  $20''$ . Calculate the data for field checking.

#### **UNIT-V**

#### **PART-A**

1. What do you mean by GIS?
2. State any two field application of GIS.
3. Mention any four total station characteristics.
4. List out the components of GIS.
5. What are the settings of measurement in total station?
6. What is cadastral survey?
7. Mention any two objectives of GIS.
8. Expand GIS&LIS
9. Mention any two uses of total station.
10. What is a total station?
11. What are maps?

#### **PART-B**

1. Write short notes on cadastral survey.
2. Write short notes on land information system.
3. Write short notes on development of GIS.

4. Compare between GIS with CAD and other systems.
5. What are the objectives of GIS?

**PART-C**

1. (i) State the various applications of total station.  
(ii) List the features available in on board software of total station **(APR-13)**  
(ii) Explain the field procedure of total procedure of total station to run a traverse. **(APR-13)**
2. (i) Briefly explain the components of GIS.  
(ii) Briefly explain the application of GIS in the fields of natural and water resources. **(OCT-13)**
3. (ii) Briefly explain the application of GIS in the fields of agriculture ,transport**(OCT-13)**
4. (i) Name any three application of total station  
(ii) State the total station characteristics. **(APR-14)**
5. (i) Write short notes on the development of GIS.  
(ii) Explain land information system. **(APR-14)**
6. (i) What is total station? Mention the accessories used in the total station.  
(ii) Explain the features of total station. **(OCT-14)**
7. (i) Explain hardware components of GIS.  
(ii) Explain any six fields of application of GIS. **(OCT-14)**
8. (i) What are the application of the total station  
(ii) Write down the field procedure for running a traverse survey. **(APR-15)**
9. (i) Explain hardware components of GIS.  
(ii) Explain land information system. **(APR-15)**
10. Explain the steps involved in total station instruments preparation and setting.