



Subject Name:

SURVEYING & GEOMATICS

Prepared by (Faculty (s) Name):

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Year and Sem, Department:

II-YEAR-II SEM-DEPARTMENT OF CIVIL ENGINEERING

Unit-I: (Title)

INTRODUCTION TO BASIC CONCEPTS & MEASUREMENT OF DISTANCES AND DIRECTIONS

Important points / Definitions: (Minimum 15 to 20 points covering complete topics in that unit)

1. Objectives of Surveying:

- (i) To take measurements to determine the relative positions of the existing features on or near the ground.**
- (ii) To layout or to mark the positions of the proposed structure on the ground.**
- (iii) To determine areas, volumes and other related quantities.**

2. History of Surveying:

- **Surveying in one form or the other had been used for distinguishing one man's land from that of another since time immemorial.**
- **Surveying in some form was used in India and Egypt to divide the land for taxation purposes even 1400 B.C.**
- **Surveying methods were used to control points in the Nile Valley Civilization.**
- **Surveying techniques were also used for setting out and establishing points and lines on the ground for the construction of pyramids and huge buildings.**

3. Primary Divisions of Surveying:

- **The actual shape of the earth is an oblate spheroid. It is ellipsoid of revolution, flattened at the poles and bulging at the equator. It is taken as a sphere approximately.**
- **The length of the polar axis is about 12713.168 km and that of the equatorial axis is about 12756.602 km, as computed by Clark in 1866. Thus the polar axis is shorter than the equatorial axis by about 43.434 km. Relative to the diameter of the earth, the difference in the lengths of the two axes is a very small quantity (about 0.34%).**
- **Average radius of earth is taken as 6370 km for all calculations.**

4. Plane Surveying: It is the type of surveying in which the curvature of the earth is neglected and it is assumed to be a flat surface.

5. Geodetic Surveying: It is the type of surveying in which the curvature of the earth is taken into consideration and a very high standard of accuracy is maintained.



Short Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)

- 1) Explain about the principles of surveying- MAY 2018
- 2) What are the objectives of plane and geodetic surveying? (March-2017)
- 3) List out the tape corrections. (Dec-2016)
- 4) Define surveying. Discuss briefly the classification of survey based on
 - i) Purpose
 - ii) Instruments. (DEC-2016)
- 5) What is the main principle of surveying? (Nov-2015)
- 6) What are the different methods of making angular measurements? (May-2018)
- 7) What is local attraction? How will you determine it in a closed traverse?(Dec-2017)
- 8) Find the magnetic Declination, if the magnetic bearing of sun at noon is $186^{\circ}30'$. (Dec-2017)
- 9) What is the limit accuracy in compass surveying? (Dec-2017)
- 10) What are the different types of bearings? MAY 2018

Long Questions (minimum 10 previous JNTUH Questions – Year to be mentioned)

1. A 20m chain used for a survey work was found to be 20.10m at the beginning and 20.30m 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? – MAY 2018
2. (a) Explain different method of testing and adjusting the chain.
(b) How the chain can be standardized? How the adjustments will be made to the chain if it is found to be too long? – MAY 2018
- 3.

The following were observed in a compass traverse. Correct for local attraction.

Line	F.B	B.B
AB	$68^{\circ}15'$	$248^{\circ}15'$
BC	$148^{\circ}45'$	$326^{\circ}15'$
CD	$224^{\circ}30'$	$46^{\circ}00'$
DE	$217^{\circ}15'$	$38^{\circ}15'$
EA	$327^{\circ}45'$	$147^{\circ}45'$

(Dec-2016)

4.

The following are the fore and back bearings of the sides of a closed traverse:

Line	F.B	B.B
AB	$150^{\circ}15'$	$300^{\circ}15'$
BC	$20^{\circ}30'$	$200^{\circ}30'$
CD	$295^{\circ}45'$	$115^{\circ}45'$
DE	$218^{\circ}00'$	$38^{\circ}00'$
EA	$120^{\circ}30'$	$300^{\circ}30'$

Calculate the interior angles of the traverse.

(Nov- 2015)



5.

- a) What is the limit accuracy in compass surveying?
- b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attractions was suspected?

Line	F.B	B.B
PQ	124°30'	304°30'
QR	68°15'	246°0'
RS	310°30'	135°15'
SP	200°15'	17°45'

At what stations do you suspect local attraction? Find the corrected bearings of the lines and also calculate the included angles. **(Dec-2017)**

- 6. a) Discuss the care and adjustments of surveying instruments.
b) What are the different types of plotting scales? What are the qualities of a good plotting scale? (May-2018)
- 7. The area of the plan of an old survey plotted to a scale of 10m to 1cm now measures as 90.5cm² as found by a planimeter. The plan is found to have shrunk so that a line originally 10cm long now measures 9.5cm only. A note on the plan also states that the 20m chain used was 9 cm too short. Find the true area of the survey. (March-2017)
- 8. A line was measured with a 30m tape. This was standardized at 20° C under a pull of 10kg. The measured length was 1500m. The temperature during measurement was 30° C and the pull was 15kg. Find the true length of the line if coefficient of expansion = 3.5×10^{-6} per °C. Modulus of elasticity = 2.1×10^6 kg/cm² and cross sectional area of the tape = 0.020cm² (March-2016)
- 9. A chain line PQ intersects a pond. Two points A and B are taken on the chain line on opposites sides of the pond. A line AC, 250m long, is set out on the left of AB and another line AD, 300m long, is set out on the right of AB. Points C, B and D are in the same straight line. CB and BD are 100 and 150 m long respectively. Calculate the length of AB. (Nov-2015)
- 10. a) Define surveying. Discuss briefly the classification of survey based on
 - i) Purpose
 - ii) Instruments. (Dec-2017)



Fill in the Blanks / Choose the Best: (Minimum 10 to 15 with Answers)

1. A clinometer is used for-----
2. The distances AC and BC are measured from two fixed points A and B whose distance AB is known. The point C is plotted by intersection. This method is generally adopted in -----
3. Planimeter is used for measuring-----
4. In a prismatic compass eye vane consists of -----
5. Cross hairs in surveying telescopes, are fitted-----
6. Cross-staff is used for -----
7. The back staff reading on a B.M. of R.L. 500.000 m is 2.685 m. If foresight reading on a point is 1.345 m, the reduced level of the point, is-----
8. Correction per chain length of 100 links along a slope of α radians, is-----
9. While working on a plane table, the correct rule is-----
10. In case of a double line river, contours are-----