ELEMENTS OF ENGINEERING
ME144

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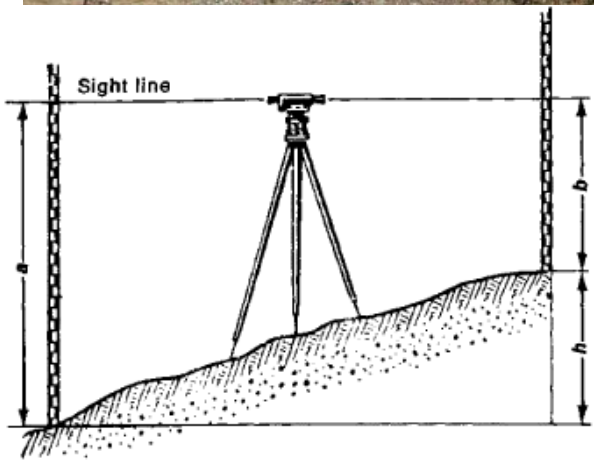
Syllabus

11.	Introduction to Surveying
11.1	Definition of surveying
11.2	Objects of surveying, Uses of surveying
11.3	Primary divisions of surveying, Principles of surveying
11.4	List of classification of surveying, Definition: Plan and Map, Scales : Plain scale and Diagonal scale, Conventional Symbols
11.5	Introduction to linear and angular measurements, Concepts of land profiling

Surveying and levelling

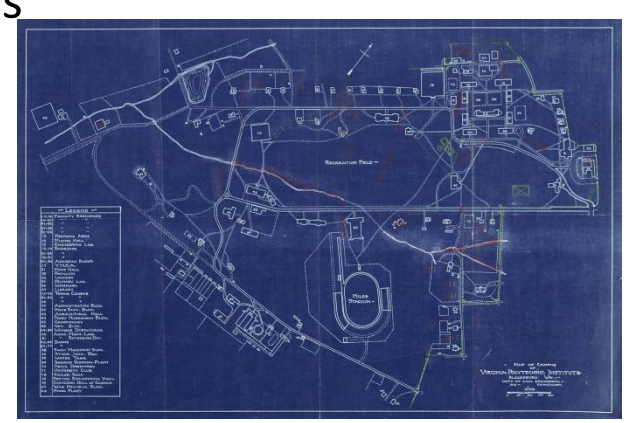
1. Surveying: Is the art of determining the relative position of various points above, on or below the surface of the earth.
2. Levelling: Is the art of determining the relative vertical distance of different points
   i. Measurement Taken
      a) Vertical distance
      b) Horizontal Distance
      c) Angle
         a) Horizontal
         b) Vertical
   ii. Computation
   iii. Preparation of maps and plans
   iv. Used for
      a) Calculation of length
      b) Area
      c) Volume
3. Art of tracing the points on a map to the ground
4. Purpose of the surveying:

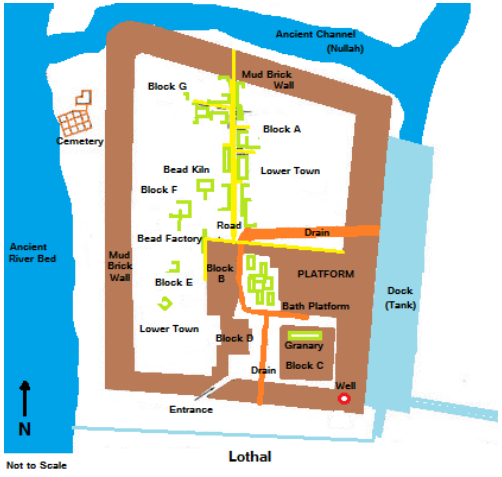


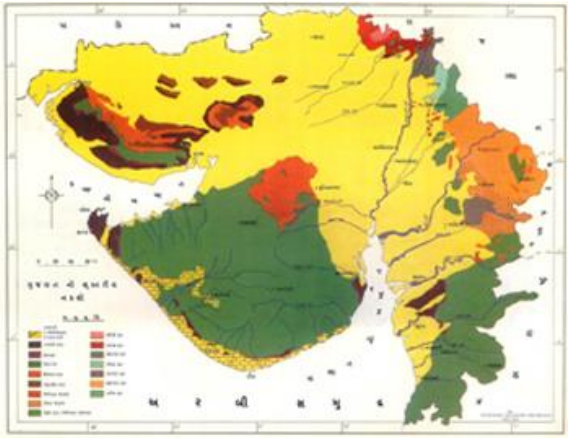
- Take measurements to determine the relative position of the point
- Make layouts , maps or plans to mark the proposed position of structure on the surface
- Determine the area, volume and other relative quantity.

Use of Surveying

- Preparation of Map
  1. To prepare the topographical maps
  2. Prepare cadastral maps showing boundaries, houses and properties
  3. Engineering map
  4. Military map
  5. Geological map
  6. Archaeological map

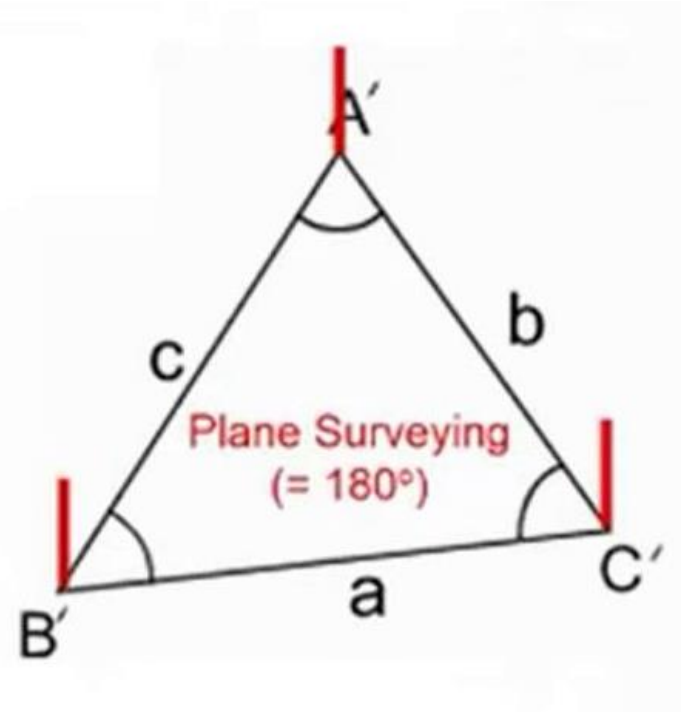


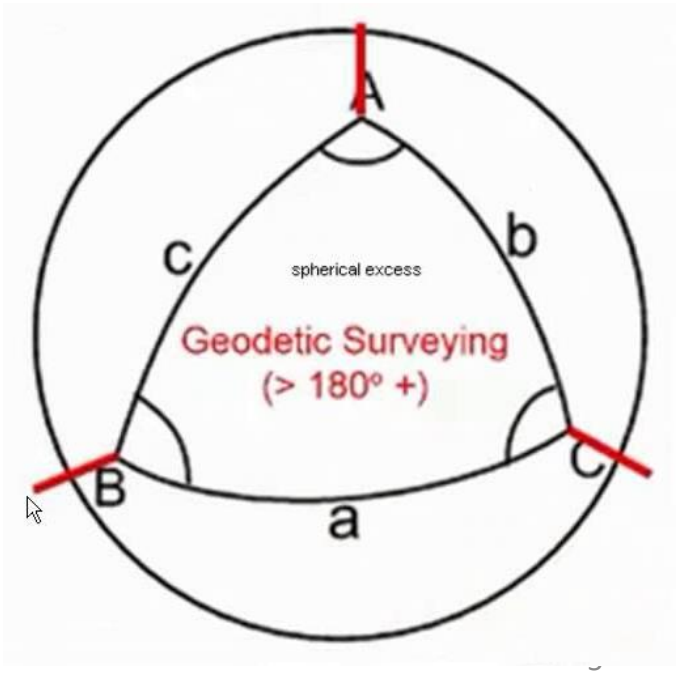




Primary Divisions of Surveying

- Primary Classification:
  - Division is based on the basis weather the curvature of the earth is taken in to consideration or not
    - Plane Surveying :
      - Curvature of earth is neglected and assumed as plane surface
      - Horizontal surface:
      - Vertical line:
      - Plane survey can be used when considered for a small area (Less than 250 Km^2)
      - Degree of accuracy is comparatively low
    - Geodetic surveying
      - Curvature of earth is taken in to consideration
      - Large distance and large area
      - Refined methods of observation and adjustment





Difference between plane survey and geodetic survey

Plane Survey

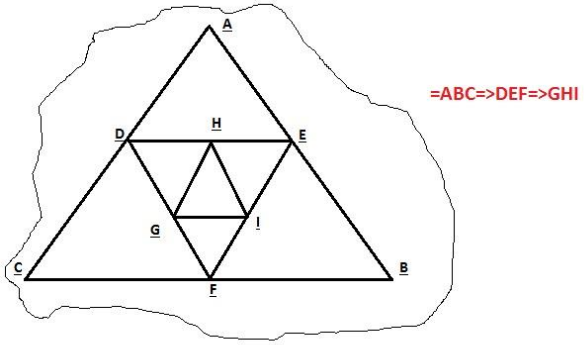
1. Curve of the earth is ignored
2. Used for relatively small area (<250 SqKm)
3. Used for establishing relatively less important area
4. Direction of plumb lines are assumed to be parallel to one another
5. Lower accuracy
6. Angle of triangle formed by any three line considered to be plane

Geodetic Survey

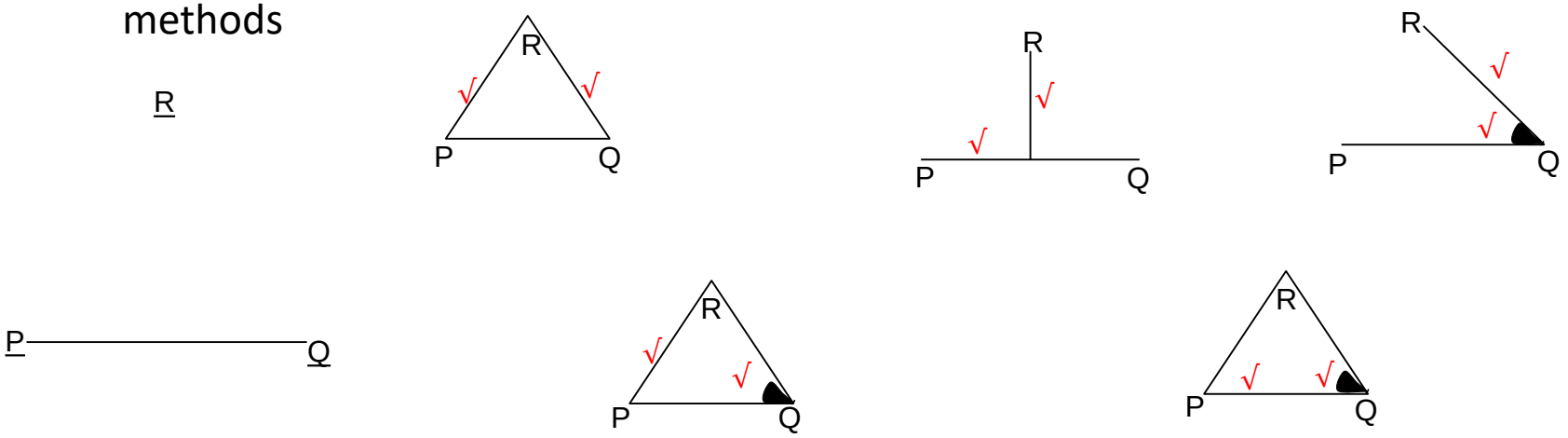
1. Curvature of earth is taken it to consideration
2. Used for larger area (>250SqKm)
3. Used for establishing precise points
4. Direction of plumb lines are different at various points
5. High accuracy and high precise instruments are used
6. Angle of triangle formed by any three line considered to be plane

Principles of Surveying:

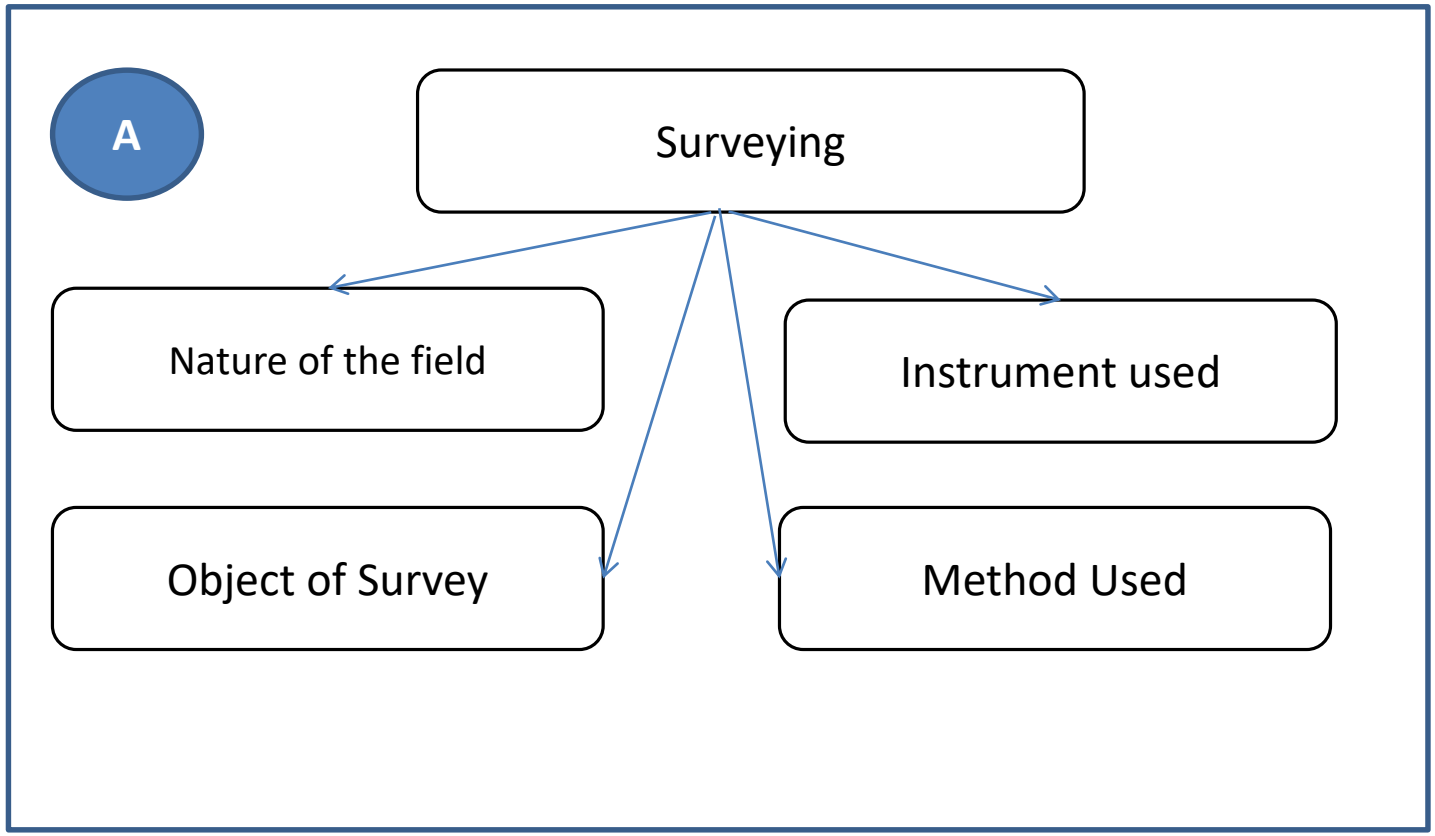
- Work should be done from “whole to part” and not from “part to whole”



- Position of new station should be fixed by at least two independent methods

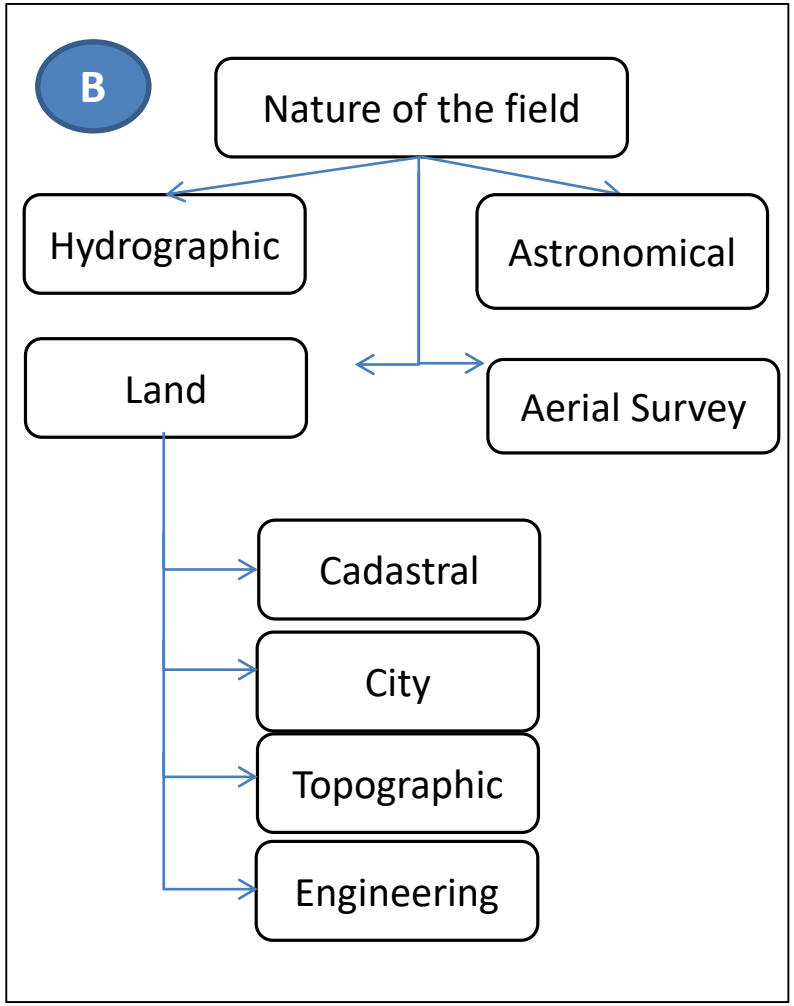


Classification of Survey

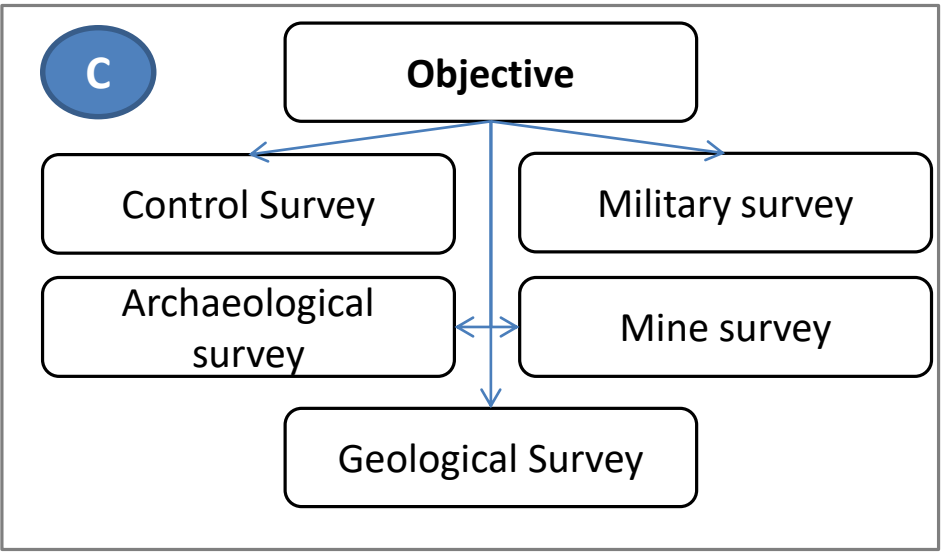


- **Hydrographic Survey:**
  - On or near the body of water.
  - Locating shore line
  - Estimation of water flow
  - Profiling of area beneath the water
- **Land Survey**
  - Determining boundaries and area of land
    - Topographic survey:
    - City survey:
    - Engineering survey: design and planning of engineering work
      - Reconnaissance survey
      - Preliminary survey
      - Location Survey
    - Cadastral Survey: Boundaries of private bodies
- **Astronomical survey:**
  - Determination of earth location (lat, long, time by observing astronomic bodies
- **Aerial Survey**
  - Conducted from aircraft
  - Photographs were taken and study

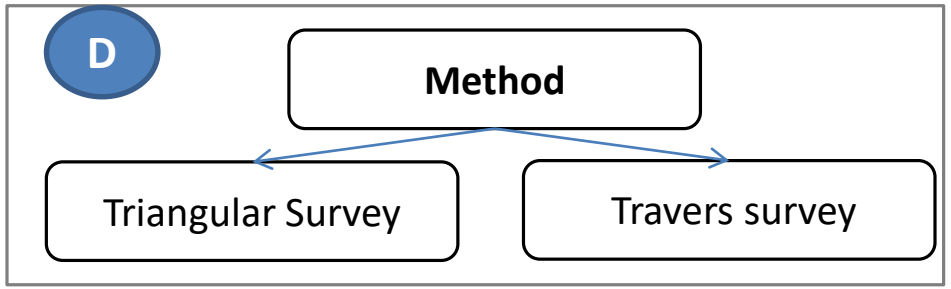
Classification Nature of the field



Classification based on objective of survey



Classification based on Method used



Classification based on instrument used