UNIT I

Chapter 1 : Compass and Levelling 1-1 to 1-50

a) Definition and Importance of Surveying ; Principles of Surveying

b) Definition, objective and fundamental classification of surveying (Plane and Geodetic), concept of Scale, Ranging, Chaining, Offsetting and Traversing. Construction and use of prismatic compass, Concept of bearing and types of bearings such as Whole Circle Bearing, Quadrental Bearing, meridian and their types, local attraction and correction for local attraction, dip, declination and calculation of true bearings, including numericals of all types.

c) Equipment required for plane table surveying, uses, advantages and disadvantages and errors in plane table surveying. Methods of plane table Survey Radiation, intersection, traversing and resection

d) Introduction to leveling, Types of leveling, Types of benchmarks, Study and use of dumpy level, auto level, digital level and laser level in construction industry, principal axes of dumpy level, testing and permanent adjustments reciprocal leveling, curvature and refraction corrections, distance to the visible horizon. Collimation Plane Method, Rise and Fall Method.

a) Study of vernier transit 20" theodolite, uses of theodolite for measurement of horizontal angles by repetition and reiteration, vertical angles, measurement of deflection angles using transit theodolite and magnetic bearing, prolonging a line, lining in and setting out an angle with a theodolite. Fundamental axes of theodolite: testing and permanent adjustments of a transit theodolite.

b) Theodolite traversing – computation of consecutive and independent co-ordinates, adjustment of closed traverse by transit rule and Bowditch's rule, Gales traverse table. Checks, omitted measurements, area calculation by independent co-ordinates.

UNIT III

a) Tacheometry - applications and limitations, principle of stadia tacheometry, fixed hair method with vertical staff to determine horizontal distances and elevations of points, finding tacheometric constants. Tacheometric contouring. Numericals.

b) Contouring - Definition of Contours, Characteristics of Contours, Contour Patterns for various natural features, direct and indirect methods of contouring, uses of contour maps, study and use of topo-sheets, profile leveling and cross-sectioning and their applications.

UNIT IV

Introduction to horizontal and vertical curves (including numericals but derivation not expected), different types of curves and their applications, simple and compound circular curves, elements and setting out by linear methods such as radial and perpendicular offsets, offsets from long chord, successive bisection of chord and offsets from chords produced. Angular methods : Rankine's method of deflection angles (one and two theodolite methods). (Numerical on simple circular curves and compound curves to be asked), Transition curves : necessity

UNIT V

a. Introduction to construction survey, establishing of horizontal and vertical controls, setting out of buildings, maintaining verticality of tall buildings, survey for open traverse (roadway, railways, drainage lines, water lines, canals)., Setting out of a bridge, Determination of the length of the central line and the location of piers. Setting out of a tunnel – Surface setting out and transferring the alignment underground.

b. Introduction to SBPS, SBPS systems - GPS, GLONASS, Galileo, GAGAN, BeiDou and their features, Segments of SBPS (Space, Control and User), applications of SBPS in surveying.

UNIT VI

Introduction to Geodetic Survey, Objects, Methods of Geodetic Surveying, Introduction to triangulation and trilateration, Objective of triangulations surveys, Classification of triangulation systems, Triangulation figures, Strength of figure, Study and use of one second theodolite and Electronic Total Station,

Introduction to Hydrographic Survey Objects, Applications, Shore line survey, Sounding, Sounding equipment, Methods of Sounding and Sounding Equipment, Stream gauging, Three point problem

Aerial Photogrammetry Objects, Classification-qualitative and quantitative photogrammetry, Applications, comparison of Map and aerial photographs, Flight Planning, Calculation of no of Photographs.

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