

# **DETAILED SYLLABUS FOR THE POST OF JUNIOR INSTRUCTOR- SURVEYOR {INDUSTRIAL TRAINING}SR FOR SC/ST AND ST ONLY**

**(Category Number : 331/2019, 398/2021)**

**(Total 100 marks)**

## **MODULE 1 - FUNDAMENTAL DEFINITIONS & CONCEPTS IN SURVEYING (10 marks)**

Primary divisions of survey, Classification of survey. Basic principles of surveying. Units of measurements. Plans and maps. Scales - different types - representative fraction. Errors in surveying - Sources - kinds of errors - permissible error.

## **MODULE 2 - SURVEY USING CHAIN / TAPE (12 marks)**

Linear measurements - different methods. Chain surveying - Instruments for chain surveying - chains - types of chain, Tapes - types. Ranging out survey lines. Measurement of length using chain and tape. Chaining on sloping ground - different methods. Errors in chaining.

Chain triangulation - Survey lines - arrangement of survey lines. Offsets for locating features. Cross staff survey. Field work and entering in field book. Conventional signs. Instruments for setting out right angles. Obstacles in chaining - methods to overcome obstacles. Plotting a chain survey.

## **MODULE 3 - PLANE TABLE SURVEYING (8 marks)**

Instruments used in plane table surveying. Working operations. Methods of plane tabling - radiation, intersection and traversing.

## **MODULE 4 - COMPASS SURVEYING (10 marks)**

Instruments for measurement of angles or directions. Bearing of a survey line. Designation of bearings. Conversion of bearings from one system to the other. Fore bearing and back bearing. Calculation of angles from bearings and vice versa. Prismatic and Surveyor's compass. Dip and Declination. Local attraction. Methods of correction of observed bearings.

## **MODULE 5 - LEVELLING & CONTOURING (12 marks)**

Definition of terms in levelling. Methods of levelling. Levelling instruments. Types of level. Types of levelling staff. Temporary adjustments of a level. Simple levelling and differential levelling. Calculation of Reduced levels - Height of instrument method and Rise & fall method. Reciprocal levelling. Cross-sectioning. Profile levelling.

Contouring - Contour interval. Characteristics of contours - methods of locating contours. Interpolation of contours. Contour gradient. Uses of contour maps.

## **MODULE 6 - THEODOLITE TRAVERSING (13 marks)**

Definition and terms in theodolite surveying. Types of theodolite. Parts of a transit theodolite. Temporary and permanent adjustments of a theodolite. Measurement of horizontal angle. Measurement of vertical angles. Miscellaneous operations with theodolite.

Traverse survey – types of traverses. Methods of traversing – loose needle method, fast needle method. Checks in closed traverse, checks in open traverse. Traverse computations – Latitude and departure, Consecutive coordinates and independent coordinates. Closing error. Balancing a traverse – Bowditch's method and Transit method. Gale's traverse table. Omitted measurements.

#### **MODULE 7-TACHEOMETRIC SURVEY & HYDROGRAPHIC SURVEY (10 marks)**

Instruments used in tacheometry. Different systems of tacheometric measurements – stadia method and tangential method. Use of anallactic lens.

Hydrographic survey - Horizontal and vertical controls. Shore line survey. Soundings – Methods of locating soundings. Reduction of soundings.

#### **MODULE 8 - SETTING OF CURVES (10 marks)**

Different types of curves - elements of a simple curve - designation of a curve - setting out simple circular curves. Rankine's method of deflection angles. Transition curves. Vertical curves.

#### **MODULE 9 - MODERN SURVEY INSTRUMENTS, REMOTE SENSING, GPS, GIS (10 marks)**

Electro-magnetic distance measurement (EDM). Types of EDM instruments. Geodimeter. Tellurometer. Distomat. Total station – component parts – set up – working principles – temporary adjustments. Measurements of Horizontal angles, vertical angles, distances and coordinates using Total Station, Traversing, Profile Survey and Contouring with Total Station.

Remote Sensing – Remote sensing system, Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management. Use of Global Positioning System (G.P.S.) -instruments. Geographic Information System (GIS): Components - Applications- Software for GIS.

#### **MODULE 10 -BASICS OF ENGINEERING DRAWING - (5 Marks)**

Drawing Instruments and supporting materials. Convention of lines and their applications. Dimensioning techniques as per SP-46:2003.

Computer Aided Drafting - concept. Hardware and various CAD software available. System requirements and understanding the interface.

**NOTE:** It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.