

**SCHEME AND SYLLABUS FOR RECRUITMENT TO THE POST OF ASSISTANT
DIRECTOR IN A.P. SURVEY SETTLEMENT AND LAND RECORDS**

**SCHEM OF THE EXAMINATION
(Degree Standard)**

WRITTEN EXAMINATION (Objective Type)				
Paper	Subject	No. Of Questions	Duration Minutes	Maximum Marks
Paper - I	General Studies & Mental Ability	150	150	150
Paper - II	Subject: Civil Engineering	150	150	300
Total				450
N.B.1: As per G.O.Ms. No.235 Finance (HR-1, Plg& Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3 rd of the marks prescribed for the question in all Objective type papers.				

SYLLABUS

PAPER-I: GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science& Technology and information Technology.
4. Social- economic and political history of modern India with emphasis on Andhra Pradesh. **(Starts from 1707 AD)**
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives with specific reference to Andhra Pradesh.
6. Economic development in India since independence with emphasis on Andhra Pradesh.
7. Physical geography of Indian sub-continent and Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster.
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
 - a) Tabulation of data
 - b) Visual representation of data
 - c) Basic data analysis (Summary Statistics such as mean, median, mode, variance and coefficient of variation) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and Legal implications/problems.

Paper - II
CIVIL ENGINEERING

1. Strength of Materials, Theory of Structures and Designs.

Strength of materials: Simple stresses and strains, Principal stresses and strains, shear force and Bending moment of determinate beams, Deflection of beams, Moment-Area Method and Conjugate Beam Method, Direct, flexural and shear stresses in the determinate beams, torsion of circular shafts, columns and struts.

Theory of structures: Propped cantilever and fixed beams. Castigliano's I and II theorems. Deflection of determinate pin jointed trusses. slope-deflection, Moment distribution and Kani's methods of analyses applied for indeterminate beams and rigid frames (Single bay two storey and Two bay single storey rigid frames) including settlement of supports and supports at different levels subjected to gravity and lateral loads.

Influence Lines: Influence Line Diagram (ILD) for simply supported beams subjected to Point loads, uniformly distributed load (udl). Shear force and Bending moment at a section using the concept of ILD. Absolute maximum bending moment for the given loads. Influence lines for determinate Trusses.

Arches: Three hinged and two hinged parabolic and circular arches. Influence lines for three and two hinged parabolic arches.

Steel structures: Limit State Design. Design of Bolted and Welded Connections. Design of simple and compound beams. Design of Tension Members. Design of Compression Members. Laced and battened columns. Design of column bases and footings.

Reinforced Concrete Structures: Design of singly, doubly reinforced and T-beams, Design of one way and two way slab, Design of long and short columns, design of rectangular and the combined footings only for two columns.

Pre-stressed concrete: Methods of pre-stressing, pre-tensioned and post-tensioned members, analysis and design of sections for flexures, losses in pre-stressing.

2. Soil Mechanics and Foundation Engineering, Fluid Mechanics

Soil Mechanics: Volume relationships, index properties of soil, soil classification, Permeability, Seepage and quick sand condition, Flow nets. Co-efficient of compressibility, consolidation settlement, pre-consolidation pressure, Compaction of soil, field compaction control. Mohr's Coulomb failure theory, effective stress, shear tests and shear parameters.

Foundation Engineering: Rankine's and Coulomb's earth pressure theories, earth pressure on retaining walls with horizontal and sloping back fill. Slope stability by Swedish circle and Friction circle method, Taylor's Stability number, Terzaghi's and Meyerhof's bearing capacity analysis, general and local shear failure, effect of water table on bearing capacity. Types and selection of footings, settlement computation, Boussinesq's and Westergaard's equation for vertical stresses in soil, pressure bulb, Vertical stress in soil due to uniformly distributed load on circular area, Newmark's influence chart.

Fluid Mechanics: Fluid properties, Fluid pressure, Fluidflow, equation of continuity, Euler's, Energy and Momentum equations, free and forced vortices, Venturimeter, Notches & Weirs. Laminar flow through circular tubes, Reynold's experiments, Flow through pipes, hydraulic gradient and total energy lines, pipes in series and parallel, syphon, Major and Minor losses in pipes. Open channel Flow, uniform and non-uniform flows, specific energy and critical depth, Rapidly varied flow – hydraulic jump, Gradually varied flow. Boundary layers – Laminar and turbulent boundary layers, laminar sub-layer, smooth and rough boundaries, drag and lift. Dimensional analysis and similitude: Types of similarities, undistorted and distorted models.

3. Building Materials, Construction scheduling

Building materials: Timber, stones, bricks, sand, limes, cement, paints, varnishes and damp proofing material. Brick work for walls, types of brick bonds, design of brick masonry walls as per IS code, detailing of walls, floors, roofs, ceilings, stair cases, doors and windows, finishing of buildings – plastering, pointing and painting – IS codes. Use of Ferro cement, fiber – reinforced and polymer concrete in construction, building estimates and specifications. Construction Scheduling, PERT and CPM methods.

4. Surveying and Photogrammetric Surveying:

General surveying – chain, compass and plane table survey. Levelling and contouring, Estimation of earth work. Theodolite survey, Computation of areas by co-ordinate system. Curves: Types of curves and elements of curves. Tacheometric Surveying: Stadia and tangential methods of Tacheometry, Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station, Errors in Total Station Survey. Perspective geometry of aerial photograph, Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, photographic mapping- mapping techniques.

5. Remote Sensing, Geographical Information Systems (GIS) and Global Positioning System (GPS):

Elements and Terminology in Remote Sensing, Electromagnetic spectrum, Energy Sources, Energy Interactions with Earth Surface Features and Atmosphere, Resolution, Sensors and Satellites, Visual Interpretation Techniques-Basic Elements, Interpretation for Terrain Evaluation, Spectral Properties of Water Bodies. GIS Terminology, GIS Categories, Components of GIS, Fundamental Operations of GIS, A theoretical Framework for GIS, Raster Data Structures, Vector Data Structures. Data Acquisition and Data Input: Existing Data Sets, Developing Own Data, Digitization and Scanning, Pre-processing- Format Conversion, Data Reduction and Generalization, Error Detection and Editing, Merging, Edge Matching, Rectification and Registration, Interpolation. Space segment, control segment, user segment, factors influencing GPS accuracy, GPS positioning. Base line data computation, Coordinate change and satellite positions, GPS receivers. GPS applications.

6. Water resources and Irrigation Engineering:

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration. Run-off, hydrograph, unit hydrograph, flood estimation, frequency analysis. Specific yield, storage coefficient of permeability, confined and unconfined aquifers, radial flow into a well under confined and unconfined conditions, recuperation tests. Water Resources Planning: Single and multipurpose projects, storage capacity, zones of storage, reservoir losses, reservoir sedimentation, flood routing through reservoirs, economics of water resources projects. Consumptive use of water, Duty and Delta, frequency of irrigation, efficiency of irrigation, Irrigation methods. Types of Dams, Gravity dams, Principles of design, criteria for stability, control of seepage, Earth dams – Design principles, Spillways, Energy dissipation. Types of canals, design of unlined canals, Lacey's regime theory, Aqueducts and super passages. Components of Diversion scheme, Wiers on permeable foundations – Bligh's and Khosla's theories.

7. Environmental and Transportation Engineering:

Population forecast, Analysis of water, Hydrogen-ion concentration, Sedimentation, Coagulation, Chlorination, Methods of disinfection, Break point chlorination, Slow sand, Rapid sand and Pressure filters. Removal of temporary and permanent hardness. Analysis of distribution system using Hardy cross method, general principle of optimal design based on cost and head loss ratio criterion, Maintenance of distribution systems, pumping station and their operation. Methods of carrying refuses, systems of sewerage, Sewers of different materials and shapes, self cleansing velocity, purification of natural streams, empirical formulae used in the design of sewers, deep man holes and their location, Automatic flushing tank, Different types of traps and classification. Primary treatment to sewage, carbon cycle, B.O.D., C.O.D., and dissolved oxygen, Grit chamber, Detritus tank, skimming tank, sludge digestion process, contact beds, septic tank, imhoff tank, Activated sludge process, sludge volume index. Sources, effects and remedial measures of water, Air and Noise pollutions, particulate and Dust collection devices like internal separators, wet collection devices and electrostatic precipitators.

Highway alignments, width of pavement, camber, types of gradient, Resistance to traction, sight distances, Super elevation and centrifugal ratio. Water Bound Macadam Road, Bituminous and cement concrete Roads, Flexible and rigid pavements, types of study for traffic, Road parking, Road accidents and traffic regulation, inter sections and rotary. Rails, creep of rails, balast, sleepers, Fastenings and Fixtures, Gauges, Turnouts, Crossings, Types of crossings, Railway track, drainage, Maintenance of track components, Traffic signals, Station yards and Machinery, station buildings, Platform sidings, turn tables, signal and inter locking, level crossing and necessary precautions. Take-off and landing distances, characteristics of jet air craft, selection of site for air port, Survey for selection of site, Wind rose diagram, Run way width, length and design criteria, standard for general aviation. Design of Taxi-way.