SCHEME AND SYLLABUS FOR THE POST OF ASSISTANT DIRECTOR OF SURVEY SETTLEMENT & LAND RECORDS SERVICE

SCHEME

Degree Standard:

PART – A: WRITTEN (Objective Type) EXAMINATION				
Paper-1	General Studies & Mental ability	150 Marks	150 Questions.	150 Minutes
Paper-2	Subject: Civil Engineering	300 Marks	150 Questions.	150 Minutes
PART – B:	INTERVIEW (ORAL TEST)	50 Marks		

SYLLABUS

GENERAL STUDIES & MENTAL ABILITY

1. General Science – Contemporary developments in Science and Technology and their implications including matters of every day observation and experience, as may be expected of a well-educated person who has not made a special study of any scientific discipline.

2. Current events of national and international importance.

3. History of India – emphasis will be on broad general understanding of the subject in its social, economic, cultural and political aspects with a focus on AP Indian National Movement.

4. World Geography and Geography of India with a focus on AP.

5. Indian polity and Economy – including the country's political system- rural development – Planning and economic reforms in India.

6. Mental ability reasoning and inferences

SUBJECT : CIVIL ENGINEERING

Strength of Materials, Theory of Structures and Designs.

a) Strength of materials: Simple stresses and strains, principal stresses and strains, shear force and binding moment of beams, Derivation of $M/I = f_b/y=E/R$, Deflection of beams, Direct and bending stresses, torsion of circular shafts, columns and struts.

b) Theory of structures: Castigliano's I and II theorems, slope deflection, moment distribution and Kani's methods of analysis applied for indeterminate beams and rigid frames.
Rolling loads: Propositions for the maximum bending moment at any given section and under any given load, Equivalent uniformly distributed load, influence line for uniformly distributed load shorter than span for maximum bending moment and shear force, Maximum bending moment for series of point loads travelling the girder, Influence lines for tresses.
Arches: Three hinged and two hinged parabolic arches influence lines for three hinged arches.

c) Steel structures: Design of simple, compound beams and laced and batened columns. Design of column bases and footings, Design of highway and railway bridges through and deck type plate girders, warren girders and pratt truss.

d) Limit state method: Design of singly, doubly reinforced and T-beams, Design of lintel one way and two way slab, Design of long and short columns, design of rectangular and combined footings.

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

Soil Mechanics and Foundation Engineering

a) Soil Mechanics: Definitions and relationships, particle size distribution, Atterburg limits, Permeability and permeability tests, Seepage pressure, quick sand condition, Laplace equation, Flow net, construction, properties, uses and applications.

b) One dimensional consolidation, co-efficient of compressibility consolidation settlement, pre-consolidation pressure, one dimensional consolidation equation, consolidation test, compaction, Field compaction method, proctor's and modified compaction test, field compaction control, factors affecting compaction.

c) Shear strength, Moher's Coulomb failure theory, effective stress, Direct shear test, Triaxial compression test and vane shear test, Rankine's theory of active and passive earth, pressures, Retaining walls, Horizontal and sloping back fill, Coulomb's Wedge theory and Rohban's construction.

d) Infinite and finite slopes, Swedish circle method, Friction circle method, Taylor's Stability number, Bearing capacity, defination, Terzaghi's analysis for shallow footing, general and local shear failure, Terzaghi's semi empirical equations for square and circular footings, effect of water table on bearing capacity.

e) Types of selection of footing, Raft, pile and floating foundations, settlement, computation for immediate and consolidation settlement, Boussarlugy equation for stress under point load and uniformly distributed load, pressure bulb, vertical pressure under uniformly distributed load on circular area, New mark influence chart.

Fluid Mechanics:

Fluid properties, Fluid Statics – Forces on flat plate and curved surfaces.

Kinematics and Dynamics of Fluid flow, stream lines, equation of continuity, stream function and velocity potential function, flow nets, types of flows.

Euler's equation of motion, Energy and Momentum equations and their applications to pipe flow, free and forced vertices, venturimeters, and Notches & Weirs.

Laminar flow through circular tubes, Reynold's experiments, Flow through pipes, hydraulic gradient and total energy lines, pipes in series and parallel, syphom, Minor losses in pipes.

Open channel Flow, uniform and non-uniform flows, best hydraulic sections, specific energy and critical depth, Rapidly varied flow – hydraulic jump and its applications, Gradually varied flow – differential equations, classification of surface profiles.

Boundary layers – development of b.L. flow, laminar and turbulent boundary layers, laminar sub-layer, smooth and rough boundaries, drag and lift.

Dimensional analysis and similitude: Types of similarities, model studies, undistorted and distorted models, Bukingham II-theorem – applications.

Computer Programming:

Type of computers – components of computer, historical development of computing systems. Different languages, Flow charts.

Fortran/Basic programming, constants & Variables, expressions, arithmetic statements, library functions.

Control statements, GO TO statements – Un conditional and computed, IF statements, DO statements.

Subroutines and Function sub-programmes – Arguments, CALL statement RETURN statement, Declaration statements.

Input and output statements, and Quoted Formats, FORMAT statements, Field specification, Stop and END statements.

Subscripted Variables, Arrays, DIMENSION statement, Simple applications of computer programming in civil engineering.

Building Materials, Construction and Surveying:

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.

General surveying – chain and compass survey, plane table survey – in combination with one another.

Levelling and contouring:- Fly levelling, reciprocal levelling, net levels, Reduction of levels, curvature and refraction corrections, characteristics of contours – estimation of earth work.

Theodolite survey: Temporary and Permanent adjustments, Traverse survey, computation of areas by co-ordinate system, theory of simple circular curve by linear and instrumental methods.

Tachometry: Stadia wires, Fixed and mobile wires, Tachometric tables, tachometric alidade, Reduction by calculations.

Water resources and Irrigation Engineering:

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration, infiltration. Run-off hydrograph, unit hydrograph, flood estimation frequency analysis.
Ground Water: Ground water resources, 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.
Water Requirement of Crops: Consumptive use of water, Duty and Delta, frequency of irrigation, efficiency of irrigation, Irrigation methods.
Storage Works: Types of Dams and their characteristics, Gravity dams principles of design, criteria for stability, control of seepage, Earth dams – Design principles, spillways – types and their suitability, energy dissipation, crest gates.
Canals: Alignment of canals types of canals, design of unlined canals Lacey's regime theory, cross masanry works – canal falls, Cross Drainage works – Aqueducts and super passages.
Diversion Works: Components of Diversion scheme, Weirs on permeable foundations – Bligh's and Khosla's theories – Design principles.

Environmental Engineering:

a) Water Supply: Protected Water Supply Scheme, Rate of demand, Population forecast, Analysis of water, Hydrogen-ion concentration, Sedimentation, Coagulation Chlorination, Methods of disinfection, Break point chlorination, Slow sand, Rapid sand and Pressure filters.
b) Hardness of Water: Removal of temporary and permanent hardness, Distribution systems of water, pipe appurtenances, Analysis of distribution system using Hardy cross method, general principle of optimal design based on cost and head loss ratio criterion, Maintenances of distribution systems, pumping station and their operation.
c) Sanitary Engineering: Methods of carrying refuses, systems of sewarage, 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.
d) Quality of Sewage: 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.
e) 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.

Transportation Engineering:

a) Road development in India, Road planning, High way alignments, width of pavement, camber, types of gradient, Resistance to traction, sight distances, Super elevation and centrifugal ratio, circular, compound, vertical, reverse and transition curves.
b) Types of Road: 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.
c) Permanent Ways: Rails, creep of rails, blast, sleepers, Fastings and Fixtures, Gauges, Trunouts, Crossings, Types of crossings, Railway track, drainage, Maintenance of track components, Traffic signals.
d) Station yards and Machinery, station buildings, Platform sidings, turn tables, signal and inter locking, level crossing and necessary precautions.
e) Development of Air Port: 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.

Sd/- Secretary