SYLLABUS
CIVIL ASST (DIPLOMA)

1. BUILDING MATERIALS:

(i) Brick: Composition, Classification, manufacturing process and uses.
(ii) Concrete: Composition & promotion of ingredients, mixing and placing, water cement ration.
(iii) Timber: Classification & structure, defects, disease & decay, seasoning & use.
(iv) Paint, Varnished & Distemper: Purpose of painting, ingredients of paint & varnished, purpose of applying distemper & process of distempering.

2. BUILDING CONSTRUCTION:

(i) Bearing Capacity of Soil: Determination of bearing capacity of soil, method improving bearing capacity of soil.
(ii) Foundation: Definition, load on building, types of building foundation.
(iii) Stair Case: Location, types of stair case & importance of stair case with reference to building construction.
(iv) Roof.
(v) Details of Doors & Windows.

3. SURVEYING:

(i) Chain Survey: Definition, principles of chain survey, error due to incorrect ranging, error in length. Numerical problems.
(ii) Compass Survey: Definition, basis difference between chain & compass survey, bearing of lines, types of meridians, whole circles & quadrantal bearing. Numerical problems.
(iii) Leveling: Definition of different terms in leveling methods of finding out reduced level, fields book recording, effects of curvetion & refraction. Numerical problems.
(iv) Contouring: Definition, uses and characteristics of contour, methods of contouring.
(v) Plane Table Surveying: General description, accessories of place table, setting up of place table, orientation, two point & three point problem.

4. P.W.D. ACCOUNTS:

(i) Organization of Engineering Department: Regular and work charges establishment, duties and responsibilities of Sub-Engineer.
(ii) Work: Classification of work, Original, major, minor, repair work, annual repair, special repair. Method of execution of work: through contract or departmentally, contact agreement, work order, item rate contact, lump-sum contract, schedule rate contract & cost plus percentage contract. Measurement book, master roll, quittance roll, method of labour payment and use of forms and necessity of submission.

5. ROAD ENGINEERING:

(i) Introduction: Requirements of good, history of road development in India.
(ii) Road Project: road survey, preparation of map, land acquisition, road alignment, longitudinal section, cross section & formation.

(iii) Classification of Road: Classification of road as per I.R.C. & cross-section of different classes of roads.
(iv) Design, Construction & Maintenance of roads: Earth & gravel roads, W.B.M. roads, bituminous road, difference between flexible and rigid pavement.
(v) Road Drainage: Drainage of urban roads and hill roads.
(vi) Traffic Engineering & Traffic Control: road junction, grade separation, traffic island, pedestrian crossing, road sign and object of road arboriculture.
(vii) Design and construction of bridges and culverts.

6. HYDRAULICS:

(i) Hydrostatics: Density, specific gravity, surface tension viscosity & their units, definition of pressure, intensity of pressure, atmospheric pressure, gauge pressure, total pressure, centre of pressure, buoyancy, centre of buoyancy, metacentre & metacentric height. Numerical problems.

(ii) Hydrodynamics: Basic equation of fluid flow & application, equation of continuity of liquid flow, Bernoulli's theorem & its application, venturimetre, orifice meter, pitot tube. Numerical problems.

Definition of various hydraulic co-efficients and their relationship. Numerical problems.

Difference between notches and weirs deduction of discharge formula for different types of notches. Numerical problems.

Flow of water through pipes, various losses in flow through pipes, derivation of formula. Numerical problems.

(iii) Hydraulics Machines: turbine-general classification & principles. Types of pumpcentrifugal

pump & reciprocating pump.

7. THEORY OF STRUCTURE:

(i) Bending Moment and Shear Forces: B.M. & S.F. of beans simply supported and cantilever with point loas and U.D.I. Numerical problems.

(ii) Bending stress in Beam: Bending stress in steel & timber beam, fletched beam. Numerical problems.

(iii) Stability of Retaining Wall and Dam: Calculation of forces acting on retaining wall and dam, Rankin's formula for earth pressure, stresses at base criteria for safety and stability calculation. Numerical problems.

(iv) Complex Stress and Strain: Definition of principle stress, stresses in inclined plane, Mohr's circle for calculation of stresses graphically. Numerical problems.

8. IRRIGATION AND HYDRAULIC STRUCTURES:

(i) Introduction: Definition necessity for irrigation, types of irrigation in India.

(ii) Rainfall and Run off: Measurement of rain, rain gauge, run off, factors effecting run off, characteristics of catchment area, factors effecting run off.

(iii) Water Requirement of Crops: River, lake, well, tube well, yield from these sources, river head work.

(iv) Storage Dam: concrete dam and earth dam, materials used for construction, advantages and disadvantages, construction of dams.

(v) Lift Irrigation: Wells, dupe wells and tube wells.

9. DESIGNING, DRAWING AND DETALLING:

(i) Introduction: Details of R.C.C. beam, slab, column, lintel, footing and stair case.

(ii) Design of R.C.C. Member: beam, slab, column, column footing, numerical problems.

(iii) Design of simple Steel Structure: types of joints, permissible stresses in rivets, design of joints, framed connection & seat connection. Numerical problems.

10. ESTIMATING:

(i) Introduction: General idea of estimating, use of standard estimating forms, use of schedule of rates.

(ii) Earthwork: Unit of measurement, different methods of calculating quantity of earth. Numerical problems.

(iii) Road Work: Unit of measurement, method of estimating various items of works.

(iv) Masonry Work: Units of measurement, method of estimating brick maronry &

reinforces brick masonry.

(v) Concrete Work: Unit of measurement, method of estimating mass-concrete and reinforced concrete work and shuttering.

(vi) Rate Analysis: analysis of rates of brick, plain cement concrete work, R.C.C. work, door, window, plastering, R.C.C. floor, white washing, shuttering, D.P.C. & carriage of materials.

(vii) Types of Estimate: Plinth area estimate, cubic rate estimate, detailed estimate, revised estimate, supplementary estimate, annual repair estimate, contingency and work charged establishment, departmental charge, bill of quantities & costing. Numerical problems.

11. SOIL MECHANICS:

(i) Introduction: Definition, particle size, classification, particle arrangement in coursegrained,
clays and composite soils.

(ii) Soil Engineering Tests: Water cement ration, specific gravity, particle size distribution, liquid limit determination and plastic limit determination application of consistency limit. Numerical problems.

(iii) Permeability: Head, gradient, Dory's law, laboratory determination and filed determination of permeability, concept of seepage, discharge through flow nets, flow net sketches.

12. RAILWAY:

(i) Introduction: History of railway development in India, importance of railway.

(ii) Railway Project: Traffic survey, engineering survey, track alignment, land with, selection of site for station yard.

(iii) Permanent Way: Definition, requirement of permanent way, gauges of railway track, function of rails, requirement of rails, types of rail sections.

(iv) Railway Joints & Sleeper: Requirement of ideal joints, types of railway joints, function of sleepers, type of sleepers & comparison between different types of sleepers.

(v) Signaling: Definition & objective classification of signaling system, methods of control for movement of trains.

13. PUBLIC HEALTH:

(A) WATER SUPPLY

(i) Introduction: necessity of public water supply, population forecast, estimating of quantity of water, design period of water supply project.

(ii) Sources and Collection Work: Sources of water, ground water, aquifer, velocity, porosity, permeability, shallow and deep well, infiltration gallery, collection of samples for various tests, various impurities, hardness and P.N. value determination.

(iii) Clarification of Water: Process of screening, softening, settling and sedimentation, coagulation, flocculation and settling tank.

(iv) Filtration: Theory of filtration, design of slow sand and rapid gravity filter with construction details.

(v) Chlorination & Softening: Necessity of disinfection methods and types of chlorination, removal of free residual chlorine, water softening.

(vi) Distribution System: Service reservoir function & design, simple network design of distribution, leakage, prevention of waste, maintenance of minimum and maximum pressure in pipe, prevention of corrosion in pipe.

(B) SANITATION

(i) Introduction: Purpose & principles of sanitation, requirement of rural and urban

sanitation.

(ii) Underground Drainage & Sewerage: Quantity of sewage, types of sewer, maximum and minimum flow, self cleansing velocity, size of sewers, gradients, design, domestic and industrial flow of sewage, ventilation of sewers, inspection chamber, sewer materials, construction, laying, jointing, manhole, drop manhole. Lamphole, flushing tank, necessity of pumping sewage, classification of pumps, components of pumps.

(iii) Disposal of Night Soil: Septic tank and soak pit-function and design.

(iv) Sewage Disposal: Primary treatment, grit chamber, clarifier, flow diagram of treatment plant, trickling filter, activated sludge process design.

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Disclaimer : The above syllabus is broadly indicative but not exhaustive