BIHAR PUBLIC SERVICE COMMISSION, PATNA

ASSISTANT ENGINEER (CIVIL) SYLLABAI

General Engineering Science

1. **Engineering Mechanics:**

   Simple application of equilibrium equations; equation of motion; work,power, energy.

2. Surveying and Measurement:

   Distance and Area measurement; Measurement of Direction; angle measurement of Slops; Elevation and Height; Common survey Instruments; Electrical shop measurement such as ammeter, Voltmeter, Charge meter, Insulation, Tester, Energy Metre and their principles of working; Mechanical Shop Measurement Instruments; Linear and Angular measurement; Straight, Flat and Circular measurement.

Mechanics of Solids:

Generalized Stress, Strain and constituting laws; transformation of stress; pressure, energy, analysis of beam, column and shaft; unsymmetrical bending, shear Center, Theories of Failure.

3. Engineering Materials and Construction:

Brick, Lime, Cement, Aggregate, Cast iron and Steel, non-ferrous metal, Timber, Paints and miscellaneous engineering materials; Testing of engineering materials; consideration in construction of masonry floor and walls.

4. Engineering Economy and Management:

Principles of engineering economy; project planning, CPM and PERT techniques; construction equipment and safety; Analysis of rate of important construction item.

5. Transport Phenomenon:

Laminar and Turbulent flow, concept of boundary layer, continuity equation, Bernoulli's theorem, energy equation, flow measurement, dimensional analysis and modelling, One dimensional study, Conduction of heat through single and multi layer bodies including wells and cylinder; neutral and forced convective heat transfer, concept of thermal boundary; Stefen-Boltzman law of radiation, Kirchoff's law, concept of black and brown bodies.

6. Energy Conversion:

Thermodynamic process, first and second law of thermodynamics, Carnot cycle, Rankine cylcle, Otto cycle, Diesel cycle, impulse and reaction turbine - Pelton wheel turbine, Francis turbine, Reciprocating and centrifugal pumps.

7. Elementry Engineering:

Electric circuit, circuit laws, principle of superposition, Thevenin's Theorem, An introduction to periodic function, study of series and parallel connection in A.C. circuit having induction resistance and capacitance junction ; transistor junction, junction diode, equivalent circuit - common ammeter equivalent circuit, megnatic effect of an electric current, megnatic circuit, ideal transformer, transformer as a circuit element, Electro-Megnatic energy conversion, Performance of D.C. motor and generator, Performance of A.C. motor and Generator.

8. Environmental Engineering:

Water pollution and purification, waste water treatment, Air pollution and it's control, Ecological Balance.

Civil Engineering

Paper -5

1. Structural Analysis:

Structurl - determency & stability, internal and external force and deflection, analysis of statically determinate and indeterminate structure beam, truss, frame and arches; structural theorem - stiffness and flexibility method, Matrix method; elastic stability of column, influence line diagram for determinate and indeterminate structure, plastic anlysis of beam and slab.

2. Structural Design:

(a). RCC:

Beam, slab and column, shear and diagonal tension, Concrete technology - Ultimate load design and limit state design, consideration of vertical and seismic forces in building frame design.

(b). Steel:

Tension, compression and flexural member, roof, truss, plate girder, bracket connection.

(c). Element of prs-stressed concrete structure.

3. Soil Mechanics and Foundation Engineering:

Geological forces and it's determination, rock formation and it's classification; nature and formation of soil, properties and behaviour; seepage and consolidation, compaction; shear strength of soil; stability of slopes; soil stresses, bearing capacity of soil, earth pressure; retaining walls and sheet pile.

Shallow and deep foundation including pile, raft and well foundation, machine foundation, expansive soil, soil stabilization.

Paper - 6

1. Hydrology and water resource:

General hydrological process, run-off estimation, uses of hydrograph, empirical formulea, probabilistic hydrological analysis,

Management of surface and ground water, irrigation engineering principles, general water requirements for crops,

Description of irrigation work; flood - causes, damage and control; river behaviour, water drainage - surface and ground drainage, general principle of water power engineering.

2. Open Channel Flow:

Description, energy and momentum principle, uniform, GVF and RVF flow, element of fluvial flow; sediments transportation.

3. Design of Hydraulic Structure:

Design of dam, weir, barrages, canal and canal structure viz. - falls, cross drainage works, cross regulators, head regulators, canal outlets; design of embankment, hydro - electric power plant.

4. Transportation Engineering:

Geometric design of highway, elements of traffic engineering, pavement design, Highway materials, Maintenance of Highway, Element of bridge engineering, IRC classification, behaviour in consideration of load and superstructure.

5. Public Health Engineering:

(a). Water Supply:

Population forecast, types of pipe used in water supply, construction of tube well and dug well, design of slow sand filter and rapid gravity filter, design of underground and overhead tank, details of water supply installation.

(b). Drainage and Sanitation:

Surface drainage, storm drainage soil sewerage, design of trickling filter, design of septic tank, design of Imhoff tank, details of sanitary installation.

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