Civil Engineering Paper-1 Syllabus :

This part is for both objective and conventional types papers :

1) BUILDING MATERIALS -

Building material are material used for construction purposes. Clay , sand ,rocks ,wood, leaves and twigs are used to build buildings which are natural elements. This segment includes

Timber : Various types and species of structural timber, strength in different directions, density-moisture relationship, defects , preservation, influence of defects on permissible stress, dry and wet rots, Plywood ,codal provisions for design.

Bricks : Types, absorption, Indian Standard classification, saturation factor, influence of morter strength onmasonry strength , strength in masonry.

Cement : Compounds of different strength , types, setting times.

Cement Mortar : Ingredients, water demand, proportions, mortars for plastering and masonry.

Concrete : Importance of W/C Ratio, ingredients including admixtures, Strength, workability, testing for strength, non-destructive testing, mix design methods , elasticity.

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2) SOLID MECHANICS –

Solid mechanics is the division of continuum mechanics that studies the behavior of solid materials under the action of forces, phase changes , temperature changes and various other internal or external agents. This includes

Elastic constants, Mohr's circle of stress, stress, plane stress, strains, Mohr's circle of strain, plane strain, combined stress; Simple bending, shear; Elastic theories of failure; Torsion of circular and rectangular sections and simple members.

3) STRUCTURAL ANALYSIS –

Structural analysis is used to determine the effects of loads on physical structures and their mechanism . It is related to type of analysis that can endure loads for instance buildings, vehicles, bridges, machinery, attire, furniture, soil strata and genetic tissue. This includes

Analysis of indeterminate skeletal frames – moment distribution, energy methods, stiffness and force methods, slope-deflection, Muller-Breslau principle and application.

Plastic analysis of indeterminate beams and simple frames – shape factors. Analysis of determinate structures – different methods including graphical methods.

4) DESIGN OF STEEL STRUCTURES –

Steel structure has a wide possibility. The settled high-rise steel structures are very common in the urbanized countries. Presently the steel structure is the most popular housing in developed countries. This includes

Principles of ultimate load design. Principles of working stress method. Design of simple members and frames. Built-up sections and frames, simple members, Design of connections, Design of Industrial roofs.

5) DESIGN OF MASONRY and CONCRETE STRUCTURES –

Design of concrete and Masonry structures deals with concrete technology, masonry design and reinforced concrete. Also this segment provides a unbiased coverage of the analytical methods, design as well as construction aspects. This includes

Limit state design for bending, axial compression, shear, and combined forces. Codal provisions for beams, slabs, walls and footings. As per I.S. Codes design of brick masonry.

Principles of pre stressed concrete design, methods of pre stressing, materials, losses. Design of simple members and determinate structures. Working stress method of design of R.C. members. Introductions to pre stressing of indeterminate structures.

6) CONSTRUCTION PRACTICE, PLANNING AND MANAGEMENT –

Construction management is related with planning, control and coordination of a project from the very beginning to completion. A construction manager is one who has responsibilities to completes the processes in each and every sector. What separates a construction manager from one sector to another is the information of the construction location. This Includes

Concreting Equipment:

Weight Batcher ,vibrator, concrete pump, Mixer, batching plant.

Cranes, lifting equipment , hoists.

Earthwork Equipment :

Power shovel, dozer, hoe, dumper, tractor and trailers, rollers, pumps ,sheep foot rollers.

Construction, Planning and Management :

Bar chart, work-break down structures, linked bar chart, Activity – on – arrow diagrams. PERT network: Crashing ,Time-cost study; Resource allocation. Probabilistic activity durations, Critical path; Event-based networks.

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Civil Engineering

Civil Engineering

Civil Engineering Paper-2 Syllabus :

This part is for both objective and conventional types papers :

1) (a) FLUID MECHANICS, OPEN CHANNEL FLOW, PIPE FLOW -

Open-channel flow is a division of hydraulics which is a form of liquid flow inside a channel. Another form of flow inside a conduit is pipe flow. Pipe flow a division of Hydraulics andFluid Mechanics which is a type of liquid flow inside a closed conduit.This includes

Fluid Properties, Thrust, Pressure, Buoyancy; Integration of flow equations; Flow Kinematics; Flow measurement; Moment of momentum; Relative motion; Boundary layer and Control, Drag, Viscosity, Lift; Modelling , dimensional Analysis; Cavitation; Momentum and Energy principles in

Open channel flow, Hydraulic jump, Flow controls, Flow sections and properties; Gradually varied flow , Normal flow; Flow oscillations; Surges; Measurements ,Flow development and losses in pipe flows; Siphons; Delivery of Power Pipe networks ; Surges and Water hammer.

(b) HYDRAULIC MACHINES AND HYDROPOWER –

Hydropower is the power derived from the energy of running water or falling water which can be used for valuable purposes. Hydropower has been used for various mechanical devices like sawmills, power houses textile mills, dockcranes, watermills and domestic lifts and paint making. This includes

Centrifugal pumps, performance parameters, types, pumps in parallel ,scaling; Reciprocating pumps, performance parameters , air vessels; Hydraulic turbines, performance parameters, types, choice, controls; Hydraulic ram; Power house, storage, control of supply ,pondage, classification and layout.

2) (a) HYDROLOGY –

Hydrology is the study of the allotment, movement and eminence of water on Earth including hydrologic cycle and ecological watershed sustainability. This includes

Hydrological cycle, PMP, precipitation and related data analyses, unit and synthetic hydrographs; PMF, Floods and their management; Evaporation and transpiration; Streams and their gauging; Routing of floods; River morphology; Capacity of Reservoirs.

(b) WATER RESOURCES ENGINEERING –

Water resources engineering deals with of supplying water for human being usage and also removing water when human beings have completed using it. The work done by water resource engineers includes the setting up and supervision of constructed amenities. This includes

Water resources of the globe ;Multipurpose uses of Water ;Soil-Plant-Water relationships, water demand assessment , irrigation systems; Ground water yield and well hydraulics , Storages and their

yields; Drainage design ,Waterlogging ; Irrigation revenue; Sediment transport in canals; Overflow and Non-Overflow sections of gravity dams and their design, Energy dissipators and tailwater rating; Lacey's and Tractive force concepts in canal design, Design of rigid boundary canals, lining of canals; Design of headworks, falls, distribution works, cross-drainage works, outlets; River training.

Environmental engineering

Environmental engineering

ENVIRONMENTAL ENGINEERING:

Environmental engineering is the incorporation of Science and engineering ideology to perk up the natural environment like air, water, and various land resources to offer hale and hearty water, air, and land for human environment . It also deals with air effluence control, waste water management, recycling of waste, radiation protection, ecological sustainability, industrial hygiene over and above a knowledge of laws of environment engineering.

3) (a) WATER SUPPLY ENGINEERING –

The Water Supply Engineering segment is accountable for the programs linked with the private and public water supply systems . Also this section is in charge of use program , certification programs for water operators, environmental laboratory certification program, wastewater operators etc. This segment includes

Sources of supply, design of intakes and conductors, yields; Water quality standards; Estimation of demand; Control of Water-borne diseases; Rural water supply; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance and distribution systems of treated water, leakages and control; Institutional and industrial water supply.

(b) WASTE WATER ENGINEERING –

Waste water engineering deals with finding solution to protect a town from the distressing effects of flood. It also helps in scheming park water features in a way that will make the most of both fun and water safeguarding. This includes

Urban rain water disposal; Design of sewers and sewerage systems; Systems of sewage collection and disposal; pumping; Disposal of products of sewage treatment, Characteristics of sewage and its treatment, streamflow rejuvenation Institutional and industrial sewage management; Rural and semi-urban sanitation ; Plumbing Systems.

(c) SOLID WASTE MANAGEMENT -

Solid Waste management is the assortment , processing, transportation, managing as well as monitoring of waste materials. It generally refers to materials produced by human doings. This includes

Sources, collection and disposal, classification; Design and Management of landfills.

(d) AIR AND NOISE POLLUTION AND ECOLOGY -

Noise and air pollution has become common problem .Many noise troubles can be prohibited by being thoughtful of others and having discussion of problems when they arise. Air pollution is the accumulation of substances in the atmosphere that jeopardize human health .This includes

Noise pollution and standards ;Sources and effects of air pollution, monitoring of air pollution; Environmental assessment ,Ecological chain and balance.

4) (a) SOIL MECHANICS -

Soil mechanics is a division of engineering mechanics that concerns about the behavior of soils. It provides the theoretical basis for analysis in geotechnical engineering and many other sub discipline of geology. This includes

Properties of soils, interrelationship and classification ; Methods of compaction and their choice , Compaction behaviour; Flow nets, Permeability and seepage, Inverted filters; Stresses and failure ,Shearing resistance; soil testing in laboratory and in-situ; Compressibility and consolidation; Stress

path and applications; Stress distribution in soil ,Earth pressure theories; soil exploration, load tests, samplers,penetration tests.

(b) FOUNDATION ENGINEERING –

A foundation forms the lowest and sustaining layer of a structure. Foundations are mainly alienated into two types one is shallow foundations and the other is deep buildings .This includes

Types of foundations, bearing capacity, Selection criteria, laboratory and field tests ,settlement; Types of piles and layout and their design , Foundations on expansive soils, foundation on swelling soils ,swelling and its prevention.

5) (a) SURVEYING –

Surveying is a technique, science and profession of correctly determining the three-dimensional position of points and the distances and angles amid them. This segment includes

Classification of surveys, accuracy , scales; Measurement of distances – indirect and direct methods; Measurement of directions, local attraction , prismatic compass; optical and electronic devices; Theodolites – types; Relief representation; Measurement of elevations – Spirit and trigonometric levelling; Contours; Establishment of control by triangulations and traversing – computation of coordinates , measurements and adjustment of observations; Digital elevation modelling concept; Field astronomy, Concept of global positioning system; Map substitutes , Remote sensing concepts;Map preparation by plane tabling and by photogrammetry.

(b) TRANSPORTATION ENGINEERING –

Transportation engineering is the relevance of technology and scientific ethics to the planning, operation , functional design and management of facilities for any sort of transportation in order to access fast, protected, well-organized, suitable, inexpensive movement of people and goods to different places . This includes

Planning of highway systems, horizontal and vertical curves, alignment and geometric design, grade separation; Drainage ; Materials and construction methods for different surfaces and maintenance; Principles of pavement design.

Intersections, Traffic surveys, signaling; Mass transit systems, networking , accessibility. Tunnelling, methods of construction, alignment, disposal of muck, lighting and ventilation, traffic control, drainage, emergency management.

Airports – orientation and layout ; Zoning laws; Runway and taxiway design and drainage management; Visual aids and air traffic control; Hangers, Helipads, service equipment. Planning of railway systems, relating to gauge, track, terminology and designs, controls, transits, tractive power ,rolling stock and track modernisation; Appurtenant works; Maintenance; Containerisation.

Harbours – shipping lanes, layouts, location identification , anchoring; sounding methods; Littoral transport with erosion and deposition; Components and operational Tidal data and analyses , Dry and Wet docks.

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