

Department of Civil Engineering

Syllabus for the admission of Ph.Dprogrammes for July 2017

*Part B (Subject core)-60 % weightage – Candidate to attempt **one section** based on area of interest. Questions will be to assess the ability to apply and /or analyse. Only brief and relevant answers are expected. Use of calculator is permitted.*

Section-1 (Construction Engineering & Management)

Fundamentals of Engineering mechanics and solid mechanics.

Modern Construction Materials; Concrete Technology; Construction equipment and management

Construction planning, scheduling techniques, Cost and Quality control.

Resource Management in Construction; Construction contracts.

Section-2 (Geotechnical Engineering)

Fundamentals of Engineering mechanics and solid mechanics.

Soil Mechanics: soil classification, three-phase system, fundamental definitions, relationship and interrelationships, permeability & seepage, effective stress principle, consolidation, compaction, shear strength.

Foundation Engineering:Sub-surface investigations- scope, drilling bore holes, sampling, penetration tests and plate load test. Earth pressure theories, effect of water table, layered soils. Stability of slopes-infinite slopes, finite slopes. Foundation types-foundation design requirements. Shallow foundations-bearing capacity, water table and other factors, stress distribution, settlement analysis in sands & clays. Deep foundations pile types, dynamic & static formulae, load capacity of piles in sands & clays, negative skin friction.

Section-3 (Hydraulics and Water Resources Engineering)

Fundamentals of Engineering mechanics and solid mechanics.

Hydrologic cycle, Hydrologic system model, Hydrologic processes, Precipitation, Infiltration, Rainfall depth, duration, distribution, Evaporation and Transpiration, Interception and Depression storage,

Streamflow, Hydrograph analysis, Snowfall and snowmelt. Rainfall/runoff models (SCS CN model, Rational method), unit hydrograph, hydrologic routing models, Watershed concepts and modeling, Flood routing, Hydrologic simulation models, Design of drainage collection systems Stages in water resources planning, data collection and processing, estimation of future water demands, Estimation of water yield, hydro-power generation, reservoir losses, water balance of a reservoir, storage requirement for conservation. Mass curve method, sequent peak algorithm, flood control storage capacity, reservoir routing. Emerging Techniques for River flow and runoff Data Acquisition and Systems Modelling.

Section-4 (Transportation Engineering)

Fundamentals of Engineering mechanics and solid mechanics.

Geometric design of highways and railways

Flexible and rigid pavements – components and design

Traffic flow characteristics

Travel demand modeling -4 stage modeling

Section-5 (Structural Engineering)

Engineering mechanics and solid mechanics.

Construction materials

Analysis of determinate and indeterminate structures

Static and kinematic indeterminacy

Design of concrete and steel structures

Finite element method