

DEPARTMENT OF WATER RESOURCES & OCEAN ENGINEERING

(Formerly Dept. of Applied Mechanics & Hydraulics)

NITK, SURATHKAL, MANGALORE, PIN-575025

Applicants called for Ph.D – Written Test and Interview for the year 2023-24

Sl. No	Reference No	Name of the Applicants
1.	PH2023WO0008	Sanjay Kumar A C
2.	PH2023WO0007	Chitharanjan M
3.	PH2023WO0011	Prema Malali
4.	PH2023WO0009	Ajeeth B
5.	PH2023WO0005	Swarna Latshmi SP
6.	PH2023WO0002	Chaya D Y
7.	PH2023WO0004	Shailender Kumar
8.	PH2023WO0001	Rohit Sahu
9.	PH2023WO0006	Shimna P

Vaniya K
29/5/23

HEAD OF THE DEPARTMENT

PROFESSOR & HEAD
Dept. of Water Resources & Ocean Engineering
(Formerly Dept. of Applied Mechanics & Hydraulics)
NITK Surathkal, P.O. Srinivasnagar, Mangaluru-575025

Dept. of Water Resources & Ocean Engineering

(Formerly Dept. of Applied Mechanics & Hydraulics)

NITK, Surathkal, Mangaluru - 575 025

General Instructions for the candidates who are appearing for the

Ph.D. Written Aptitude Test & Interview:

1. There are two parts (Part A and Part B) in the Ph.D written aptitude test. The Part A (Syllabus is attached in Annexure) is compulsory for all the candidates. The candidates are expected to provide the subject preference available in syllabus which is given in Annexure (**PAPER 1: MARINE STRUCTURES/ PAPER 2: WATER RESOURCES ENGINEERING/ PAPER 3: GEOINFORMATICS**) to the DRPC Chairperson (Email address: hodwroe@nitk.edu.in) and Copy to department mail ID (Email address: wroednitk@gmail.com), Department of Water Resources and Ocean Engineering on or before 14th June 2023, 12.00 PM. They are allowed to select any one of the subject preferences available in Annexure (**Please refer next page**).
2. Mode of the written aptitude test is offline. Details of examination will be announced in our Institute's Website (<https://www.nitk.ac.in/>). For further updates, the candidates are requested to visit our Institute's Website regularly.
3. There will be 30 multiple choice questions (MCQ) for the Ph.D. Written Aptitude Test. For every question, four options will be given. The candidates are expected to select correct option.
4. Each correct answer carries one mark. Total marks for the test is 30.
5. There is negative marking for wrong answer. For each wrong answer, 0.25 marks will be deducted.
6. Time duration is 60 minutes.
7. The candidates are allowed to use scientific calculators for solving numerical problems.
8. After the written test, the shortlisted candidates will be allowed to attend the technical interview. For the technical interview, the candidates are expected to prepare maximum of 10 PPT slides. The presentation slides should include the present and the proposed research work.
9. **Written Test Date and Time:** 19th June 2023, 8.30 AM onwards.
10. **Interview Date and Time:** 19th June 2023, 10.30 AM onwards.

Vaniya K
29/5/23
HEAD OF THE DEPARTMENT

Dept. of Water Resources & Ocean Engineering
(Formerly Dept. of Applied Mechanics & Hydraulics)
NITK, Surathkal, B.C. Chikmagalur, Mangaluru-575025

Annexure

Syllabus for the PhD Written Test

Paper 1: Marine Structures

PART A (Compulsory) – Basic Sciences, Mathematics and Engineering

Engineering Mechanics: System of Forces, Free-Body Diagrams, Equilibrium Equations; Internal Forces in Structures; Plane Truss, Second Area Moment.

Solid Mechanics: Bending Moment and Shear Force in Statically Determinate Beams; Simple Stress and Strain Relationships; Simple Bending Theory, Flexural and Shear Stresses, Uniform Torsion, Buckling of Column.

Fluid Mechanics: Properties of Fluids, Fluid Statics; Continuity, Momentum, Energy and Corresponding Equations; Potential Flow, Applications of Momentum and Energy Equations; Laminar and Turbulent Flow; Flow in Pipes, Pipe Networks; Concept of Boundary Layer and its Growth.

Numerical Methods: Accuracy and Precision; Error Analysis. Numerical Solutions of Linear and Non-Linear Algebraic Equations; Least Square Approximation, Newton's and Lagrange Polynomials, Numerical Differentiation, Integration by Trapezoidal and Simpson's rule, Single and Multi-Step Methods for First Order Differential Equations.

Calculus: Functions of Single Variable; Limit, Continuity and Differentiability; Mean Value Theorems, Local Maxima and Minima.

PART B (Marine Structures) – Core Subject

Marine Structures: Basics of Wave Hydrodynamics, Wave Structure Interactions, Oceanography, Design Aspects of Marine Structures, Port Planning, Marine Geotechnical Engineering.

Paper 2: Water Resources Engineering

PART A (Compulsory) – Basic Sciences, Mathematics and Engineering

Engineering Mechanics: System of Forces, Free-Body Diagrams, Equilibrium Equations; Internal Forces in Structures; Plane Truss, Second Area Moment.

Solid Mechanics: Bending Moment and Shear Force in Statically Determinate Beams; Simple Stress and Strain Relationships; Simple Bending Theory, Flexural and Shear Stresses, Uniform Torsion; Buckling of Column.

Fluid Mechanics: Properties of Fluids, Fluid Statics; Continuity, Momentum, Energy and Corresponding Equations; Potential Flow, Applications of Momentum and Energy Equations; Laminar and Turbulent Flow; Flow in Pipes, Pipe Networks; Concept of Boundary Layer and its Growth.

Numerical Methods: Accuracy and Precision; Error Analysis. Numerical Solutions of Linear and Non-Linear Algebraic Equations; Least Square Approximation, Newton's and

Lagrange Polynomials, Numerical Differentiation, Integration by Trapezoidal and Simpson's rule, Single and Multi-Step Methods for First Order Differential Equations.

Calculus: Functions of Single Variable; Limit, Continuity and Differentiability; Mean Value Theorems, Local Maxima and Minima.

PART B (Water Resources Engineering) – Core Subject

Hydrology: Hydrologic Cycle, Water Budget, World Water Quantities, Precipitation and Abstractions: Forms of Precipitation, Data Analysis, Rain-Gauge Networks; Infiltration – Processes, Infiltration Indices and Horton's Equation; Evaporation and Evapotranspiration – Pan Evaporation, Empirical Equations for Estimating Evaporation and Evapotranspiration; Transpiration; Runoff and Hydrographs: Rainfall Runoff Relations, Time Area Concept, Flow Duration Curve, Mass Curve, Flow Hydrograph, Unit Hydrograph (UH) and its Analysis.

Paper 3: Geoinformatics

PART A (Compulsory) – Basic Sciences, Mathematics and Engineering

Engineering Mechanics: System of Forces, Free-Body Diagrams, Equilibrium Equations; Internal Forces in Structures; Plane Truss, Second Area Moment.

Solid Mechanics: Bending Moment and Shear Force in Statically Determinate Beams; Simple Stress and Strain Relationships; Simple Bending Theory, Flexural and Shear Stresses, Uniform Torsion, Buckling of Column.

Fluid Mechanics: Properties of Fluids, Fluid Statics; Continuity, Momentum, Energy and Corresponding Equations; Potential Flow, Applications of Momentum and Energy Equations; Laminar and Turbulent Flow; Flow in Pipes, Pipe Networks; Concept of Boundary Layer and its Growth.

Numerical Methods: Accuracy and Precision; Error Analysis. Numerical Solutions of Linear and Non-Linear Algebraic Equations; Least Square Approximation, Newton's and Lagrange Polynomials, Numerical Differentiation, Integration by Trapezoidal and Simpson's rule, Single and Multi-Step Methods for First Order Differential Equations.

Calculus: Functions of Single Variable; Limit, Continuity and Differentiability; Mean Value Theorems, Local Maxima and Minima.

PART B (Geoinformatics) – Core Subject

Geoinformatics: Energy Sources & Radiation Principles, EMR & Spectrum, Emission, Transmission, Spectral Response Pattern, Components of GIS, Co-ordinate System, MAP Projections, Input Data for GIS, Types of Output, Level & Scale, Data Quality.

Vaiya K
29/5/23
PROFESSOR & HEAD
HEAD OF THE DEPARTMENT
Dept. of Water Resources Engineering
(Formerly Dept. of Applied Mechanics & Hydraulics)
NITK Surathkal, P.O. Srinivasnagar, Mangaluru-575026