NATIONAL INSTITUTE OF TECHNOLOGY, KARNATAKA

DEPARTMENT OF WATER RESOURCES AND OCEAN ENGINEERING

Ph.D. Admission 2022 –December Session

LIST OF CANDIDATES SHORTLISTED FOR WRITTEN TEST/ INTERVIEW

Sl.No	Application Number	Name
1	PH2022WO0026	DEVALLA KISHORE
2	PH2022WO0028	SANKAVALLI SIDVILASINI
3	PH2022WO0029	DESSAI PRACHI PRABHAKAR
4	PH2022WO0030	JEEVARATHINAM KANDHASWAMY

Dept. Water Resources & Ocean Engineering

(Formerly Dept. of Applied Mechanics & Hydraulics)

NITK, Surathkal, Mangalore, Pin: 575 025

General Instructions for the candidates who are appearing for the Ph.D. Written Aptitude Test & Interview:

1. 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**: REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM (RS & GIS)) to the DRPC Chairperson (Email address: **hodwroe@nitk.edu.in**), Department of Water Resources and Ocean Engineering. 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**: Written Test Date and Time: December 13th 2022, 8.30 AM onwards. No extra time will be given after the test duration.

10. **Interview Date and Time:** Interview Date and Time: December 13th 2022, 10.30 AM Onwards through offline mode.

HEAD OF THE DEPARTMENT

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.

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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: Remote Sensing & Geographic Information System (Rs & Gis)

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.

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

PART B (Remote Sensing & Geographic Information System (RS & GIS)) – Core Subject

Remote Sensing & GIS: 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.

HEAD OF THE DEPARTMENT