Instructions:
1. **Entrance test question paper consists of multiple choice questions for 100 Marks and it is Classified as Part-A, Part-B & Part- C**
2. **Entrance Test Duration shall be 3 hours**
3. **Part-A shall be Subject specific for 50 Marks.**
   Part – B shall be General Aptitude for 30 Marks
   Part – C shall be Mathematics for 20 Marks

<div align="center">

Part – A
Subject Specific (Engineering Discipline)
Civil Engineering Syllabus - 50 Marks

</div>

1: Construction Materials

Building materials: Rock, Fine aggregate, coarse aggregate, Bricks, Timber, Paints

Concrete technology: Properties of cement and admixtures, Properties of fresh and hardened concrete, Special concretes, Non destructive testing of concrete.

2: Analysis and Design of Structures

Strength of Materials: Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, bending moment and shear force on beam, pure torsion

Structural analysis: Structural systems, Truss analysis, Deflection of beams, Strain energy, Arches and cables.

Design of concrete and steel structures: Principles of limit state design, Design of beams, Design of slabs Design of columns. Steel structural fasteners, Tension, compression, flexural members Connections.

3 Fluid mechanics, Irrigation and Environmental Engineering

Fluid mechanics: Basic properties of fluid, Open channel flow, Pipe flow and water hammer, Dimensional analysis and model studies, Impact of jets on vanes, Pumps & turbines.

Irrigation Engineering: Water requirements of crops, Canal cross drainage work, Gravity dams and earthen dams

Environmental Engineering: Population forecasting, Water quality, Water treatment, Methods of sanitation, Sewage treatment and industrial waste water treatment.

4 Geotechnical, Highway Engineering and Surveying

Geotechnical engineering: Index properties of soil, Soil structure & classification of soils, Compaction of soil, Soil water system, Consolidation of soils, Effective stress and shear strength Ground modifications.

Highway engineering: Highway planning and alignment, Highway geometric design, Pavement material and construction.

Surveying: Chain surveying, Compass surveying, Leveling and contouring, Theodalite survey, Curve settings, Areas & volumes.

5 Construction Planning &Management

Construction Planning &Management: work breakdown structure, Grant Chart, preparation of network diagram- CPM, PERT method.

Reference Books:

1) S. K. Duggal, "Building Materials", (Fourth Edition)New Age International (P) Limited, 2016 National Building Code(NBC) of India
2) .Neville A.M. "Properties of Concrete"-4th Ed., Longman.
3) M.S. Shetty, Concrete Technology - Theory and Practice Published by S. Chand and Company, New Delhi.
4) Chitkara, K.K, "Construction Project Management: Planning Scheduling and Control", Tata McGrawHill Publishing Company, New Delhi.
5) S. K. Garg, Environmental Engineering vol-I, Water supply Engineering – M/s Khanna Publishers, New Delhi2010
6) R.K. Bansal, "A Text book of Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi
7) Subramanian, " Design of Concrete Structures" , Oxford university Press
8) Punmia B C, Soil Mechanics and Foundation Engineering, Laxmi Publications co., New Delhi.
9) S K Khanna and C E G Justo, "Highway Engineering", Nem Chand Bros, Roorkee.
10) D.H. Young, S.P. Timoshenko "Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition
11) N Subramanian., "Design of Steel Structures" (2016), Oxford University Press, New Delhi
12) S.K. Duggal "Surveying Vol. I & II", Tata McGraw Hill Publishing Co. Ltd. New Delhi.

General Aptitude Test Syllabus (Weightage 30%)

<u>Common to all branches</u>

1. Arithmetical Ability,

2. Data Interpretation,

3. Verbal Ability,

4. Numerical Analysis Quantitative ability,

5. Reading Comprehension data Sufficiency

6. Logical Reasoning, computer awareness.

Reference Books:

1. Quantitative Aptitute by R S Agarwal

2. Fast Track Objective Arithmetic by Rajesh Verma

Mathematics Entrance Test Syllabus for Ph.D - 20 marks
Common to all branches

Linear Transformations: The algebra of Linear Transformation, singular and non-singular transformations, characteristic polynomials, minimal polynomials, Rank and Nullity, Eigen values and Eigen vectors.

Solutions of Linear System of Equations : Introduction to Direct Methods via., Gauss Elimination method, Gauss-Jordan method. Iteration Methods: Gauss Jordan methods, Gauss-Seidel method, Successive Over relaxation method and problems on each method.

Fourier Series : Dirichlet's conditions, Expansions of Periodic functions into Fourier series, Half range Fourier series.

Laplace Transforms: Properties of Laplace transformation, Unit step function, Convolution theorem, Solution of differential equation using Laplace transformation.

Statistical method : Curve fitting by the method of least squares – Fitting the curve of the form $y = ax + b,\ y = ax^2 + bx + c$ and $y = ax^b$. Correlation and regression.

Differential Calculus: polar curves, angle between polar curves, Curvature and radius of curvature, Taylor's and Maclaurin's expansion for a function of single variable.

Differential Equations: Ordinary Differential Equations (ODEs): Existence and Uniqueness of Solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs.

Numerical methods : Solution of ODE of first order : Taylor's series method , Modified Euler's method, RK - 4th method, Milne's method , Newton forward- backward method, interpolation method.

References:

1. B. S. Grewal: "Higher Engineering Mathematics", Khanna publishers, 44th Ed.2018
2. E. Kreyszig: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed. (Reprint), 2016.
3. H.K.Dass and Er. Rajnish Verma: "Higher Engineering Mathematics" S.Chand Publication (2014).
4. N.P Bali and Manish Goyal: "A textbook of Engineering Mathematics" Laxmi Publications, Latest edition.