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

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

1.Network Analysis: Basic Concepts, Network Theorems, Resonant Circuits, Two Port networks, Unbalanced Three Phase Systems, Laplace Transformation**. Field Theory:** Electrostatics, Energy and Potential, Conductor and Dielectrics, Steady magnetic fields, Magnetic forces & Magnetic Materials and Magnetism, Time varying fields and Maxwell's equations. **Digital Circuits:** Analysis and Design of Combinational Logic & Sequential Circuit, Flip-Flops

2.Analog Circuits: Diode Circuits, Transistor Biasing and Stabilization, JFET and MOSFET. **Operational Amplifiers:** Feedback & Power amplifiers, Oscillators, Analysis of combinational logic circuits DC Voltage Regulators, A/D & D/A Converters, Phase Locked Loop (PLL), 555 timer, multivibrators and applications. **Microcontroller:** 8051 Microcontroller Basics, ADC, DAC and sensor interfacing, Comparators & Converters A/D & D/A Converters. **S&S and Processing:** Classification & basics of signals, Time – Domain Representations for LTI Systems, Continuous-time Fourier transform, Discrete-time Fourier transform, Z transform, Design of IIR and HR filters.

3.Transformers: Single phase Transformers, Three-phase Transformers, Tests, Parallel Operation of Transformer, Auto Transformer, Parallel Operation of Transformers, Tap changing transformers, Three-Winding Transformers **Synchronous generators**: Direct current Generator. Basics of synchronous generators, synchronous generators analysis, performance of synchronous generators. **DC Motors:** Classification, Back emf, Torque equation, and significance of back emf, Losses and Efficiency, Testing of DC Motors,

4.Three-phase Induction Motor: Equivalent circuit, losses, efficiency, No-load and blocked rotor tests, Performance analysis. Starting & speed control, Single-phase induction motor, synchronous motor. **Power Electronics:** Power Diodes, Diode Rectifiers, Power Transistors, Thyristors, Controlled Rectifiers, AC Voltage Controllers, DC-DC Converters, DC-AC converters. **Transmission & Distribution:** Overhead Transmission Lines, Overhead Line Insulators, Performance of Transmission Lines, Corona & Underground Cable, Distribution.

5.High Voltage Engineering: Breakdown in Gases, Liquid Dielectrics & Solid Dielectrics, Generation & Measurement of High Voltages and Currents, High Voltage Testing of Electrical Apparatus. **Power System Protection:** Relay Construction and Operating Principles, Overcurrent Protection, Distance Protection, Circuit Breakers, Protection against over voltages.

Load Flow Studies: Network Topology, Economic Operation of Power System, Unit Commitment, Symmetrical Fault Analysis, Power System Stability. **Power System Operation and Control:** SCADA, Automatic Generation Control (AGC), AGC in Interconnected Power system, Control of Voltage and Reactive Power, Power System Security.

REFERANCE BOOKS:

1.) Engineering Electromagnetics William H Hayt et al McGraw Hill 8thEdition, 2014
2.) Network Analysis M.E.Vanvalkenburg Pearson 3rd Edition,2014
3.) Electronic Devices and Circuits David A Bell Oxford University Press 5th Edition, 2008
4.) Digital Principles and Design Donald D.Givone McGraw Hill 2002 ISBN 978-0- 07-052906-9.
5.) The 8051 Microcontroller and Embedded Systems Using Assembly and C Muhammad Ali Mazadi Pearson 2nd Edition, 2008.
6.) Signals and Systems Simon Haykin, Berry Van Veen Wiley 2nd Edition,2002
7.) Electric Machines D. P. Kothari, I. J. Nagrath McGraw Hill 4th edition, 2011
8.) Power Electronics: Circuits Devices and Applications Mohammad H Rashid, Pearson 4th Edition, 2014
9.) High Voltage Engineering M.S. Naidu, V.Kamaraju McGraw Hill 5th Edition, 2013.

Part - B

General Aptitude Test Syllabus (Weightage 30%)

Common to all branches

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

Part –C

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.