

## **Ph.D. Admission 2019**

**Syllabus (CSE/ECE/Math/Physics)**

**Total Marks: 50 (Written Test)**

**Time: 1hr 30 min**

### **Syllabus for Ph.D. Admission: written test (CSE)**

Question Pattern: MCQ based problem solving (except English writing)

1. English writing and communication skill
2. Mathematics : Probability and statistics, Linear Algebra, Discrete Mathematics
3. C-Programming Skill
4. Data Structure and Algorithms
5. Formal Languages and Automata Theory
6. Operating Systems
7. Computer Organization and Architecture
8. Database Management System
9. Computer Networks

### **Syllabus for Ph.D. Admission: written test (ECE)**

Question Pattern: MCQ based problem solving (except English writing)

1. English writing and communication skill
2. Mathematics : Probability and statistics, Linear algebra, Differential calculus
3. C-Programming Skill
4. Operational Amplifier and Integrated Circuit
5. Solid State Device
6. Analog and Digital Communication
7. Circuit Theory
8. Digital Electronics

### **Syllabus for Ph.D. Admission: written test (Mathematics)**

Question Pattern: MCQ based problem solving (except English writing)

1. English writing and communication skill
2. Mathematics: Elasticity, Linear Algebra, Linear Integral Equations, Ordinary Differential Equations, Partial Differential Equations.

#### **Elasticity:**

Analysis of strain and stress, strain and stress tensors; Geometrical representation; Compatibility conditions; Strain energy function; Constitutive relations; Elastic solids Hookes law; Saint-Venant's principle, Equations of equilibrium; Plane problems-Airy's stress function, vibrations of elastic, cylindrical and spherical media.

**Linear Algebra:**

Finite dimensional vector spaces; Linear transformations and their matrix representations, rank; systems of linear equations, eigenvalues and eigenvectors, minimal polynomial, Cayley-Hamilton Theorem, diagonalization, Jordan-canonical form, Hermitian, Skew-Hermitian and unitary matrices; Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, self-adjoint operators, definite forms.

**Linear Integral Equations:**

Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigen functions, resolvent kernel.

**Ordinary Differential Equations:**

First order ordinary differential equations, existence and uniqueness theorems for initial value problems, systems of linear first order ordinary differential equations, linear ordinary differential equations of higher order with constant coefficients; linear second order ordinary differential equations with variable coefficients; method of Laplace transforms for solving ordinary differential equations, series solutions; Legendre and Bessel functions and their orthogonal properties.

**Partial Differential Equations:**

Linear and quasilinear first order partial differential equations, method of characteristics; second order linear equations in two variables and their classification; Cauchy, Dirichlet and Neumann problems; solutions of Laplace, wave in two dimensional Cartesian coordinates, Interior and exterior Dirichlet problems in polar coordinates; Separation of variables method for solving wave and diffusion equations in one space variable; Fourier series and Fourier transform and Laplace transform methods of solutions for the above equations.

**Syllabus for Ph.D. Admission: written test (Physics)**

1. English writing and communication skill
2. Classical Mechanics
3. Thermodynamics & Statistical Physics
4. Atomic & Molecular Physics
5. Mathematical Methods in Physics
6. Space and Atmospheric Physics
7. Quantum Mechanics
8. Electromagnetic Theory
9. Solid State Physics
10. C-Programming Skill

**Written Examination Schedule (CSE, ECE, Math, Physics)**

**Venue :** Indian Institute of Information Technology Kalyani

Webel IT-Park, Kalyani, West Bengal – 741 235

**Date:** 20<sup>th</sup> July, 2019

**Reporting time:** 10:00 A.M.

**Written test :** 10:15 A.M.

**Note:**

1. The names of the shortlisted candidates will be published on 5<sup>th</sup> July, 2019.
2. All the relevant documents in original in support of your academic record, age, and experience shall have to be furnished before interview.
3. Interview for shortlisted candidates will be held on the same date based on the performance in the written test.