

## **Ph.D. (in Computer Science and Engineering) Entrance Examination, 2022**

1. Basic 10+2 mathematics
2. Data structures
  - Array, stack, queue, linked list, binary tree, heap, AVL tree.
3. Programming languages
  - Languages like C and C++.
4. Design and analysis of algorithms
  - Asymptotic notation, sorting, selection, searching.
5. Computer organization and architecture
  - Number representation, computer arithmetic, memory organization, I/O Organization.
6. Operating systems
  - Memory management, processor management, critical section problem, deadlocks.
7. Formal languages and automata theory
  - Finite automata and regular expressions, pushdown automata, context-free grammars, Turing machines, elements of undecidability.
8. Principles of Compiler Construction
  - Lexical analyzer, parser, syntax-directed translation, intermediate code generation.
9. Database management systems
  - Relational model, relational algebra, relational calculus, functional dependency, normalization (up to BCNF).
10. Computer networks
  - OSI, LAN technology - Bus/tree, Ring, Star; MAC protocols; WAN technology - circuit switching, packet switching; Data communications – data encoding, routing, flow control, error detection/correction, Internetworking, TCP/IP networking including IPv4.
11. Switching Theory and Logic Design
  - Boolean algebra, minimization of Boolean functions, combinational and sequential circuit synthesis and design.