

**Syllabus and Scheme of Examination for the Post of  
Technical Officer- Office of Dean of Digital & Computing Services**

**Advertisement No. IIT Mandi/Recruit./NTS/2023/09 Date: 12.02.2025**

There will be two-stage examination.

**Stage I:** Written Examination (Total MCQ- 100)

**Stage II:** Presentation & Interview.

**Syllabus of written examination:**

**Computer Organization and Architecture**

- Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

**Programming and Data Structures**

- Programming, Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

**Algorithms**

- Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

**Operating System**

- System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

**Databases**

- ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

**Computer Networks**

- Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit switching; Data link layer: framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP, Email.

**General information:**

- The MCQs have negative marking for wrong answers. For a correct answer 01 mark will be awarded, while for every wrong answer 0.50 marks will be deducted.
- The unanswered questions will not be considered for evaluation. (i.e., no marks will be awarded for any question not attempted).
- Only one best-suited answer has to be given for any MCQ. More than one answer will be treated as wrong answer.
- Use of only blue or black ballpoint pen is permitted to answer the questions and fill the form in the exam hall. Use of ink pen/gel pen/pencil/whitener is not permitted.
- Use of calculator, cell phones, log book, periodic table, and any type of electronic device etc., are strictly prohibited.
- The medium of instruction/answers will be English only.
- Involvement in any malpractices will lead to disqualification
- Any additional instructions given during the selection process must be adhered/complied.