

Syllabus and Scheme of Examination for the Post of Junior Technical Superintendent - C4DFED

Advertisement No. IIT Mandi/Recruit./NTS/2023/06 Date: 17.05.2023
Date of Selection Process: 17.01.2025
Reporting Time: 09:30 A.M.

There will be a two-stage examination.

Stage I: Written Examination (MCQ Based)

Stage II: Skill/Trade Test

Syllabus (Stage I - Written examination)

Basics of Electronics & Electronics Devices:

Electronic Components: Basic conceptual understanding of resistors, capacitors, inductors, diodes, transistors (BJT, FET, MOSFET), active & passive components, and electronic integrated circuits (ICs). Understanding of series and parallel circuits, clipping, clamping, rectifiers, voltage dividers, and current dividers. Electronic circuits Include Ohm's law, Kirchhoff's laws, Thevenin's and Norton's theorems, and the superposition theorem. Electronics Devices, including Operation and characteristics of semiconductor devices, including PN junction and Zener diodes, as well as transistors (BJT, FET, MOSFET, etc).

Microscopy for Surface Morphology & Materials Characterization:

Principle and operation of X-ray diffraction, Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Scanning Tunneling Microscopy (STM), Transmission Electron Microscopy (TEM), Kelvin Force Microscopy (KPFM), Optical Microscopy, Electron Beam Lithography.

Cleanroom Environment & Standard Thin Films Processes:

Cleanroom Technology: Overview of cleanroom technology, including HVAC design & components, various filter and airflow designs, sophisticated high-end equipment setup including instruments earthing, neutral and grounding, power supply single phase and three phases supply for instruments, and clean room utility maintenance processes and usefulness for semiconductor manufacturing. Semiconductor standard fabrication process understanding includes oxidation, chemical vapor deposition (CVD), physical vapor deposition (PVD), atomic layer deposition (ALD), and pattern transfer using lithography in a clean environment.

Electrical Systems & Measurements

Electrical systems, including three-phase induction motors, principles and operation of synchronous motors, asynchronous motors, DC motors, and basic electrical measurement devices and functioning of oscilloscopes, ammeter, voltmeter, bridge circuits (DC and AC), half wave and full wave rectifiers, step up and step down transformer, digital instruments, and virtual instrumentation systems.

Domain Knowledge of Safety Procedures for Electronic Devices Fabrication Facility

Cleanroom Safety: Best practices for maintaining safety and cleanliness in semiconductor grade class 100 industrial standard clean room facility. Safety guidelines for safely handling both high- voltage and low-voltage circuits. Importance & procedures to prevent electrostatic discharge (ESD) damage. Emergency Preparedness: Basic first aid knowledge for lab accidents and fire extinguishing protocols for electrical fires.

Note: It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper.

Syllabus (Stage II – Skill Test)

Handling common instruments in cleanroom environments, electronics laboratories, and software and hardware computer operation skills, including Word Processor, Data Transfer, Spreadsheet, Computer organization, Presentation tools, Software Installation, Hardware of Computers, Internet, basic commands, and operations.

Important Instructions for candidates:

General information about the exam:

- 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.

Final Selection:

- Examinations for Stage-I and Stage-II will be conducted for all the candidates or as decided by the selection committee.
- Final selection will be made on the scores obtained in the Stage-I, as the Stage –II is of qualifying nature. But if a candidate fails to qualify in Stage-II, her/his candidature will not be considered further.
- Please note that for consideration in the merit list, a candidate has to secure minimum marks fixed by the selection committee in both exams at Stage-I and Stage-II – failing which institute will not make an offer of appointment even if vacancies go unfilled.