NHSRCL Exam Pattern is an important document according to the exam point of view. With the help of exam pattern, applicant can get an idea of question framing and design.

NHSRCL Exam Pattern

This examination will be conducted on Computer Based Mode. The paper will consist of Multiple-Choice questions of Objective Type. In this paper, question will be asked from General Awareness, General Intelligence, Reasoning, Quantitative Aptitude, General English and Knowledge of Discipline.

- There will a total of 120 question.
- Each question will carry equal mark.
- There will be negative marking for every wrong answer.
- 1/4 Mark will be deducted for wrong answer.
- Duration of paper will be 01 Hours 30 Minutes.

Exam Pattern

Subject	Maximum Question	Maximum Marks	Duration of Paper
General Awareness	15	15	
General English	15	15	
General Intelligence & Reasoning, Quantitative Aptitude	30	30	01 Hour 30 Minutes
Knowledge of Discipline	60	60	

Syllabus for Senior Executive (S&T) Examination

General Awareness
- Current Affairs (National and International)
- Major Financial / Economic News
- Budget and Functions of NITI Aayog.
- Sports
- Books and Authors
- Awards and Honours
- Science – Inventions and Discoveries
- Abbreviations & Important Days
- General Information about High Speed Railways.

General Intelligence, Reasoning & Quantitative Aptitude
- Spatial Visualization.
- Visual Memory.
- Discrimination.
- Non-verbal series.
- Analogies.
- Observation.
- Coding and Decoding
- Arithmetic Number Series.
- Arithmetical Reasoning.
- Similarities and Differences
- Figures Classification.
- Relationship concepts.
- Spatial Orientation.
- Number System
- HCF, LCM
- Simplification
- Decimal Fractions
- Ratio & proportions
- Unitary Method
- Percentage, Time & Distance
- Time & Work
- Profit & loss
- Average
- Simple & Compound Interest
- Mensuration
- Algebra
- Data Interpretation

General English
- Vocabulary & Grammar
- Antonyms & Synonyms and its correct usage.
- Basics of English Language.
- Sentence structure.
- Reading Comprehension

Electronics and Communication Engineering

BASIC ELECTRICITY
Electrostatics, Coulomb's law, Electric field, Gausses theorem, Concept of potential difference; concept of capacitance and capacitors; ohm's law, power and energy, Kirchoff's voltage, current laws and their applications in simple DC circuits, Basic magnetism; Electromagnetic induction; Concept of alternating voltage & current; Cells and Batteries; Voltage and Current Sources; Thevenin's theorem, Norton's Theorem and their applications.

ELECTRONIC COMPONENTS & MATERIALS
Materials: Conducting, Insulating and magnetic materials
Components: Capacitors, Resistors, Transformers, Inductors and RF coils, surface mounted devices.
Relays and Switches: Various types of switches, Concept of 'make' and 'break' contacts in relays. Operating current, Holding current, Various types of relays. Their symbols, specifications and applications

ELECTRONIC INSTRUMENTS & MEASUREMENT
Specification of Instruments- accuracy, precision, sensitivity, resolution range, Errors in measurements and loading effect; principles of voltage, current and resistance measurements; Transducers, measurement of displacement & strain, forces & torque measuring devices, pressure measuring devices, flow measuring devices, power control devices and circuits.
Working principles and operation of different electronic instruments (Analog as well as digital) viz Multimeter, Electronic voltmeter, AC millivoltmeter, CRO, Signal generators, impedance bridges and Q-meters.

ELECTRONIC DEVICES & CIRCUITS
Multistage Transistor Amplifier, Transistor Audio Power Amplifiers, Feedback in Amplifier, Sinusoidal Oscillators, Tuned Voltage Amplifiers, Opto Electronics Devices and Their Applications, Operational Amplifier, Wave shaping Circuits, Timer I.C, Multivibrator Circuits, Time Base Circuits, Integrated Electronics, Regulated Power Supply, VCO (IC565) abd PLL (IC566) and their applications, THYRISTORS AND UJT.

DIGITAL ELECTRONICS
Number System, Conversion from one system to another, Operations (addition, subtraction, multiplication and division), Logic Gates, Logic Simplification, Implementation of Boolean (logic) equations with gates, Karnaugh map (up to 4 variables) and simple application in developing combinational logic circuits, Logic Families, SSI, MSI, LSI, VLSI. TTL and MOS families & their sub classification. Codes and Parity, Concept of code, weighted and non-weighted codes examples of 8421, BCD excess-3 and Grey code, Parity, Alphanumeric codes: ASCII & EBCDIC, Arithmetic Circuits, Half adder & Full adder, Half & Full subtractor circuit, 4 bit adder/subtractor, Decoders, Display Devices and Associated Circuits, Multiplexers and De-multiplexers, Latches and Flip Flops, Counters, Shift Register, MEMORIES, Basic RAM cell, N x M bit RAM. Expansion of word length and capacity, static and

dynamic Ram, basic idea of ROM, PROM, EPROM and EEROM, A/D and D/A CONVERTERS, Dual slope and successive approximation types of ADCs.

INTRODUCTION TO MICROPROCESSORS
Architecture of a Microprocessor (with reference to 8085 microprocessors, Concept of Bus, Bus organisation of 8085, Pin details of 8085 and related signals, Demultiplexing of Address/Data bus (AD0AD7). Generation of read write control signals. Memories and I/O interfacing. Programming (with respect of 8085 microprocessor), Instruction Timing and Cycles, Interrupts. Data transfer techniques, async data transfer, async data transfer (hand shaking), interrupt driven data transfer, DMA, serial output data, serial input data.

NETWORK, FILTERS & TRANSMISSION LINES
Two port network; Network solution methods: nodal and mesh analysis; Network theorems: superposition, Thevenin and Norton's, maximum power transfer; Wye Delta transformation; Attenuators; filters; transmission lines and their applications; characteristic impedance of line; concept of reflection and standing waves on a transmission line; Transmission Line equation; principles of impedance matching.

COMMUNICATION
Modulation and Demodulation in communication systems, Amplitude Modulation, Frequency Modulation, Phase Modulation, Pulse Modulation, Coding, Digital Modulation Techniques: Amplitude shift keying (ASK): Interrupted continuous wave (ICW), two tone modulation, Frequency Shift keying (FSK), Phase shift keying (PSK) Modems, Network and Control Considerations, Telemetry: radio-telemetry, and its application. Block diagram of TDM and FDM telemetry system, Radio-paging systems: concept and applications, Electronic Exchange, Operation of CELLULAR mobile telephone system. Concept of cells and frequency reuse, Facsimile (FAX), Carrier Telephony.
Microwave Engineering: Microwave Devices, Wave guides, Microwave Components, Microwave Antennas, Microwave Communication Systems- Block diagram & working principles of microwave communication link.

CONSUMER ELECTRONICS
Audio Systems, Microphones, Loud Speakers, Sound Recording: on magnetic tape, its principles, Digital sound recording on tape and disc, CD Systems, Hi-Fi systems, pre-amplifiers, amplifiers, and Equalizers. Stereo Amplifiers, TV, Principles of Black and White and colour TV communications, scanning, composite video signal, VCR, Monochrome TV Communication, Elements of TV communication system, Colour TV Communication.

BASIC COMPUTER APPLICATIONS/SKILLS
Basic Hardware Knowledge about processors, various ports HDMI, D-Port, Serial etc, RAM, USB Peripherals, Basic know how about OS (Windows/Mac OS), Office Suits, Presentation Soft wares, Spread sheets (Excel, Google Spread Sheets, etc.)