Indicative Syllabus	
Post Code	010
Name of Post	Junior Engineer (Plant) (Electronics) - Trainee
Minimum Educational Qualification	Regular Diploma in Electronics/ Electronics & Instrumentation/ Electronics & Telecommunication/ Electronics & Communication/ Instrumentation/ Instrumentation & Control Engineering from AICTE/ UGC approved University/ Institute.

1. **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.

2. **Electronic Components & Materials:** Materials: Conducting, Insulating and Magnetic materials; Components: Capacitors, Resistors, Transformers, Inductors and RF coils, surface mounted devices, Cells and Batteries; Relays and Switches- Relay characteristics, Relay performance, various types of Relays- their symbols, specifications and applications, Concept of 'make' and 'break' contacts in relays; Switches- types of switches, their features, principle of operation and applications, Operating current, Holding current.

3. **Electronic Instruments & Measurement:** Specification of Instruments- accuracy, precision, sensitivity, resolution range, Errors in measurements and loading effect; principles of voltage, current and resistance measurements; Working principles and operation of different electronic instruments (Analog as well as digital) viz. Multi meter, Electronic voltmeter, AC millivolt meter, Oscilloscopes- CRO, Multiple Trace CRO, Signal generators, impedance bridges and Q-meters. Transducers- Classification, Selection criteria, Characteristics, Construction, Working Principles, Applications, measurement of displacement & strain, forces & torque measuring devices, pressure measuring devices, flow measuring devices, power control devices and circuits.

4. **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, Multi vibrator Circuits, Time Base Circuits Wave form (Triangular & Trapazoidal), Integrated Electronics (Timer IC 555), Regulated Power supply, VCO (IC565) and PLL (IC566) and their applications, Thyristors and UJT.

5. **Digital Electronics:** Number Systems and Boolean Algebra, Conversion from one number 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,

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Shift Register, MEMORIES- Basic RAM cell, N x M bit AM. Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM and EEPROM, Data Converters- A/D and D/A Converters, Dual slope and successive approximation types of ADCs.

6. **Introduction to Microprocessors:** Architecture of a Microprocessor (with reference to 8085 microprocessors, Concept of Bus, Bus organization of 8085, Pin details of 8085 and related signals, de-multiplexing 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,

7. **Network, Filters & Transmission Lines:** Two port network; Network solution methods: Node and Mesh Analysis; Network Theorems: Superposition, Thevenin Theorem and Norton's Theorem, 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.

8. **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, , Electronic Exchange (SPC Exchange), Operation of CELLULAR mobile telephone system. Concept of cells and frequency reuse, carrier Telephony; Microwave Engineering: Microwave Devices, Wave guides, Microwave components, Microwave Antennas, Microwave Communication Systems- Block diagram & working principles of microwave communication link.GSM, Second Generation /Mobile, TDMA, FDMA, CDMA, Optical Fiber Communication, Principle, SMF, MMF, Losses in Fiber Communication, Dispersion, BDP, LED and Laser Signals, PIN Diode receiver, Computer Networking, LAN, WAN, MAN, Topology – Star, Mesh, Ring, Model- OSI, TCP/IP Model.

9. **Consumer Electronics:** Audio Systems, Microphones, Loud Speakers, Sound Recording: 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, Home/ Office Appliances.