భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Advertisement No. IITH/2023/NF/15 dated 22.10.2023

Post Number	Post Name
15.12	**Junior Technician - Electrical Engineering**

Selection Process consists of Skill Test and Written Test

Syllabus for Written and/or Skill Test

JUNIOR TECHNICIAN – ELECTRICAL ENGINEERING

Common for all the streams: Arithmetic- Ratio and proportion, Arithmetic progression and geometric progression, Permutation and combination, Logarithm and exponential series, Complex numbers. **General English-** Parts of speech, Types of sentences, Numbers, genders, persons, tenses, articles and degrees, Direct speech and indirect speech, Active voice, and passive voice.

Microelectronics and VLSI Stream

Electronic Devices and Circuits: Network theorems, Diode IV characteristics, MOSFET IV and operating regimes, Integrated Circuits, Scaling of semiconductor technology. **Laboratory Instrumentation and Measurements:** Impedance, sampling rate, settling time and other common instrument parameters, Oscilloscopes - Digital and analog, Function generators, Familiarity with low-current and high-speed measurements and necessary precautions, Understanding of Signal grounding, routing and noise reduction, EMI. **PCB Design and Testing:** High-speed high-performance PCB board design, Types of connectors and interfaces, ESD Protection. **Computer skills:** Basic programming skills (C and Python), pseudo-code, Types of interfaces for automating measurements (GPIB/USB/LXI). **Miscellaneous Topics:** Basic principles of common electronic/electrical devices in every-day life (e.g. communication devices, inverters, chargers, monitors, etc), Application of signal processing techniques for measurements

Communications and Signal Processing

1. Computing Skills: Basic programming constructs: data types, arrays, pointers, linked lists and trees, statements, I/O, conditionals, loops, functions, class/object.

2. Communication Technologies: Communication Standards, 2G/3G/4G/5G, ZigBee, BLE, Wi-Fi, LTE, IEEE 802.11x, data rates, coverage/range, power, computations, bandwidth, sensing, processing, communication powering, communication networking, topologies, layer/stack architecture, QoS.

3. Communications System: Physical layer description of communication systems, quantization, data formatting and framing, capacity of a point-to-point link, link budget analysis, multiple access techniques, network routing

4. Data Analytics: Combinatorics, Probability on finite sample spaces, Joint and conditional probabilities, independence, total probability; Bayes' rule and applications.

5. Digital Communications: Passband representation, Baseband equivalent AWGN Channel, Data Modulation and Demodulation, Synthesis of the Modulated Waveform, Discrete Data Detection, The Additive White Gaussian Noise (AWGN) Channel, Signal-to Noise Ratio (SNR) Maximization with a Matched Filter, Error Probability for the AWGN Channel, MAP and ML detection, Digital Modulation Techniques, Wireless signal propagation and channel models.

6. Digital Signal Processing: Sampling, continuous and discrete-time transforms, Frequency Domain Analysis of LTI Systems, implementation of FFT, algorithms, Filter Design: IIR and FIR filters, sampling rate conversion.

Note: The syllabus topics mentioned above are for illustrative purposes only.

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