

Police Sub Inspector Wireless Exam Syllabus

1. **Electronic Devices**: Energy bands in silicon, intrinsic and extrinsic silicon, Carrier transport in silicon, diffusion current, drift current, mobility and resistivity, Generation and recombination of carriers, p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitors, MOSFET, LED, p-i-n and avalanche photo diode, Basics of LASERS.
2. **Analog Circuits**: Small Signal Equivalent circuits of diode, BJTs, MOSFETs and analog CMOS, Simple diode circuits, clipping, clamping, rectifiers.
3. **Digital circuits** : Boolean algebra, minimization of Boolean functions, logic gates, digital IC families (DTL, TTL, ECL, MOS, CMOS), Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs, Sequential circuits: latches and flip-flops, counters and shift-registers, Sample and hold circuits, ADCs, DACs, Semiconductors memories, Microprocessor (8085): architecture, programming, memory and I/O interfacing
4. **Communications**: Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication system: amplitude and angle modulation and demodulation system, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication system; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication system: pulse code modulation (PCM), differential pulse code modulation(DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.
5. **Digital Logic** :- Logic Functions, Minimization, Design and Synthesis of combinational and sequential circuits; Number representation and computer arithmetic(Fixed and Floating point)
6. **Computer Organization and Architecture**:-Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.
7. **Computer Networks** :- ISO/OSI Stack, LAN Technologies (Ethernet, Token ring) Flow and error Control Techniques, Routing Algorithm , Congestion control, TCP/UDP and sockets, IP(V4), Application Layer Protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways and routers. Network security , basic concepts of public key and private key cryptography, digital signature, firewalls

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Radio operator/Radio Technician Exam Syllabus

1) Electronics Components, Devices and Circuits:

Conducting Materials, Magnetic Materials, Insulating Materials, Semiconductors, Electronics Components, Semiconductor physics and diodes, Diode applications and other terminal devices, Transistor, Transistor amplifier, Transistor biasing circuits and thermal stability, Frequency response of small signal transistor amplifier, Hybrid parameter, Regulated Power Supply, Feedback in transistor amplifiers and oscillators, transistor power amplifier, pulse circuits, field-effect transistor, linear integrated circuits

2) Digital Electronics & VLSI:

Binary number systems, logic gates and logic families, Boolean algebra, combinational circuits, flip-flops, counters & registers, memory, PLA, A to D and D to A conversion, Introduction to VLSI Design, MOS Transistor and Inverters, Combinational & Sequential MOS Circuits, FPGA, Introduction to VHDL

3) Electronics Networks-Lines & Computer Networks:

Network Theorems, Resonance & Couples Circuits, Attenuator, Equalizers, Filters, Transmission line theory, Hardware Structure for Networks, Reference Models, LAN Technologies, TCP/IP and Internet, Introduction to High Speed Networking Technologies, Internet Applications

4) Communication Engineering:

Introduction to Communication systems, AM, FM, PM, AM Radio Receiver, FM Receiver, Antenna wave propagation, SSB techniques, SSB receivers, communication receiver, pulse & digital modulation, source coding & multiplexing, data communication

5) Communication Applications: Microwave Engineering:

Microwave propagation & components, mw tube oscillators and amplifiers, semiconductor microwave devices, microwave measurements, RADAR systems, satellite communication systems.

Fibre Optics Engineering: Principles of optical ray transmission, optical fibres and cables, Optical sources, detectors and components, optical communication systems and fibre optic measurements

Mobile Communication: Cellular telephone concepts, GSM, CDMA, Mobile Handset and Introduction to Advance Concepts

Telecom Techniques: Introduction, Electronic Space Division switching, speech Digitization and Coding, Time Division switching, Traffic Engineering, Telephone networks, Data networks, Integrated Services Digital Networks (ISDN)

6) Microprocessors & Microcontrollers:

Microprocessor Architecture & Microprocessor system, 8085 instruction and timing, 8085 Instruction Set, Programming techniques, Advance Microprocessor, Main memory system. Evolution of Microcontrollers and Introduction to Microcontrollers, Introduction to Assembly Language Programming (8051), Advance Programming Techniques, External peripheral devices and advance RISC machines.

7) Other Engineering: Industrial Engineering:

Control systems, Thyristors, Poly phase rectifiers, Solid state control of AC & DC motors, timers & Automatic controllers, RF heating and resistance welding, Bio-medical electronics, Programmable Logic Controllers

Instruments & Measurements: Introduction, Bridges, Basic Parameter Measurements, Oscilloscopes, Signal Generators, Frequency Counters, Transducers, Component Testers and Analyzers

Television Engineering: Essential of Television system, TV Optics and Video Signal, Color theory and color signal processing, TV signal modulation and TV systems, PAL-D Color Receiver, receiver servicing and Alignment, Advance topics in TV technology.

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