

SYLLABUS (TOPIC WISE) FOR THE POST OF DEPUTY SUPERINTENDENT OF POLICE (WIRELESS), CLASS-I (GAZETTED) (ON REGULAR BASIS) IN THE DEPARTMENT OF HOME, H.P. IS AS UNDER:-

1. Basic Electronics Engineering: Semiconductor Materials, PN Junction diodes and its applications, Zener diode and its applications, Clipping and Clamping Circuits. Bipolar Junction Transistors (BJT): Transistor fundamentals, transistor configurations, DC operating point, BJT characteristics & parameters, fixed bias, emitter bias with and without emitter resistance, analysis of above circuits and their design, variation of operating point and its stability. MOSFET and its operation: Current equation, channel length modulation, oxide capacitance; Biasing and bias stability, Small signal models for MOSFET, Analysis of single transistor amplifiers: Inverting amplifier (CS), Voltage Buffer (CD), Current Buffer (CG),

2. Basic Electrical Engineering: Transformers, efficiency, Basic DC Machines, Induction machines and Synchronous machines. Basics of electrical power sources: hydroelectric, thermal, nuclear, wind and solar. Basics of batteries and their uses.

3. Electronic Measurements and Instrumentation: Principles of measurement, accuracy, precision and standard; Analog and digital systems for measurement, measuring instruments for different applications, Static and Dynamic characteristics of measuring systems, errors, statistical analysis and curve fitting, Measurement systems for non-electrical quantities, different types of transducers and displays, basics of telemetry and data acquisition system.

4. Network Theory: Ohm's and Kirchoff's laws, DC circuits, mesh and nodal analysis, Circuit theorems, Network graphs and their matrices, star-delta transformation, time and frequency domain analysis of RLC circuits, sinusoidal steady state analysis, two port network parameters, driving point and transfer functions, elements of network synthesis.

5. Analog Electronic Circuits: Small signal equivalent circuits of diodes, BJTs and MOSFETs. Simple diode circuits: Clipping, clamping and rectifier circuits. BJT and MOSFET amplifiers: small signal analysis and frequency response. BJT and MOSFET amplifiers: multi-stage, differential, feedback, power and operational amplifiers. Active filters, Oscillators, Op-Amp and its configuration, Function Generators, Wave shaping Circuits, 555 timers.

6. Digital Electronic Circuits: Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders and PLAs; Sequential circuits: latches and flip flops etc. Sample and Hold Circuits, Counters, Shift registers and finite state machines. Data converters: ADC and DAC.

7. Communication Systems: Basic information theory, Modulation and detection in analog and digital systems, sampling and data reconstruction, Quantization and coding, Time division and frequency division multiplexing, Equalization, Optical communication in free space and fiber optic, Propagation of signals at HF, VHF, UHF and microwave frequency, Satellite communication.

8. Control Systems: Open and closed loop systems, Block diagram and signal flow graphs, stability analysis, Routh-Hurwitz criteria, Bode, Root-Locus and Nyquist Plots, Transient and frequency response analysis, Design of Control systems, lead, lag, and lag-lead compensators, state space analysis, PID and industrial controllers.

9. Electromagnetics: Electrostatics; Coordinate System : Spherical and Cylindrical Coordinates, Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth; Transmission lines, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations.

10. Computer Fundamentals: Introduction to Digital computers. Memory hierarchy: Main, Auxiliary and Associative memory, Cache memory and cache mapping, Virtual memory and address mapping, Memory management hardware. Micro-operations, Micro-programmed and Hard-wired control, Microinstruction format, Design of control unit, Micro-program sequencer, Design and Organization of Central Processing Unit (CPU), RISC and CISC characteristics. Pipelining and Parallel processing.

11. Signals and Systems: Representation of continuous and discrete time signals, shifting and scaling operations, linear, time invariant and causal systems, Fourier series representation of continuous periodic signals, sampling theorem, Fourier and Laplace transforms, Z- transform, Discrete Fourier transform; FFT, linear convolution , Discrete Cosine transform, FIR and IIR filters, Bilinear transformation.

(80 question of 80 marks)

Ten (10) questions consisting of General Knowledge pertaining to state of Himachal Pradesh

Ten (10) questions consisting of General Knowledge of National & International affairs

The Screening Test (Computer Based Test/Offline) will be of 100 marks of two hour duration.

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