

# WB Police Wireless Operator Mains Exam Syllabus

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## Physics Syllabus:

### i. Mechanics :

1D Motion, 2D Motion, Relative Motion, Uniform Circular Motion, Inertia Frames, Mass, Newton's 3 Laws, Kinetic Energy, Potential Energy, Conservation of Mechanical Energy, Conservation of Total Energy, Impulse, Momentum and Angular Momentum, Simple Harmonic Motion, Pendulums.

### ii. Oscillations and Waves :

Periodic motion - period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring-restoring force and force constant; energy in S.H.M.- kinetic and potential energies; simple pendulum-derivation of expression for its time period; free, forced and damped oscillations (qualitative ideas only), resonance.

Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.

### iii. Current Electricity:

Electric current, flow of electric charges in a metallic conductor, Ohm's law, electrical resistance, V-I characteristics (linear and non-linear) electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance. Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel. Elementary idea of secondary cells. Kirchoff's laws and simple applications. Wheatstone bridge, metre bridge. Potentiometer - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell

### iv. Electromagnetic induction and Alternating Currents:

Faraday's laws, induced emf and current; Lenz's Law, peak and rms value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current.

**v. Electromagnetic waves :**

Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves. Electromagnetic spectrum (radio waves, microwaves, infrared visible, ultraviolet, Xrays, gamma rays) including elementary facts about their uses.

**vi. Electronic Devices :**

Energy bands in solids, conductors, insulators and semiconductors; semiconductor diode – I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, photodiode, solar cell and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND and NOR). Transistors as a switch.

**vii. Communication Systems:**

Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation. Production and detection of an amplitude- modulated waves.

**Computer Application:**

- I. Basic knowledge in Computer
- II. Operating Computer using GUI based Operating System
- III. Understanding Word Processing
- IV. Using Spread Sheet
- V. Communication using the Internet
- VI. Presentation using Power Point.
- VII. www and Web Browser
- VIII. Communication and Collaboration.

## **Mathematics Syllabus:**

**i. Algebra :**

Irrational numbers, Arithmetic Progression, Geometric Progression, Quadratic Equations, Logarithm, Laws of Indices, Set theory.

**ii. Trigonometry:**

Associated angles, Compound angles, Multiple Angles, Sub-multiple angles.

**iii. Co-ordinate Geometry:**

Equations of straight lines, equations of Circles.

**iv. Calculus :**

Limit, Differentiation, Integration, maximum and minimum values of functions.

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