**Ch 1: Physics Toolkit**

***Slope***

***Quadratic Formula***

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***Pythagorean Theorem***

***Law of Cosines***

***Law of Sines***

**Ch 2: Representing Motion**

***Time Interval***

***Displacement***

***Average Velocity***

**Ch 3: Accelerated Motion**

***Average Acceleration***

***Motion equations***

**Ch 4: Forces in One Dimension**

***Newton’s Second Law***

***Newton’s Third Law***

**Ch 5: Forces in Two Dimensions**

***Kinetic Friction Force***

***Static Friction Force***

**Ch 6: Motion in Two Dimensions**

***Centripetal Acceleration***

***Newton’s Second Law of Circular Motion***

**Ch 7: Gravitation**

***Kepler’s Third Law***

***Law of Universal Gravitation***

***Period of a Planet Orbiting the Sun***

***Speed of a Satellite Orbiting Earth***

***Period of a Satellite Orbiting Earth***

***Gravitational Field***

**Ch 8: Rotational Motion**

***Angular Velocity***

***Angular Acceleration***

***Torque***

***Moment of Inertia of a Point Mass***

***Newton’s Second Law for Rotational Motion***

**Ch 9: Momentum and Its Conservation**

***Momentum***

***Impulse-Momentum Theorem***

***Angular Momentum***

***Angular Impulse-Angular Momentum Theorem***

***Law of Conservation of Angular Momentum***

**Ch 10: Energy and Work**

***Work***

***Kinetic Energy***

***Work-Energy Theorem***

***Work (Angle Between Force and Displacement)***

***Power***

***Mechanical Advantage***

***Ideal Mechanical Advantage***

***Efficiency***

**Ch 11: Energy and Its Conservation**

***Gravitational Potential Energy***

***Rest Energy***

***Mechanical Energy of a System***

***Conservation of Mechanical Energy***

**Ch 12: Thermal Energy**

***Heat Transfer***

***Conservation of Energy***

***Heat Required to Melt a Solid***

***Heat Required to Vaporize a Liquid***

***The First Law of Thermodynamics***

***Change in Entropy***

**Ch 13: States of Matter**

***Pressure***

***Combined Gas Law***

***Ideal Gas Law***

***Force Exerted by a Hydraulic Lift***

***Pressure of Water on a Body***

***Buoyant Force***

***Coefficient of Linear Expansion***

***Coefficient of Volume Expansion***

**Ch 14: Vibrations and Waves**

***Hooke’s Law***

***Potential Energy in a Spring***

***Period of a Pendulum***

***Frequency of a Wave***

***Wavelength***

**Ch 15: Sound**

***Doppler Effect***

**Ch 16: Fundamentals of Light**

***Point Source of Illuminance***

***Malus’s Law***

***Observed Light Frequency***

***Doppler Shift***

**Ch 17: Reflection and Mirrors**

***Law of Reflection***

***Plane-Mirror Image Position***

***Plane-Mirror Image Height***

***Mirror Equation/Thin Lens Equation***

***Magnification***

**Ch 18: Refraction and Lenses**

***Snell’s Law of Refraction***

***Index of Refraction***

***Critical Angle for Total Internal Reflection***

**Ch 19: Interference and Diffraction**

***Wavelength from Double-Slit Experiment***

***Width of Bright Band in Single-Slit Diffraction***

***Wavelength from a Diffraction Grating***

***Rayleigh Criterion***

**Ch 20: Static Electricity**

***Coulomb’s Law***

**Ch 21: Electric Fields**

***Electric Field Strength***

***Electric Potential Difference***

***Electric Potential Difference in a Uniform Field***

***Capacitance***

**Ch 22: Current Electricity**

***Power***

***Resistance***

***Thermal Energy***

**Ch 23: Series and Parallel Circuits**

***Equivalent Resistance for Resistors in Series***

***Current***

***Equivalent Resistance for Resistors in Parallel***

**Ch 24: Magnetic Fields**

***Force on a Current-Carrying Wire in a Magnetic Field***

***Force of a Magnetic Field on a Charged, Moving Particle***

**Ch 25: Electromagnetic Induction**

***Electromotive Force***

***Effective Current***

***Effective Voltage***

***Transformer Equation***

**Ch 26: Electromagnetism**

***Charge-to-Mass Ratio in a Thomson Tube***

***Charge-to-Mass Ratio of an Ion in a Mass Spectrometer***

***Wavelength-Frequency Relationship for a Wave***

**Ch 27: Quantum Theory**

***Energy of Vibration***

***Energy of a Photon***

***Kinetic Energy of an Electron Ejected Due to the Photoelectric Effect***

***Photon Momentum***

***De Broglie Wavelength***

**Ch 28: The Atom**

***Energy of an Emitted Photon***

***Electron Orbital Radius in Hydrogen***

***Energy of a Hydrogen Atom***

**Ch 30: Nuclear Physics**

***Energy Equivalent of Mass***