(As per New Syllabus of NCERT/CBSE)

Revised Edition

S. Chand's Principles of Physics

FOR CLASS XII

With Value Based Questions

Also useful for Engineering & Medical Ent. Exams

V.K. MEHTA
ROHIT MEHTA

S. CHAND School

As per the New CBSE Course Structure and New NCERT Guidelines.

S. Chand's Principles of Physics

For

CLASS XII

[with Value Based Questions]

[Senior Secondary Certificate Examinations of CBSE, Other State Boards of School Education and Various Engineering/Medical Entrance Examinations]

V.K. MEHTA
ROHIT MEHTA

S. CHAND & COMPANY PVT. LTD.
(An ISO 9001 : 2008 Company)
RAM NAGAR, NEW DELHI-110 055

S. CHAND & COMPANY PVT. LTD.

(An ISO 9001 : 2008 Company)

***Head Office*: 7361, RAM NAGAR, NEW DELHI - 110 055**

Phone: 23672080-81-82, 9899107446, 9911310888

Fax: 91-11-23677446

Shop at: schandgroup.com; e-mail: info@schandgroup.com

Branches :

AHMEDABAD	:	1st Floor, Heritage, Near Gujarat Vidhyapeeth, Ashram Road, **Ahmedabad** - 380 014, Ph: 27541965, 27542369, ahmedabad@schandgroup.com
BENGALURU	:	No. 6, Ahuja Chambers, 1st Cross, Kumara Krupa Road, **Bengaluru** - 560 001, Ph: 22268048, 22354008, bangalore@schandgroup.com
BHOPAL	:	Bajaj Tower, Plot No. 2&3, Lala Lajpat Rai Colony, Raisen Road, **Bhopal** - 462 011, Ph: 4274723, 4209587. bhopal@schandgroup.com
CHANDIGARH	:	S.C.O. 2419-20, First Floor, Sector - 22-C (Near Aroma Hotel), **Chandigarh** -160 022, Ph: 2725443, 2725446, chandigarh@schandgroup.com
CHENNAI	:	No.1, Whites Road, Opposite Express Avenue, Royapettah, **Chennai** - 600014 Ph. 28410027, 28410058, chennai@schandgroup.com
COIMBATORE	:	1790, Trichy Road, LGB Colony, Ramanathapuram, **Coimbatore** -6410045, Ph: 2323620, 4217136 coimbatore@schandgroup.com **(Marketing Office)**
CUTTACK	:	1st Floor, Bhartia Tower, Badambadi, **Cuttack** - 753 009, Ph: 2332580; 2332581, cuttack@schandgroup.com
DEHRADUN	:	1st Floor, 20, New Road, Near Dwarka Store, **Dehradun** - 248 001, Ph: 2711101, 2710861, dehradun@schandgroup.com
GUWAHATI	:	Dilip Commercial (Ist floor), M.N. Road, Pan Bazar, **Guwahati** - 781 001, Ph: 2738811, 2735640 guwahati@schandgroup.com
HYDERABAD	:	Padma Plaza, H.No. 3-4-630, Opp. Ratna College, Narayanaguda, **Hyderabad** - 500 029, Ph: 27550194, 27550195, hyderabad@schandgroup.com
JAIPUR	:	1st Floor, Nand Plaza, Hawa Sadak, Ajmer Road, **Jaipur** - 302 006, Ph: 2219175, 2219176, jaipur@schandgroup.com
JALANDHAR	:	Mai Hiran Gate, **Jalandhar** - 144 008, Ph: 2401630, 5000630, jalandhar@schandgroup.com
KOCHI	:	Kachapilly Square, Mullassery Canal Road, Ernakulam, **Kochi** - 682 011, Ph: 2378740, 2378207-08, cochin@schandgroup.com
KOLKATA	:	285/J, Bipin Bihari Ganguli Street, **Kolkata** - 700 012, Ph: 22367459, 22373914, kolkata@schandgroup.com
LUCKNOW	:	Mahabeer Market, 25 Gwynne Road, Aminabad, **Lucknow** - 226 018, Ph: 4076971, 4026791, 4065646, 4027188, lucknow@schandgroup.com
MUMBAI	:	Blackie House, IInd Floor, 103/5, Walchand Hirachand Marg, Opp. G.P.O., **Mumbai** - 400 001, Ph: 22690881, 22610885, mumbai@schandgroup.com
NAGPUR	:	Karnal Bagh, Near Model Mill Chowk, **Nagpur** - 440 032, Ph: 2720523, 2777666 nagpur@schandgroup.com
PATNA	:	104, Citicentre Ashok, Mahima Palace , Govind Mitra Road, **Patna** - 800 004, Ph: 2300489, 2302100, patna@schandgroup.com
PUNE	:	291, Flat No.-16, Ganesh Gayatri Complex, IInd Floor, Somwarpeth, Near Jain Mandir, **Pune** - 411 011, Ph: 64017298, pune@schandgroup.com **(Marketing Office)**
RAIPUR	:	Kailash Residency, Plot No. 4B, Bottle House Road, Shankar Nagar, **Raipur** - 492 007, Ph: 2443142,Mb. : 09981200834, raipur@schandgroup.com **(Marketing Office)**
RANCHI	:	Flat No. 104, Sri Draupadi Smriti Apartments, (Near of Jaipal Singh Stadium) Neel Ratan Street, Upper Bazar, **Ranchi** - 834 001, Ph: 2208761, ranchi@schandgroup.com **(Marketing Office)**
SILIGURI	:	122, Raja Ram Mohan Roy Road, East Vivekanandapally, P.O., Siliguri, **Siliguri**-734001, Dist., Jalpaiguri, (W.B.) Ph. 0353-2520750 **(Marketing Office)** siliguri@schandgroup.com
VISAKHAPATNAM	:	No. 49-54-15/53/8, Plot No. 7, 1st Floor, Opp. Radhakrishna Towers, Seethammadhara North Extn., **Visakhapatnam** - 530 013, Ph-2782609 (M) 09440100555, visakhapatnam@schandgroup.com **(Marketing Office)**

First Edition 1998

Subsequent Editions and Reprints 2000, 2001, 2002, 2003, 2004, 2006, 2007, 2008, 2009, 2011

Seventh Edition 2013

ISBN : 81-219-1769-7 **Code :** 16C 235

PRINTED IN INDIA

By Rajendra Ravindra Printers Pvt. Ltd., 7361, Ram Nagar, New Delhi -110 055
and published by S. Chand & Company Pvt. Ltd., 7361, Ram Nagar, New Delhi -110 055.

PREFACE TO THE SEVENTH EDITION

The general response to the sixth edition of the book was very encouraging. The authors feel that their work has been amply rewarded and wish to express their deep sense of gratitude to the large number of readers who have used it and in particular to those of them who have sent helpful suggestions from time to time for the improvement of the book.

In the present edition, authors have made sincere efforts to make the book up-to-date. A notable feature of this edition is the inclusion of **Value Based Questions.** These questions will not only create general awareness among the students but will also help them to understand the theoretical and practical aspects of physics. It is hoped that these features will make the book more useful to the students.

We are thankful to the Management Team and Editorial Department of S.Chand & Company Pvt. Ltd. for all help and support in the publication of this book.

Errors might have crept in despite utmost care to avoid them and authors shall be grateful if these are pointed out alongwith other suggestions for the improvement of the book.

V.K. MEHTA
ROHIT MEHTA

CBSE SYLLABUS
CLASS XII

Unit I : Electrostatics (Periods 25)

Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution. Electric field, electric field lines, electric field due to a point charge; electric dipole, electric field due to a dipole at axial and equitorial position; torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field.

Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with dielectric medium between the plates, energy stored in a capacitor. Van de Graaff generator.

Unit II: Current Electricity (Periods 22)

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; 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; effect of temperature on resistance.

emf and potential difference of a cell, internal resistance of a cell, combination of cells in series and in parallel.

Kirchhoff'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.

Unit III: Magnetic Effects of Current and Magnetism (Periods 25)

Concept of magnetic field, Oersted's experiment.

Biot - Savart law and its application to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire. Straight and toroidal solenoids, force between two parallel current-carrying conductors-definition of ampere.

Force on a current-carrying conductor in a uniform magnetic field. Torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Force on a moving charge in uniform magnetic and electric fields. Cyclotron.

Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements.

Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.

Unit IV: Electromagnetic Induction and Alternating Currents (Periods 20)

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance, displacement current.

Alternating currents, 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.

AC generator and transformer.

Unit V: Electromagnetic Waves (Periods 4)

Displacement current, Electromagnetic waves and their characteristics (qualitative ideas only).

Transverse nature of electromagnetic waves.

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics (Periods 30)

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lensmaker's formula. Magnification, power of a lens, combination of thin lenses in contact. Refraction and dispersion of light through a prism, rainbow.

Wave optics: wave front and Huygens' principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens' principle. Interference, coherent sources, Young's double slit experiment and expression for fringe width. Diffraction due to a single slit, width of central maximum. Polarisation, plane polarised light; malus law, Brewster's law, uses of plane polarised light and Polaroids.

Optical instruments: Microscopes, astronomical telescopes (reflecting and refracting). Magnifying powers and resolving power of microscopes and astronomical telescopes.

Unit VII : Dual Nature of Matter and Radiation (Periods 8)

Dual nature of radiation. Photoelectric effect, Experimental observation and their sginificance, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment.

Unit VIII: Atoms & Nuclei (Periods 18)

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum.

Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity –alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear reactor, nuclear fusion.

Unit IX: Electronic Devices (Periods 18)

Semiconductors; semiconductor diode – I-V characteristics in forward and reverse bias, diode as a rectifier; 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). Transistor as a switch.

Unit X: Communication Systems (Periods 10)

Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.

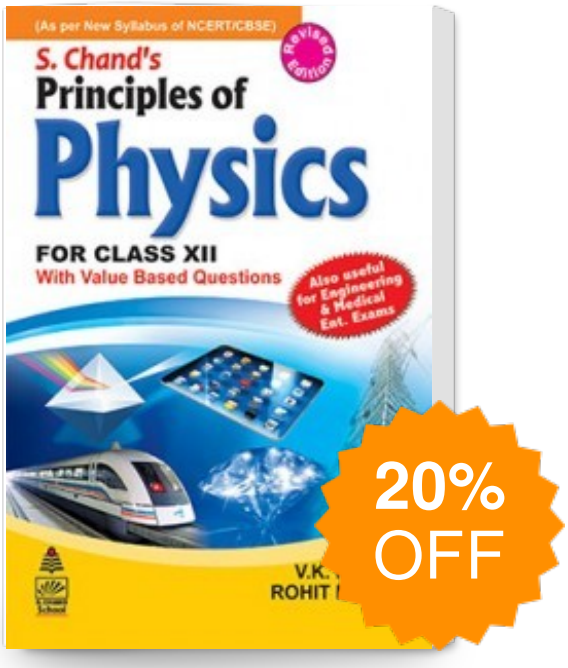
CONTENTS

UNIT-1
ELECTROSTATICS

UNIT-III
MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

UNIT-VII
DUAL NATURE OF RADIATION AND MATTER

S. Chand's Principle Of Physics Class XII



Publisher : SChand Publications ISBN : 9788121917698

Author : V K Mehta And Rohit Mehta

Type the URL : http://www.kopykitab.com/product/12008