

*Seventh Edition*

# Lab Manual

# PHYSICS

XIII

# Saraswati Physics Lab Manual Class 12

**Anil Sharma, Prashant Sharma, Goyal  
Brothers Prakashan**



## **Saraswati Physics Lab Manual Class 12:**

Lab Manual-Physics-TB-12\_E-R Dr R K Gupta, Lab Manual Physics TB 12\_E R **Core Laboratory Manual of Physics for Class XII** Anil Sharma, Prashant Sharma, 2020-04-16 Goyal Brothers Prakashan *Practical/Laboratory Manual Physics Class - XII - by Er. Meera Goyal (SBPD Publications)* Er. Meera Goyal, 2021-07-03 In accordance to the new syllabus of Central Board of Secondary Education CBSE New Delhi and other State Boards following CBSE Curriculum **CBSE Laboratory Manual Physics Class 12th** Er. Akash Shukla, 2022-12-13 Once Owen Chamberlain said The development of Physics like the development of any science is a continuous one It is a constant effort of NCERT that it puts on its textbooks to promote clearer understanding of concepts in every student As important as theoretical study is practical study is also essential to prove theories into realities The freshly updated edition of LABORATORY MANUAL Physics for class XII has been designed as a complete package to understand all the relevant Physics experiments in a simple lucid and interactive manner Strictly based on CBSE guidelines each experiment includes theory to give deep insights into each concept formula term definition etc Viva Voce questions Precautions Activities Diagrams and Appendices are accumulated to make concepts clearer in accordance with the curriculum Along with the experiments suggested Investigatory Projects will reveal the complete adherence of CBSE curriculum This book serves as a step by step guide for conducting experiments in such a way that students will not need to refer to any other book for explanations of the concepts An all inclusive guidance book for Physics laboratory experiment Coverage of each experiment in a simple and lucid manner Detailed and Step by Step procedure for each experiment Necessary precautions to be followed for the experiment Viva Voce Questions to get an understanding on the experiment Suggested Investigatory Projects of the CBSE curriculum Clearly labeled Diagrams in each experiment Appendices related to some useful data TABLE OF CONTENT General Introduction of Practical Work How to Record an Experiment Experimental Errors Logarithms Basic Trigonometry Study of Graphs Section A Experiments Activities Section B Experiments Activities Suggested Investigatory Projects Appendices **ICSE-Lab Manual Physics-TB-10** Dr M K Gandhi, ICSE Lab Manual Physics TB 10 *Practical/Laboratory Manual Physics Class - 12* Er. Meera Goyal, 2023-04-30 Sections A 1 Experiments 2 Activities Sections B 1 Experiments 2 Activities 3 Suggested Investigatory 4 Project Work

**Practical/Laboratory Manual Physics Class XII based on NCERT guidelines by Dr. Sunita Bhagia & Megha Bansal** Dr. J. P. Goel, Er. Meera Goyal, 2020-06-24 SECTION A EXPERIMENTS 1 To determine resistance per cm of a given wire by plotting a graph for potential difference versus current 2 To find resistance of a given wire using meter bridge and hence determine the specific resistance Resistivity of its material 3 To verify the laws of combination Series Parallel of resistance using a meter bridge 4 To compare the e m f of two given primary cells using potentiometer 5 To determine the internal resistance of a given primary cell e g Leclanche cell using potentiometer 6 To determine the resistance of a galvanometer by half deflection method and to find its figure of merit 7 A To convert a given galvanometer of known

resistance and figure of merit into an ammeter of desired range and to verify the same 7 B To convert a given galvanometer of known resistance and figure of merit into a voltmeter of desired range and to verify the same 8 To find the frequency of AC mains with a sonometer and horse shoe magnet

**SECTION B EXPERIMENTS**

- 1 To find the value of  $v$  for different values of  $u$  in case of a concave mirror and to find the focal length
- 2 To find the focal length of a convex lens by plotting graph between  $u$  and  $v$  or  $1/u$  and  $1/v$
- 3 To find the focal length of a convex mirror using a convex lens
- 4 To find the focal length of a concave lens using a convex lens
- 5 To determine the angle of minimum deviation for a given prism by plotting a graph between the angle of incidence and angle of deviation
- 6 To determine refractive index of a glass slab using a travelling microscope
- 7 To find the refractive index of a liquid by using a convex lens and a plane mirror
- 8 To draw I V characteristics curve of a p n function in forward bias and reverse bias
- 9 To draw the characteristics curve of a zener diode and to determine its reverse break down voltage
- 10 To study the characteristics of a common emitter n p n or p n p transistor and to find out the values of current and voltage gains

**SECTION A ACTIVITIES**

- 1 To measure the resistance and impedance of an inductor with or without iron core
- 2 To measure resistance voltage AC DC current AC and check continuity of given circuit using multimeter
- 3 To assemble a household circuit comprising of three bulbs three on off switches a fuse and a power source
- 4 To assemble the components of a given electrical circuit
- 5 To study the variation in potential drop with length of a wire for a steady current
- 6 To draw the diagram of a given open circuit comprising atleast a battery resistor rheostat key ammeter and voltmeter Make the components that are not connected in proper order and correct the circuit and also the circuit diagram

**SECTION B ACTIVITIES**

- 1 To study effect of intensity of light by varying distance of the source on an LDR Light Depending Resistor
- 2 To identify a diode a LED a transistor an IC a resistor and a capacitor from mixed collection of such items
- 3 Use a multimeter to
  - i identify the transistor
  - ii distinguish between n p n and p n p type transistor
  - iii see the unidirectional flow of current in case of a diode and a LED
  - iv Check whether a given electronic components e g diode transistor or IC is in working order
- 4 To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab
- 5 To observe polarisation of light using two polaroids
- 6 To observe diffraction of light due to a thin slit
- 7 To study the nature and size of the image formed by
  - i convex lens
  - ii concave mirror on a screen by using candle and a screen for different distance of the candle from the lens
- 8 To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses

**SUGGESTED INVESTIGATORY PROJECT**

- 1 To Study Various factors on which the Internal Resistance EMF of a cell depends
- 2 To study the variations in current following in a circuit containing L D R because of variation
  - a In the power of incandescent lamp used to illuminate the L D R Keeping all the lamps in fixed position
  - b In the Distance of a incandescent lamp of fixed power used to illuminate the L D R
- 3 To find the refractive indices of a Water b Oil Transparent using a plane mirror an equiconvex lens made from a glass of known refractive index and an adjustable object needle
- 4 To design an appropriate logic gate combination for a given truth table
- 5 To investigate the relation between the ratio of i Output and

Input voltage ii Number of turns in secondary coils and primary coils of a self designed transformer 6 To Investigate the dependence of angle of deviation on the angle of incidence using a hollow prism filled one by one with different transparent fluids 7 To Estimate the charge induced on each one of the two identical styrofoam balls suspended in a vertical plane by making use of Coulomb's Law 8 To study the factors on which the self inductance of a coil depends by observing the effect of this coil when put in series with a resistor bulb in a circuit fed up by an a.c. source of adjustable frequency 9 To study the earth's magnetic field using a tangent galvanometer APPENDIX Some Important Tables of Physical Constants Logarithmic and other Tables *Physics Grade 12 Student Lab Manual 3rd Edition* 259077, BJU Press, 2010-03-01 **ICSE-Lab Manual**

**Physics-TB-09** Dr M K Gandhi, ICSE Lab Manual Physics TB 09 *Core Laboratory Manual of Physics for Class XI* Anil Sharma, Prashant Sharma, Goyal Brothers Prakashan, 2020-04-16 Goyal Brothers Prakashan *Lab Manual Latest Edition* Dr. J. P. Goel, 2016-12-17 Lab E Manual Physics For XIIth Practicals A Every student will perform 10 experiments 5 from each section 8 activities 4 from each section during the academic year Two demonstration experiments must be performed by the teacher with participation of students The students will maintain a record of these demonstration experiments B Evaluation Scheme for Practical Examination One experiment from any one section 8 Marks Two activities one from each section 4 4 8 Marks Practical record experiments activities 6 Marks Record of demonstration experiments Viva based on these experiments 3 Marks Viva on experiments activities 5 Marks Total 30 Marks Section A Experiments 1 To determine resistance per cm of a given wire by plotting a graph of potential difference versus current 2 To find resistance of a given wire using metre bridge and hence determine the specific resistance of its material 3 To verify the laws of combination series parallel of resistances using a metre bridge 4 To compare the emf of two given primary cells using potentiometer 5 To determine the internal resistance of given primary cells using potentiometer 6 To determine resistance of a galvanometer by half deflection method and to find its figure of merit 7 To convert the given galvanometer of known resistance and figure of merit into an ammeter and voltmeter of desired range and to verify the same 8 To find the frequency of the a.c. mains with a sonometer Activities 1 To measure the resistance and impedance of an inductor with or without iron core 2 To measure resistance voltage AC DC current AC and check continuity of a given circuit using multimeter 3 To assemble a household circuit comprising three bulbs three on/off switches a fuse and a power source 4 To assemble the components of a given electrical circuit 5 To study the variation in potential drop with length of a wire for a steady current 6 To draw the diagram of a given open circuit comprising at least a battery resistor rheostat key ammeter and voltmeter Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram Section B Experiments 1 To find the value of  $v$  for different values of  $u$  in case of a concave mirror and to find the focal length 2 To find the focal length of a convex lens by plotting graphs between  $u$  and  $v$  or between  $1/u$  and  $1/v$  3 To find the focal length of a convex mirror using a convex lens 4 To find the focal length of a concave lens using a convex lens 5 To determine angle of minimum deviation for a given prism by

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**Activities**

- 1 To study effect of intensity of light by varying distance of the source on a L D R
- 2 To identify a diode a LED a transistor and IC a resistor and a capacitor from mixed collection of such items
- 3 Use of multimeter to i identify base of transistor ii distinguish between npn and pnp type transistors iii see the unidirectional flow of current in case of a diode and a LED iv check whether a given electronic component e g diode transistor or IC is in working order
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- 5 To observe polarization of light using two Polaroids
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- 8 To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses

**Suggested Investigatory Projects**

- 1 To investigate whether the energy of a simple pendulum is conserved
- 2 To determine the radius of gyration about the centre of mass of a metre scale as a bar pendulum
- 3 To investigate changes in the velocity of a body under the action of a constant force and determine its acceleration
- 4 To compare effectiveness of different materials as insulators of heat
- 5 To determine the wavelengths of laser beam by diffraction
- 6 To study various factors on which the internal resistance emf of a cell depends
- 7 To construct a time switch and study dependence of its time constant on various factors
- 8 To study infrared radiations emitted by different sources using photo transistor
- 9 To compare effectiveness of different materials as absorbers of sound
- 10 To design an automatic traffic signal system using suitable combination of logic gates
- 11 To study luminosity of various electric lamps of different powers and make
- 12 To compare the Young's modulus of elasticity of different specimens of rubber and also draw their elastic hysteresis curve
- 13 To study collision of two balls in two dimensions
- 14 To study frequency response of i a resistor an inductor and a capacitor ii RL circuit iii RC circuit iv LCR series circuit

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**Physics 12 : Student Laboratory Manual** Somers, Ron, British Columbia. Division of Public Instruction. Curriculum Development Branch, British Columbia. Physics 11/12 Curriculum Revision Committee, 1985

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