

As per HCF 2023

Saraswati
Lab Manual
PHYSICS



XII

- Detailed explanations of each experiment.
- Viva voce questions with answers.
- Diagrams for concept clarity.
- Activities on day-to-day physics and real-life examples.



Ncert Saraswati Lab Manual Physics Class 12

Er. Meera Goyal



Ncert Saraswati Lab Manual Physics Class 12:

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 ammeter 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 junction 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
 mirror 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 *Lab Manual-Physics-TB-12_E-R* Dr R K Gupta, Lab Manual Physics TB 12_E R **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
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 the experiment Suggested Investigatory Projects of the CBSE curriculum Clearly labeled Diagrams in each experiment
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 Experiment Experimental Errors Logarithms Basic Trigonometry Study of Graphs Section A Experiments Activities Section B

Experiments Activities Suggested Investigatory Projects Appendices **Lab Manual-Physics-TB-11_E-R1** Dr R K Gupta,
 Lab Manual Physics TB 11_E R1 **Practical/Laboratory Manual Physics Class XI based on NCERT guidelines by Dr. J. P. Goel & Er. Meera Goyal** Dr. J. P. Goel ,Er. Meera Goyal,2020-06-24

SECTION A EXPERIMENTS

1 Measurement of Length

- 1 To measure the diameter of a small spherical cylindrical body by using a vernier callipers
- 2 To measure the dimensions of a given regular body of known mass using vernier callipers and hence find its density
- 3 To measure the internal diameter and depth of a given cylindrical vessel say calorimeter beaker by using vernier callipers and hence find its internal volume i.e. capacity

Viva voce

2 Screw Gauge Micrometer

- 4 To determine the diameter of a given wire using a screw gauge and find its volume
- 5 To find the thickness of a given sheet with the help of screw gauge
- 6 To measure the volume of an irregular lamina by using a screw gauge

Viva voce

3 Spherometer

- 7 To measure the radius of curvature of a given spherical surface convex lens by using a spherometer

Viva voce

4 Mass and Weight

- 8 To determine the mass of two different objects using a beam balance

Viva voce

5 Parallelogram Law of Vectors

- 9 To find the weight of a given body using parallelogram law of vectors

Viva voce

6 Simple Pendulum Measurement of Time

- 10 Using a simple pendulum plot L vs T^2 and L vs T^2 graphs Hence find the effective length of a second's pendulum using appropriate graphs

Viva voce

7 Friction

- 11 To study the relationship between force of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface

Viva voce

8 Motion of a Body Along an Inclined Plane

- 12 To find the downward force along an inclined plane acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between force and $\sin \theta$

Viva voce

SECTION B EXPERIMENTS

1 Elasticity

- 1 To determine the Young's modulus of elasticity of the material of the wire using Searle's apparatus

Viva voce

2 Spring Constant

- 2 To find the spring constant of a helical spring by plotting load extension graph

Viva voce

3 Boyle's Gas Law

- 3 To study the variation in volume with pressure for a sample of air constant temperature by plotting graphs between P and V and between P and $1/V$

Viva voce

4 Surface Tension

- 4 To determine the surface tension of water by capillary rise method

Viva voce

5 Viscosity

- 5 To determine the coefficient of viscosity of given liquid by measuring the terminal velocity of a given spherical body in it

Viva voce

6 Newton's Law of Cooling

- 6 To study the relationship between temperature of a hot body and time by plotting a cooling curve

Viva voce

7 Vibrations of Strings

- 7 To study the relation between frequency and length for a given wire under constant tension using a sonometer

Viva voce

- 8 To study the relation between the length of a given wire and tension for constant frequency using sonometer

Viva voce

8 Vibrations of Air Columns

- 9 To find the velocity of sound in air at room temperature using a resonance tube by two resonance position

Viva voce

9 Specific Heat

- 10 To determine specific heat of a given solid by the method of mixture
- 11 To determine the specific heat of a given liquid by method of mixture

Viva voce

SECTION A ACTIVITIES

- 1 To make a paper scale of given least count e.g. 0.2 cm, 0.5 cm and use it to measure the length of a given object
- 2 To determine the mass of a given body using a metre scale and by applying principle of moments

Viva voce

- 3 To plot a

graph for a given set of data using proper choice of scales and error bars Viva voce 4 To measure the force of limiting friction for rolling of a roller on horizontal plane Viva voce 5 To study the variation in the range of a jet of water with angle of projection Viva voce 6 To study the conservation of energy of a ball rolling down on inclined plane using a double inclined plane Viva voce 7 To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time Viva voce

SECTION B ACTIVITIES

1 To observe the change of the state and plot a cooling curve for molten wax Viva voce 2 To observe and explain the effect of heating on a bimetallic strip Viva voce 3 To note the change in level of liquid in a container on heating and interpret the observations Viva voce 4 To study the effect of detergent in surface tension by observing capillary rise Viva voce 5 To study the factors affecting the rate of loss of heat of a liquid Viva voce 6 To study the effect of load on depression of a suitably clamped meter scale loaded i at its end ii in the middle Viva voce 7 To observe the decrease in pressure with the increase in velocity of the fluid Viva voce

APPENDIX Some Important Tables of Physical Constants Log Antilog and other Tables

Physics Lab Manual Class XII According to the Latest CBSE Syllabus and Other State Boards Following the CBSE Curriculum Edugorilla Prep Experts, 2022-08-18

The all new class 12 physics Lab Manual by Mr Pradeep Dwivedi is strictly based on the curriculum prescribed by CBSE State Boards of Chhattisgarh Haryana Bihar Jharkhand Kerala Mizoram Meghalaya and other state boards All the experiments in this Science Lab Manual have been given in a simple lucid and interactive manner The theory given with each experiment gives complete knowledge of each term concept and definition in order to provide a compact knowledge to the students at one place Viva Voce questions are given with each experiment to test students understanding of related experiments All the lab based experiments have well labeled diagrams which clearly demonstrate the details of the apparatus that are used the correct way of handling laboratory apparatus and perform the experiments methodically The basic purpose of this Lab Manual is to provide the students with appropriate guidance so that they can easily understand carry out and document the experiments in the Science Laboratory Some demonstration experiments are also included to illustrate principles and laws of physics Illustrative diagrams have been used at the places where it is required The Lab Manual comes with practical lessons followed by lab experiments after each chapter projects and attached Notebook for jotting down all the essential information The aim of this Science Lab Manual is to help class 12 students to prepare and understand the complex physics concepts through experimental approach by utilizing pedagogically enhanced content of the Lab Manual and with a compact knowledge base for improving their analytical experimental skills and learning abilities

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

LK-Science-HB-09-R R Rangarajan, Neena Sinha, Rajesh Kumar, LK Science HB 09 R

Physics : Textbook For Class Xii, 2006-01-01

Practical/Laboratory Manual Physics Class XII based on NCERT guidelines by Dr. Sunita Bhagia & Megha Bansal Dr. J. P. Goel ,Er. Meera Goyal ,2020-06-23

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- 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 mirror
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SUGGESTED INVESTIGATORY PROJECT

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- 2 To study the variations in current flowing 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 Lab Manual** Neena Sinha, R Rangarajan, R P Manchanda, R K Gupta, Rajesh Kumar, Lab Manual **Physics Grade 12 Student Lab Manual 3rd Edition** 259077, BJU Press, 2010-03-01 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

Physics : Textbook For Class Xii NCERT, 2006-01-01 **Physics : Textbook For Class Xi** , 2007-01-01 **ICSE-Lab Manual Physics-TB-09** Dr M K Gandhi, ICSE Lab Manual Physics TB 09 **Physics 12 Laboratory Manual** WVU, Physics Staff, Wvu Physics, 1992-06-01 *NCERT Exemplar Problems-Solutions Physics Class 12th* Sanjeev Kumar, 2022-11-26

Problem solving is just like other skills we need to master in life To be good at it we need to practice it with the right approach In view of this DESM NCERT has developed Exemplar Problems to provide a large number of quality problems Get your hands on the latest edition of NCERT EXEMPLAR PROBLEMS SOLUTIONS PHYSICS which has been designed for class XII students to master the basic technique of problem solving This book contains Explanatory Accurate Solutions to all the questions given in the NCERT Exemplar physics book Besides this two additional features that is Thinking Process and Note have been included to enhance the learning and thinking abilities of students Acquiring this book will be highly useful to score best in school examinations and build a foundation for entrance examinations It offers An all inclusive book of NCERT Exemplar Problem Solution Explanatory accurate solutions to all questions A thinking process to tell how to solve a problem Notes are provided with special points A great tool to learn each concept of physics in a complete manner

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Optical Instruments Wave Optics Dual Nature of Radiation and Matter Atoms Nuclei Semiconductor Electronics Materials
Devices and Simple Circuits Communication Systems *Core Laboratory Manual of Physics for Class XI* Anil
Sharma, Prashant Sharma, Goyal Brothers Prakashan, 2020-04-16 Goyal Brothers Prakashan

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