

# Cbse Class 12 Biology Practical Lab Manual

Cbse Class 12 Biology Practical Lab Manual CBSE Class 12 Biology Practical Lab Manual Your Guide to Mastering Practical Skills The CBSE Class 12 Biology Practical Lab Manual is an essential resource for students preparing for their board examinations It provides a comprehensive guide to performing various experiments and projects covering all the practical skills required for the syllabus The manual aims to enhance student understanding of theoretical concepts through hands on experience promoting active learning and critical thinking CBSE Class 12 Biology Practical Lab Manual Experiments Projects Practical Skills Board Examinations Active Learning Critical Thinking The CBSE Class 12 Biology Practical Lab Manual serves as a vital tool for students in their preparation for the board examinations It covers a wide range of practical skills including specimen identification dissection microscopy and experimental procedures The manual guides students through each experiment providing detailed instructions safety protocols and analysis techniques Additionally it offers tips for effective data collection interpretation and presentation crucial for success in the practical examination

**Analysis of Current Trends** The field of biology is constantly evolving with new discoveries and advancements shaping the landscape The CBSE Class 12 Biology Practical Lab Manual reflects these trends by incorporating contemporary techniques and relevant experiments

**Focus on Interdisciplinary Approaches** The manual emphasizes the interdisciplinary nature of biology integrating concepts from other subjects like chemistry physics and mathematics This approach allows students to develop a holistic understanding of biological processes

**Increased Emphasis on Biotechnology and Genomics** Recognizing the growing significance of biotechnology and genomics in modern biology the manual includes experiments that demonstrate the application of these technologies in realworld scenarios

**Integration of Technology** The manual encourages the use of digital tools and online resources for data analysis research and visualization This helps students develop essential skills for navigating the digital world of scientific information

**2 Discussion of Ethical Considerations** The study of biology often involves working with living organisms raising critical ethical considerations that students must be aware of The CBSE Class 12 Biology Practical Lab Manual addresses ethical issues in a transparent and informative manner

**Animal Welfare** The manual emphasizes ethical practices when handling animals promoting humane treatment and minimizing any potential harm It encourages students to consider the welfare of animals used in experiments and to find alternative methods wherever possible

**Respect for Human Subjects** The manual highlights the importance of informed consent and confidentiality when conducting experiments involving human subjects It stresses the need for ethical research practices that safeguard the rights and wellbeing of participants

**Biotechnology and Gene Editing** The manual provides a nuanced discussion on the ethical implications of emerging technologies such as genetic engineering and gene editing It prompts students to critically evaluate the potential benefits and risks associated with these technologies

**Detailed Breakdown of the Manuals Content** The CBSE Class 12 Biology Practical Lab Manual typically encompasses the following sections

**Specimen Identification** This section focuses on identifying various plant and animal specimens including their morphological characteristics classification and ecological significance

**Dissection** The manual provides stepbystep guides for dissecting common biological specimens such as frogs earthworms and flowers Students learn about the anatomy and physiology of these organisms through hands on experience

**Microscopy** This section covers techniques for preparing and observing microscopic specimens including cells tissues and microorganisms Students learn about the different types of microscopes their functionalities and their applications in biological research

**Experimental Procedures** The manual includes a variety of experiments designed to investigate fundamental biological processes and concepts These experiments cover topics such as photosynthesis respiration enzyme activity genetics and ecology

**Data Analysis and Interpretation** The manual provides guidance on collecting analyzing and interpreting experimental data Students learn to use statistical methods graphs and tables to effectively communicate their findings

**Project Work** The manual encourages students to undertake independent research projects on topics of interest This section provides guidelines for selecting a project topic conducting 3 research and writing a project report

**Safety Guidelines** The manual emphasizes the importance of safety in the laboratory environment It outlines specific safety protocols for handling chemicals equipment and biological

specimens Benefits of Using the CBSE Class 12 Biology Practical Lab Manual Enhanced Understanding The manual provides a practical approach to learning biology allowing students to apply theoretical concepts in realworld scenarios Development of Practical Skills Through hands on experiments and project work students develop essential practical skills including microscopy dissection and experimental design Improved Critical Thinking The manual encourages students to analyze data draw conclusions and critically evaluate information This fosters a deeper understanding of biological concepts and encourages independent thinking Preparation for Examinations The manual serves as a valuable resource for preparing for the practical examination providing students with a comprehensive understanding of the required skills and knowledge Increased Engagement The hands on nature of the manual promotes active learning and increases student engagement in biology Conclusion The CBSE Class 12 Biology Practical Lab Manual is an invaluable resource for students aspiring to excel in their practical examinations and gain a deeper understanding of biology It provides a comprehensive guide to conducting experiments analyzing data and developing essential practical skills By embracing the ethical considerations and staying informed about current trends in the field students can utilize this manual to unlock their potential in the exciting world of biology

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a surface chemistry 1 to prepare colloidal solution sol of starch 2 to prepare a colloidal solution of egg albumin 3 to prepare colloidal solution of gum 4 to prepare colloidal solution of aluminium hydroxide  $Al(OH)_3$  5 to prepare colloidal solution of ferric hydroxide  $Fe(OH)_3$  6 to prepare colloidal solution of arsenious sulphide  $As_2S_3$  7 to purify a freshly prepared sol by dialysis 8 to compare the effectiveness of different common oils castor oil cotton seed oil coconut oil kerosene oil mustard oil in forming emulsions viva voce b chemical kinetics 1 to study the effect of concentration on the rate

of reaction between sodium thiosulphate and hydrochloric acid 2 to study the effect of temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid 3 to study the rate of reaction of iodide ions with hydrogen peroxide at different concentrations of iodide ions 4 to study the rate of reaction between potassium iodate  $\text{KIO}_3$  and sodium sulphite  $\text{Na}_2\text{SO}_3$  using starch solution as indicator  
 viva voce c thermochemistry 1 determine the enthalpy of dissolution of copper sulphate  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in water at room temperature 2 to determine the enthalpy of neutralization of the reaction between  $\text{HCl}$  and  $\text{NaOH}$  3 to determine enthalpy change during the interaction between acetone and chloroform  
 viva voce d electrochemistry 1 to study the variation of cell potential in  $\text{Zn} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu}$  with change in concentration of electrolytes  $\text{CuSO}_4$  or  $\text{ZnSO}_4$  at room temperature  
 viva voce e chromatography 1 to separate the coloured components pigment present in the given extract of leaves and flowers by ascending paper chromatography and find their  $R_f$  values 2 to separate the coloured components present in the mixture of red and blue inks by ascending paper chromatography and find their  $R_f$  values 3 to separate  $\text{CO}_2$  and  $\text{Ni}^{2+}$  ions present in the given mixture by using ascending paper chromatography and determine their  $R_f$  values  
 viva voce f preparation of inorganic compounds 1 preparation of double salt of ferrous ammonium sulphate mohr's salt from ferrous sulphate and ammonium sulphate 2 to prepare a pure sample of potash alum fitkari 3 preparation of crystals of potassium ferric oxalate or potassium trioxalato ferrate iii  
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 viva voce i study of carbohydrates fats and proteins 1 to study simple reactions of carbohydrate 2 to study simple reactions of fats 3 to study simple reactions of proteins 4 to investigate presence of carbohydrates fats and proteins in food stuffs  
 viva voce j volumetric analysis 1 to prepare 250 ml of  $M/10$  solution of oxalic acid 2 to prepare 250 ml of  $M/10$  solution of ferrous ammonium sulphate 3 prepare  $M/20$  solution of oxalic acid with its help find out the molarity and strength of the given solution of potassium permanganate 4 prepare  $M/20$  solution of mohr's salt using this solution determine the molarity and strength of potassium permanganate solution  
 viva voce k qualitative analysis  
 viva voce investigatory projects 1 to study the presence of oxalate ions in guava fruit at different stages of ripening 2 to study the quantity of casein present in different samples of milk 3 preparation of soyabean milk and its comparison with natural milk with respect to curd formation effect of temperature etc 4 to study the effect of potassium bisulphite as food preservative at various concentrations 5 to study the digestion of starch by salivary amylase and the effect of pH and temperature on it 6 to study and compare the rate of fermentation of the following materials wheat flour gram flour potato juice and carrot juice 7 to extract essential oils present in saunf aniseed ajwain coriander illaichi cardamom 8 to detect the presence of adulteration in fat oil and butter 9 to investigate the presence of  $\text{NO}_2$  in brinjal

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  $\ln t$  and  $\ln t^2$  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  $1/v$  18 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

laboratory manual in biotechnology students

changes in the organization of health services in developing countries have led to district levels assuming more responsibility for the planning delivery and quality of community health care this fully up dated new edition has been produced to help those working in the district laboratory and those responsible for the organization and management of community laboratory services and the training of district laboratory personnel replacing the previous publication medical laboratory manual for tropical countries this book provides an up to date practical bench manual taking a modern approach to the provision of a quality medical laboratory service

an excellent book in accordance with the latest syllabus for class 11 prescribed by cbse ncert and adopted by various state education boards a basic laboratory techniques 1 to cut a glass tube or glass rod 2 to bend the glass rod at an angle 3 to draw a glass jet from a glass tube 4 to bore a cork and fit a glass tube into it b characterisation and purification of chemical substances 1 to determine the melting point of the given unknown organic compound and its identification simple laboratory technique 2 to determine the boiling point of a given liquid when available in small quantity simple laboratory method 3 to prepare crystals of pure potash alum  $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$  from the given impure sample 4 to prepare the pure crystals of copper sulphate from the given crude sample 5 to prepare pure crystals of benzoic acid from a given impure sample c measurement of pH values 1 to determine the pH value of vegetable juices fruit juices tap water and washing soda by using universal pH paper 2 to determine and compare the pH values of solutions of strong acid HCl and weak acid  $CH_3COOH$  of same concentration 3 to study the pH change in the titration of strong base vs strong acid by using universal indicator paper 4 to study the pH change by common ion  $CH_3COO^-$  ion in case of weak acid  $CH_3COOH$  5 to determine the change in pH value of weak base  $NH_4OH$  in presence of a common ion  $NH_4^+$  d chemical equilibrium 1 to study the shift in equilibrium between ferric ions and thiocyanate ions by changing the concentrations of either of the ions 2 to study the shift in equilibrium between  $CO_2$ ,  $H_2O$  and  $Cl^-$  ions by changing the concentrations of either of the ions e quantitative analysis 1 to prepare  $M/10$  oxalic acid solution by direct weighing method 2 to prepare  $M/10$  solution of sodium carbonate by direct weighing method 3 to determine the strength of given solution of sodium hydroxide by titrating it against  $N/10$  or  $M/20$  solution of oxalic acid 4 to determine the strength of a given solution of hydrochloric acid by titrating it against a standard  $N/10$  or  $M/20$  sodium carbonate solution f qualitative analysis 1 analysis of anions 2 analysis of cations g

detection of elements in organic compounds 1 to detect the presence of nitrogen sulphur and halogens in a given organic compound by lassaigne s test 2 to detect the presence of nitrogen sulphur and halogens in the given organic compound sample number by lassaigne s test investigatory projects a checking of bacterial contamination in water 1 to check the bacterial contamination in drinking water by testing sulphide ions b methods of water purification 1 to purify water from suspended impurities by using sedimentation 2 to purify water by boiling 3 to purify water by distillation method 4 to purify water by reverse osmosis technique 5 to purify water by gac method 6 to purify water by bleach treatment 7 to purify water by oxidising agent 8 to purify water by ozone treatment method c water analysis 1 to test the hardness of different water samples d foaming capacity of various soaps 1 to compare the foaming capacity of different washing soaps 2 to study the effect of addition of sodium carbonate on foaming capacity of washing soap e tea analysis 1 to study the acidity of different samples of tea leaves tea by using ph paper f analysis of fruits and vegetable juices 1 to analyse the fruit and vegetable juices for the constituent present in them g rate of evaporation 1 to study the rate of evaporation of different liquids h effect of acids and bases on tensile strength of fibres 1 to compare the tensile strength of natural fibres and synthetic fibres 2 to study the effect of acids and bases on tensile strength of different fibres log antilog table

basic and practical microbiology lab manual uses clear concise text and outstanding visuals to guide students through exercises that enhance their understanding of microbes students learn about the role these diverse amazing organisms play in our lives and environment and gain a deeper understanding of the concepts of cultivation identification and control of microbial growth organized into seven modules each featuring several laboratory exercises the manual provides up to date exercises on microbial diversity and ubiquity cultivating and staining cells for microscopy bacterial metabolism identifying unknown bacteria controlling bacterial growth symbiosis immunology and epidemiology the written text engages students through real world examples and practices while easy to follow diagrams and figures help students complete the laboratory exercises with confidence basic and practical microbiology lab manual includes a supplementary online component which offers videos of basic techniques flashcards games and quizzes that prepare students for in class tests designed for introductory courses at the college level the book is ideal for the laboratory component of lecture courses in microbiology for both majors and non majors

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