

# LABORATORY MANUAL

Class XII

# PHYSICS



# Ncert Lab Manual

**Dr. S. C. Rastogi ,Er. Meera Goyal**



## Ncert Lab Manual:

**Practical/Laboratory Manual Chemistry Class XI based on NCERT guidelines by Dr. S. C. Rastogi & Er. Meera Goyal** Dr. S. C. Rastogi , Er. Meera Goyal, 2020-06-23 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  $Co^{2+}$  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

**Comprehensive Practical Science IX** S.P. Saxena,Dheeraj Saxena,2010 Comprehensive Practical Science X S. P. Saxena,Dheeraj Saxena,2011-12 CBSE MCQs Chapterwise For Term I & II, Class 12, Mathematics Career Point Kota,2021-10-12 Strictly as per the new term wise syllabus for Board Examinations to be held in the academic session 2021 22 for class 12 Multiple Choice Questions based on new typologies introduced by the board Stand Alone MCQs MCQs based on Assertion Reason Case based MCQs Include Questions from CBSE official Question Bank released in April 2021 Answer key with Explanations Sample Paper on the latest pattern of Term 1 exam *CBSE Class 12th Maths (10 Most likely Question Papers with Solution) By Career Point Kota* Career Point Kota,2020-07-28 The CBSE has made certain changes in the assessment structure from the session 2019 20 onwards In the new scheme of examination CCE and term system has been replaced with the Internal Assessment Single Annual Exam by CBSE itself Single exam conducted by CBSE will carry 80 marks whereas 20 marks are left to the schools for internal assessment CBSE has issued detailed guidelines on how the internal marks will be divided among different activities From 2019 onwards there will be internal choices in board examinations with increased internal options in the question paper Considering this change now a student has to prepare accordingly for board examinations The new assessment format brought with it excitement as well as anxiety And to help them prepare and excel in their CBSE board examination Career Point Kota has developed a series of 10 Most Likely Question Papers with Solutions The Key Features of Most Likely Question Papers with Solutions Series New OBJECTIVE TYPE question in each paper Syllabus of CBSE 2019 20 Based on the latest CBSE Syllabus Pattern Mind map of each chapter is given to visualize and help acquire a better understanding Important terms facts formulae and quick revision tips are given Covers questions asked in previous year board exams Toppers Answer Sheet as released by CBSE to understand the scoring technique We hope this book will gratify students need for the new CBSE pattern board exam and smoothen their path to success We wish to utilize the opportunity to place on record our special thanks to all the members of the Content Development team for their efforts to create this wonderful book *Oswaal CBSE Question Bank Class 12 Mathematics, Chapterwise and Topicwise Solved Papers For Board Exams 2025* Oswaal Editorial Board,2024-01-23 Description of the product 100% Updated Syllabus Fully Solved Board Papers we have got you covered with the latest and 100% updated curriculum Crisp Revision with Topic wise Revision Notes Smart Mind Maps Mnemonics Extensive Practice with 3000 Questions Board Marking Scheme Answers to give you 3000 chances to become a champ Concept Clarity with 1000 Concepts 50 Concept Videos for you to learn the cool way with videos and mind blowing concepts NEP 2020 Compliance with Art Integration Competency Based Questions for you to be on the cutting edge of the

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**Physics**

- 1 To determine the focal length of concave mirror
- 2 To find the focal length of convex lens by two pin method
- 3 To find the image distance for varying object distances in case of a convex lens and drawing corresponding ray diagrams to show the nature of image formed
- 4 To trace the path of the rays of light through a glass prism
- 5 To trace the path of a ray of light passing through a rectangular glass slab for different angles of incidence
- 6 To study the dependence of potential difference  $V$  across a resistor on the current  $I$  passing through it and determine its resistance. Also plotting a graph between  $V$  and  $I$
- 7 To determine the equivalent resistance of two resistors when connected in series and parallel

**Chemistry**

- 8 To find the pH of the following samples by using pH paper universal indicator
  - 9 To studying the properties of a base dil NaOH Solution and Acid HCl by their reaction with a Litmus solution
  - Blue
  - Red
  - b Zinc metal
  - c Solid sodium carbonate
- 10 To perform and observe the following reactions and to classify them into a Combination reaction b Decomposition reaction c Displacement reaction d Double displacement reaction
  - i Action of water on quick lime
  - ii Action of heat on ferrous sulphate crystals
  - iii Iron nails kept in copper sulphate solution
  - iv Reaction between sodium sulphate and barium chloride solutions
- 11 To observe the action of Zn Fe Cu and Al on the following salt solutions
  - a  $\text{ZnSO}_4$  aq
  - b  $\text{FeSO}_4$  aq
  - c  $\text{CuSO}_4$  aq
  - d  $\text{Al}_2\text{SO}_4$  3 aq
 Based on the above result to arrange Zn Fe Cu and Al metals in the decreasing order of reactivity
- 12 To study the following properties of acetic acid ethanoic acid
  - i Odour
  - ii Solubility in water
  - iii Effect on litmus
  - iv Reaction with sodium hydrogen carbonate
- 13 To study the comparative cleaning capacity of a sample of soap in soft and hard water

**Biology**

- 14 To study stomata by preparing a temporary mount of a leaf peel
- 15 To show experimentally that carbon dioxide  $\text{CO}_2$  is given out during aerobic respiration
- 16 To study A Binary fission in Amoeba and B Budding in yeast with the help of prepared slides
- 17 To identify the different parts of an embryo of a dicot seed pea gram or red kidney beans

Practical/Laboratory Manual Chemistry Class XII based on NCERT guidelines by Dr. S. C. Rastogi, Er. Meera Goyal Dr. S. C. Rastogi, Er. Meera Goyal, 2020-06-22

**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  $\text{Al}(\text{OH})_3$
- 5 To prepare colloidal solution of ferric hydroxide  $\text{Fe}(\text{OH})_3$
- 6 To prepare colloidal solution of arsenious sulphide  $\text{As}_2\text{S}_3$
- 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 HCl and 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  $\text{Zn} \mid \text{Zn}^{2+} \parallel \text{Cu}^{2+} \mid \text{Cu}$  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 Viva Voce G Preparation of Organic Compounds 1 Preparation of iodoform from ethyl alcohol or acetone 2 Preparation of acetanilide in laboratory 3 Preparation of  $\beta$ -Naphthol aniline dye 4 To prepare a pure sample of dibenzalacetone 5 To prepare a pure sample of  $p$ -nitro acetanilide Viva Voce H Tests for the Functional Groups Present in Organic Compounds 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 caseine 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 corum 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

Practical/Laboratory Manual Biology Class XI based on NCERT guidelines by Dr. Sunita Bhagia & Megha Bansal Dr.

Sunita Bhagia, Megha Bansal, 2020-06-23 An Excellent Book in Accordance with the latest syllabus for Class 11 Prescribed by CBSE NCERT and Adopted by Various State Education Boards Introduction 1 Necessary equipments chemicals and other things for practical work 2 General Instructions for practical work 3 Special Instructions for practical note book Drawing and Recording 4 Special Instructions for spotting EXPERIMENTS 1 To study and describe the flowering plant belonging to family

one from each of the families a Solanaceae b Fabaceae c Liliaceae 2 To prepare temporary slide of transverse section of dicot monocot stem dicot monocot root 3 To study osmosis by potato osmometer 4 To study of plasmolysis in epidermal peel of Tradescantial or Rhoeo leaf 5 To study the distribution of stomata on the upper and lower surface of a leaf 6 To compare the rate of transpiration in upper and lower surface of the leaf 7 To test the presence of sugars Glucose Sucrose and Starch proteins and fats and to detect their presence in suitable plant and animal materials 8 To study the separation of plant pigments by paper chromatography 9 To study the rate of respiration in flower buds leaf tissue and germinating seeds 10A To test presence of urea in urine 10B To test presence of sugar in urine 10C To detect presence of albumin in urine 10D To test urine for presence of bile salt

**SPOTTING** 1 Study of compound microscope 2 To study the plant specimen and identification with reasons Bacteria Oscillatoria Spirogyra Rhizopus Mushroom Yeast Liverwort Moss Fern Pine One Monocotyledonous plant One dicotyledonous plant and one Lichen 3 Study of animal specimens 1 Amoeba 2 Hydra 3 Fasciola Hepatica Liver fluke 4 Ascaris Lumbricoides 5 Hirudinaria Granulosa 6 Pheretima Posthuma 7 Palaemon 8 Bombyx Mori 9 Apis Indica Honeybee 10 Pila Globosa Snail 11 Asterias Starfish 12 Scoliodon Dogfish Shark 13 Labeo Rohita Rohu 14 Rana Tigrina Frog 15 Hemidactylus Lizard 16 Columba Livia Pigeon 17 Orytolagus Cuniculus Rabbit

**4A** To study the plant tissues Palisade cells Guard cells Parenchyma Collenchyma Sclerenchyma Xylem and Phloem through prepared slide **4B** To study the animal tissue squamous epithelium muscles fibres through prepared slide **4C** To study mammalian blood smear by temporary permanent slide 5 Study of mitosis in root tip of onion 6 Study of different modification in root stem and leaves 7 To study and identify different types of inflorescence Racemose and Cymose 8 To study imbibition in seed raisins 9 To demonstrate that anaerobic respiration take place in the absence of air 10 To study human skeleton and joints 11 To study the external features of cockroach with help of model or chart

*Practical/Laboratory Manual Biology Class XII based on NCERT guidelines by Dr. Sunita Bhagia & Megha Bansal* Dr. Sunita Bhagia ,Megha Bansal,2020-06-22

**A List of Experiments** 1 Study pollen germination on a slide 2 Collect and study soil from at least two different sites and study them for texture moisture content pH and water holding capacity Correlate with the kinds of plants found in them 3 Collect water from two different water bodies around you and study them for pH clarity and presence of any living organism 4 Study the presence of suspended particulate matter in air at two widely different sites 5 Study the plant population density by quadrature method 6 Study the plant population frequency by quadrature method 7 Prepare a temporary mount of onion root tip to study mitosis 8 Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch 9 Isolate DNA from available plant material such as spinach green pea seeds papaya etc

**B** Study observation of the following **Spotting** 1 Flowers adapted to pollination by different agencies wind insects birds 2 Pollen germination on stigma through a permanent slide 3 Identification of stages of gamete development i e T S of testis and T S of ovary through permanent slides from grasshopper mice 4 Meiosis in onion bud cell or grasshopper testis through permanent slides 5 T S of blastula through

permanent slides Mammalian 6 Mendelian inheritance using seeds of different colour sizes of any plant 7 Prepare pedigree charts of any one of the genetic traits such as rolling of tongue blood groups ear lobes widow s peak and colour blindness 8 Controlled pollination emasculation tagging and bagging 9 Common disease causing organisms like Ascaris Entamoeba Plasmodium any fungus causing ringworm through permanent slides or specimens Comment on symptoms of diseases that they cause 10 Two plants and two animals model virtual images found in xeric conditions Comment upon their morphological adaptations 11 Two plants and two animals models virtual images found in aquatic conditions Comment Content  
 EXPERIMENTS 1 To study pollen germination on slide 2 To study the texture moisture content pH and waterHolding Capacity of soils collected from different sites 3 To collect water from different water bodies and study them for pH Clarity and presence of living organisms 4 To study the presence of suspended particulate matter in air at different sites 5 To study plant population density by quadrat method 6 To study plant population frequency by quadrat method 7 To study various stages of mitosis in root tip of onion by preparing slide in acetocarmine 8 To study effect of different temperature and three different pH onthe activity of salivary amylase 9 To study the isolation of DNA from available plant material such as spinach green pea seeds papaya etc SPOTTING 1 Pollination in flowers 2 Pollen germination 3 Slides of mammal tissues 4 Meiosis cell division 5 T S of Blastula 6 Mendel s inheritance laws 7 Pedigree chart 8 Controlled pollination 9 Common disease causing organisms 10 Xerophytic adaptation 11 Aquatic adaptation      Complete Science Laboratory Manual CBSE For Class 10 Education Experts,2019-10      **Complete Mathematics Laboratory Manual CBSE For Class 9 Education Experts,2019-10**      **Lab Manual Science Class 09** Neena Sinha, R.Rangarajan, Rajesh Kumar, These Lab Manuals provide complete information on all the experiments listed in the latest CBSE syllabus The various objectives materials required procedures inferences etc have been given in a step by step manner Carefully framed MCQs and short answers type questions given at the end of the experiments help the students prepare for viva voce      **CBSE Laboratory Manual MathematicsClass 9** Divya Malik,2022-12-13 Once William Paul Thurston said Mathematics is not about numbers equations computations or algorithms it is about Understanding 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 Mathematics for class IX has been designed as a complete package to understand all the relevant mathematical experiments in a simple lucid and interactive manner Strictly based on CBSE guidelines each activity includes theory to give deep insights into each concept formula term definition etc Viva Voce questions Notes Suggested Activities Applications etc are accumulated to make concepts clearer in accordance with the curriculum Along with the Activities all the projects listed in NCERT Lab Manual have also been properly covered 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 Maths laboratory activities



Coverage of each activity in a simple and lucid manner Detailed and Step by Step procedure for each activity Accurate Figures Illustrations and Diagrams in each activity Detailed Demonstration and Calculations with each activity Notes Applications etc with each activity TABLE OF CONTENT Activity 1 34 List of Projects To Develop Heron s formula for area of a triangle story of Chronology of Indian Mathematicians with their contributions Development of formula for the area of a cyclic quadrilateral With rectangle of given perimeter finding the one with a maximum area and with rectangle of given area finding the ones with least perimeter Knowledge and classification of solid figures with respect to surface areas and volumes Generation of Pythagorean triplets Magic squares with cuboid of given surface area finding the one with maximum volume and with cuboid of given volumes finding one with least surface area Mathematical designs and patterns Application of algebra in day to day life

**Practical/Laboratory Manual Chemistry Class - XI** Er. Meera Goyal, 2021-05-29

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2 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 Viva Voce 3 Water Analysis 1 To test the hardness of different water samples Viva Voce 4 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 Viva Voce 5 Tea Analysis 1 To study the acidity of different samples of tea leaves tea by using pH paper Viva Voce 6 Analysis of Fruits and Vegetable Juices 1 To analysis the fruit and vegetable juices for the constituent present in them Viva Voce 7 Rate of Evaporation 1 To study the rate of evaporation of different liquids IViva Voce 8 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 Viva Voce **Lab Manual**

**Science Class 10** Neena Sinha, R.Rangarajan, Rajesh Kumar, These Lab Manuals provide complete information on all the experiments listed in the latest CBSE syllabus The various objectives materials required procedures inferences etc have been given in a step by step manner Carefully framed MCQs and short answers type questions given at the end of the experiments help the students prepare for viva voce **Annual Report** National Council of Educational Research and Training

(India),2007 *Practical/Laboratory Manual Chemistry Class XII based on NCERT guidelines* Dr. S. C. Rastogi, ,Er. Meera Goyal,2022-02-25 An Excellent Book in Accordance with the latest syllabus for class XII Prescribed by CBSE NCERT and Adoptedby Various State Education Boards 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  $KIO_3$  and sodium sulphite  $Na_2SO_3$  using starch solution as indicator Viva Voce C Thermochemistry 1 Determine the enthalpy of dissolution of copper sulphate  $CuSO_4 \cdot 5H_2O$  in water at Room temperature 2 To determine the enthalpy of neutralization of the reaction between  $HCl$  and  $NaOH$  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  $Zn|Zn^{2+}||Cu^{2+}|Cu$  with change in concentration of electrolytes  $CuSO_4$  or  $ZnSO_4$  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

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**Bibliography** ,2015-07 Indian Education ,1967

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