APP

What are the problems?	Compilation of problems	Categorization of Problems (Subjective &Behavioral)
1. Abstract Concepts: Electrostatics involves abstract concepts such as electric fields, potentials, and flux. Students may find it difficult to visualize and grasp these concepts initially. The abstract nature of electrostatics can make it challenging for students to understand and apply the principles effectively. 2. Mathematical Calculations: Electrostatics involves complex mathematical calculations, especially when dealing with Coulomb's law, electric fields, and potentials. Students may struggle with mathematical manipulations, including vector calculations and integration, which are necessary for solving electrostatics problems. 3. Visualizing Electric Fields: Understanding the concept of electric fields and visualizing their patterns can be challenging for students. Electric fields are invisible, and students may struggle to visualize the forces acting on charged particles or objects within these fields. 4. Applying Gauss's Law: Gauss's law, which involves calculating electric fields and electric flux through closed surfaces, can be challenging for students. Understanding the appropriate selection of Gaussian surfaces and applying the law to complex charge distributions may pose difficulties.	Students find problem in : 1. Deriving the formula, calculation, unit conversion and application (Application) 2. analysis of graph and to solve questions related to graph (Analysis) 3. relating the concept with daily life. (Application) 4. understanding the language of question paper and time management during exam. (Evaluate) 5. Attempting less number of Question in exam due to above problem	SUBJECTIVE PROBLEMS: 1. Understanding abstract concepts: Electrostatics involves abstract concepts such as electric fields, potentials, and charges. Students may struggle to visualize and grasp these concepts initially, making it challenging to apply them to problem-solving. 2. Calculating and manipulating vectors: Electrostatics problems often involve vector quantities like electric fields and forces. Students may find it difficult to perform vector calculations, such as vector addition or resolving vectors into components. 3. Identifying appropriate formulas: There are numerous formulas in electrostatics, and students may find it challenging to select the appropriate formula for a given problem. This requires a clear understanding of the concepts and knowing how to apply the relevant equations. 4. Analyzing complex charge distributions: Some problems involve complex charge distributions, such as charged rings, discs, or non-uniformly charged objects. Determining the electric field or potential due to such distributions can be challenging and may require

5. Capacitors and Circuits: Understanding the behavior of capacitors and their applications in circuits can be challenging. Students may find it difficult to grasp concepts such as capacitance, energy storage in capacitors, and the behavior of capacitors in series and parallel configurations. 6. Lack of Hands-on Experience: Students may face challenges if they have limited access to laboratory facilities or practical demonstrations. Hands-on experience is crucial for understanding and visualizing electrostatic phenomena, conducting experiments, and verifying theoretical concepts. 7. Problem Solving: Electrostatics problems often require analytical thinking and applying multiple concepts simultaneously. Students may struggle with selecting appropriate equations, manipulating variables, and identifying relevant information to solve problems effectively. 8. Lack of Conceptual Understanding: Students may face difficulties if they focus solely on memorizing formulas and equations without developing a strong conceptual understanding. This can hinder their ability to apply concepts to different scenarios and solve unfamiliar problems. 9. Time Management: The electrostatics unit covers various topics, and students may struggle with time		advanced techniques or integration skills. 5. Solving problems involving multiple principles: Electrostatics often combines various principles, such as Coulomb's Law, Gauss's Law, and the superposition principle. Students may face difficulty in applying multiple principles simultaneously to solve complex problems. 6. Interpreting word problems: Some electrostatics problems are presented as word problems, requiring students to identify the relevant information, extract key details, and formulate an appropriate solution strategy. This can be challenging for students who struggle with problem-solving skills or reading comprehension. BEHAVIRIOL OBJECTIVE: 1. Understanding and applying concepts: Students should aim to develop a solid understanding of fundamental electrostatics concepts, including electric charges, fields, potentials, and forces. They should be able to apply these concepts to solve a variety of problems. 2. Developing analytical and critical thinking skills: Electrostatics requires analytical and critical thinking skills to analyze

management, especially when preparing for examinations. Balancing the theoretical understanding, mathematical calculations, and practical aspects can be challenging within the given timeframe.		complex scenarios, identify relevant principles, and formulate appropriate solution strategies. Students should strive to enhance their problem-solving abilities and think critically when interpreting and solving electrostatics problems. 3. Enhancing visualization and spatial reasoning: Electrostatics often involves visualizing and reasoning about electric fields, charge distributions, and their interactions. Students should aim to improve their visualization skills and develop a clear mental picture of electrostatic phenomena. 4. Communicating scientific ideas effectively: Students should be able to articulate their understanding of electrostatics concepts and communicate scientific ideas clearly and coherently. This includes effectively explaining solutions, using appropriate scientific vocabulary, and supporting arguments with evidence and reasoning. 5. Developing laboratory skills: The electrostatics unit often includes practical experiments and demonstrations. Students should aim to develop laboratory skills such as conducting experiments, making observations, recording data accurately,

		and analyzing experimental results. 6. Promoting scientific inquiry and curiosity: Students should develop a sense of scientific inquiry and curiosity in the electrostatics unit. They should be motivated to explore electrostatic phenomena, ask questions, and seek answers through investigation and research. 7. Building collaborative and cooperative skills: Electrostatics, like other science subjects, can benefit from collaborative learning. Students should strive to work collaboratively in group activities, discussions, and projects, promoting cooperation, teamwork, and effective communication with peers. 8. Cultivating a growth mindset: Electrostatics can be challenging, and students may face difficulties along the way. It is essential for students to develop a growth mindset, embracing challenges, persisting through obstacles, and viewing mistakes as opportunities for learning and improvement. .

KPI CLASS XII

KPI NAME	KPI DEF. NO	KPI DEFn.	WHERE ARE WE NOW? (scale & description)	KPI GOAL	KPI LIMIT	WHAT WE NEED TO DO?	HOW WILL IT BE ACHIEVED?	KPI MEASUREMENT	REVIEW	KPI REPORTING	KPI ACHIEVEMENT	KPI IMPROVEMENT
SCIENTIFIC AND EXPERIMENTIAL TACTICS	01	KPI 01: Students face problems in understanding the conceptual questions, HOT'S questions KPI 02 : Students face problems in solving numerical portion/ mathematical calculations KPI 03 : Students Face problem in analytical study of Graphical portion, KPI 04: Sstudents face problems in analysing the	Appr 45% of the students are able to understand.	48%	± 3%	To give more Practice and continuous follow – up action.	1. To prepare lesson plan according to the KPI. 2. Written assignment sheet after completing topic / Chapters will be given. 3. Providing Supporting Material to understand the basic terminologies of the chapter in the form of notes should be provided. 4. proper formula practice along with its unit should be given to all the students in class along with the framing of given content in numerical part. 5.proper copy checking work should	Self – Assessment test /practice Test after every Chapter.	It will be done after every periodic test and exam based on marking Schemes	In every month.		

		concepts of dielctrics. KPI 5: Students will face problems in solving numericals based on series and parallel combination of capacitance.					be done in class for their updates. 6.Remidial classes to be taken for average and Below average students. 7. Proper follow up to be given to parents regarding the improvement of the students. 8.To give practice on class Board					

LESSON PLAN 1
SUBJECT : PHYSICS
CLASS: XII

(BLOOM'S LEVELS AND SUB CATEGORIES TO BE PUT, ACCORDINGLY, THE TABLE TO BE FILLED)

CHAPTER 1: ELECTRIC CHARGES AND FLUX
CHAPTER 2: ELCTRIC POTENTIAL AND CAPACITANCE

BRIEF DESCRIPTION- CONCEPT OF ELECTRIC CHARGE, COLUMBS LAW, DILECTRIC CONSTANT, ELECTRIC FIELD , DIPOLE MOMENT, ELECTRIC POTENTIAL , PROBLEMS BASED ON GAUSS THEOREM, CAPACITANCE AND ITS APPLICATION

KPI DEFINITION :

KPI 01: Students face problems in solving the problems of distributive property of charge.

KPI 02 : Students face problems in solving numerical portion/ mathematical calculations.

KPI 03 : Students Face problem in solving problems based on capacitance and dielectric slab introduction in capacitance.

KPI 04: students face problem in framing a particular diagram/graph for any particular set of problems.

KPI 05: Students wont be able to understand the general applications of gauss theorem

KPi 06: students will face problems in understanding the difference between electric field and electric potential properties.

OBJECTIVES:

I- **Specific Objectives-**

1. Understanding the concept of charge: Students should understand the concept of electric charge, its properties, and the two types of charges - positive and negative.

2. Coulomb's Law: Students should be able to understand and apply Coulomb's law, which states that the force between two point charges is directly proportional to the product of their magnitudes and inversely proportional to the square of the distance between them.

3. Electric field and electric field lines: Students should understand the concept of an electric field and electric field lines. They should be able to calculate the electric field strength due to a point charge and multiple charges.

4. Gauss's Law: Students should understand Gauss's law and its applications. They should be able to calculate the electric field and flux through closed surfaces of different shapes, including spheres, cylinders, and planes.

5. Electric potential and potential difference: Students should understand the concept of electric potential and potential difference. They should be able to calculate the potential difference between two points in an electric field and understand the relation between electric potential and electric field.

6. Capacitors: Students should understand the working principle of capacitors, their types, and how they store electrical energy. They should be able to calculate the capacitance of capacitors in different configurations, such as parallel plate capacitors and capacitors in series and parallel.

7. Dielectrics: Students should understand the role of dielectrics in capacitors, their effect on capacitance, and the concept of relative permittivity or dielectric constant.

8. Energy stored in capacitors: Students should be able to calculate the energy stored in capacitors and understand the factors affecting the energy stored.

9. Electric potential due to a system of charges: Students should be able to calculate the electric potential due to a system of point charges and continuous charge distributions.

10. Electric dipole: Students should understand the concept of an electric dipole, its properties, and the torque experienced by an electric dipole in an electric field.

11. Electric flux and Gauss's law for magnetic fields (as an extension): Students may also learn about the concept of electric flux and Gauss's law for magnetic fields as an extension to electrostatics.

II -Behavioural Objectives

To enable the students to-

1. Knowledge Objectives:

a. Identify and define the fundamental properties of electric charge.
b. Explain Coulomb's law and its mathematical representation.
c. Describe the concept of an electric field and its relationship with electric charges.
d. Define electric potential and differentiate it from potential difference.
e. Identify different types of capacitors and their applications.
f. Explain the concept of dielectrics and their effect on capacitance.
g. Describe the behavior of electric dipoles in an electric field.

2. Skill Objectives:

a. Calculate the magnitude and direction of the electric field at a point due to one or more charges.
b. Use Gauss's law to determine the electric field or electric flux through a closed surface.
c. Calculate the potential difference between two points in an electric field.
d. Determine the capacitance of capacitors in various configurations.
e. Calculate the energy stored in a capacitor.
f. Analyze and solve problems related to the behavior of electric dipoles.

3. Attitude Objectives:

a. Develop an appreciation for the importance and relevance of electrostatics in various real-world applications.

b. Develop a scientific and analytical mindset in approaching problems related to electrostatics.

c. Cultivate curiosity and a willingness to explore and discover electrostatic phenomena.

d. Develop a sense of responsibility towards safety and precautions when working with electric charges and capacitors.

PROCESS /ACTIVITIES

ACTIVITY:

1. Charging by Friction: Provide students with various materials like a comb, plastic rod, or cloth. Ask them to rub different materials together and observe the transfer of charges. They can use a charged object to attract small pieces of paper or experiment with the attraction and repulsion between charged objects.

2. Electrostatic Precipitator: Demonstrate how an electrostatic precipitator works. Set up a simple model using a plastic container, a small fan, and a metal mesh. Fill the container with smoke or talcum powder and let the fan blow the particles towards the mesh. Show how the charged mesh attracts and collects the particles, effectively cleaning the air.

3. Van de Graaff Generator: Arrange for a Van de Graaff generator demonstration. Students can take turns operating the generator and observing the effects of static electricity. They can touch the generator and see their hair stand on end or observe sparks being generated.

4. Capacitor Charging and Discharging: Provide students with capacitors, resistors, and a power supply. Ask them to construct a simple circuit to charge and discharge capacitors. They can measure the time it takes for the capacitor to charge and discharge using a stopwatch or a multimeter.

5. Mapping Electric Field Lines: Have students draw electric field lines for different charge distributions. They can use a positive or negative point charge, or a combination of charges, and draw the field lines to represent the electric field in the surrounding space. This activity helps students visualize the direction and strength of electric fields.

6. Investigating Coulomb's Law: Provide students with different sets of charged objects and ask them to measure the force between them using a spring balance or a force sensor. They can vary the distance between the charges and measure the corresponding forces. By plotting a graph of force versus distance, they can verify the inverse square relationship described by Coulomb's law.

7. Simulation Activities: Utilize online simulations and virtual experiments to explore electrostatic concepts. Websites like PhET simulations (phet.colorado.edu) offer interactive simulations on topics such as electric field, charges and fields, capacitors, and more. Students can manipulate variables, visualize electric fields, and observe the effects of different parameters.

8. Conceptual Discussions and Problem Solving: Engage students in group discussions and problem-solving activities related to electrostatics. Provide them with conceptual questions and numerical problems to solve individually or in groups. Encourage critical thinking and peer-to-peer discussions to enhance understanding.

ASSESSMENT:

1. Written Examinations: Conduct written tests or examinations that include a combination of multiple-choice questions, short-answer questions, and numerical problems. These

assessments can cover topics such as Coulomb's law, electric fields, electric potential, capacitors, and related calculations.

2. Practical Experiments: Assess students' practical skills by conducting laboratory experiments related to electrostatics. Students can be evaluated based on their ability to set up and perform experiments accurately, record data, analyze results, and draw conclusions. Practical assessments may also include related questions and calculations.

3. Conceptual Questions: Include conceptual questions that require students to explain various electrostatic phenomena, principles, and their applications. These questions assess students' understanding of fundamental concepts and their ability to articulate their knowledge effectively.

4. Problem Solving: Provide students with problem-solving tasks and numerical calculations involving electrostatics concepts. Evaluate their ability to apply formulas and principles to solve problems accurately. These assessments assess their analytical skills and problem-solving strategies.

5. Projects or Presentations: Assign students to work on projects or presentations related to electrostatics. They can research and present topics such as the applications of electrostatics in everyday life, the impact of electrostatic discharge, or the working principles of devices like electrostatic precipitators. Assess their presentation skills, content knowledge, and ability to explain complex concepts effectively.

6. Worksheets or Assignments: Assign worksheets or homework that involve a range of questions, including theoretical and numerical problems. These assignments provide opportunities for students to practice and reinforce their understanding of electrostatics.

7. Class Participation and Discussions: Assess students' active participation in class discussions, group activities, and their ability to ask relevant questions related to electrostatics. Monitor their engagement, critical thinking, and communication skills during class interactions.

8. Online Quizzes or Interactive Assessments: Utilize online platforms or learning management systems to administer quizzes or interactive assessments on electrostatics. These assessments can provide immediate feedback and help track students' progress and areas of improvement.

EXPECTED LEARNING OUTCOME–

Students will be able to:

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	Placement of Objectives, Instructional Activities and Assessment **Topic: CURRENT ELCTRICITY**					
	KNOWLEDGE	**UNDERSTANDING**	**APPLICATION**	**ANALYSIS**	**SYNTHESIS**	**EVALUATION**
Objectives	S: 1,5,8 B: 1	S: 2, 6, 9	S: 4,10	B: 2	B: 3	S: 3, 7,11
Activities	1,4	2,6	8,	5	3,7	
Assessment	2, 5	1,7	3	4		8,6

REVIEW OF THE LESSON PLAN
(TO BE DONE WHEN THE LESSON GETS OVER)

Problems faced –
Success-
Failure-
Real Learning Outcomes
ELO-

Students' response/ participation

Teacher's Learning

TO INCORPORATE IN TERM 2-