LESSON PLAN 3. SUBJECT : PHYSICS CLASS: XII

CHAPTER 4 : MAGNETIC EFFECT OF CURRENT .

CHAPTER 5: MAGNETISM AND MATTER

BRIEF DESCRIPTION- CONCEPT OF BIOT SAVERTS LAW AND ITS APPLICATION, AMPERES CIRCUITAL LAW AND ITS APPLICATION, MOVING COIL GALVANOMETER, CONCEPT OF SHUNT, TYPES OF MAGNETIC MATERIALS , MAGNETIC MOMENT OF ELECTRON.

KPI DEFINITION :

KPI 01: Students face problems in solving the problems based on biot saverts law.

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

KPI 03 : Students Face problem in solving problems based on shunt and its applications.

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 properties related with magnetic materials.

OBJECTIVES:

SUBJECTIVE OBJECTIVE

1. **Magnetic Force on a Moving Charge**:
    - Describe the motion of a charged particle in a uniform magnetic field.
    - Calculate the magnetic force acting on a proton moving with a certain velocity in a magnetic field.
    - Explain how the direction of the magnetic force is determined by the right-hand rule.
2. **Magnetic Fields Due to Currents**:

- Calculate the magnetic field strength at a point due to a straight current-carrying wire.
- Determine the direction of the magnetic field around a circular loop of current.
- Discuss the concept of magnetic field lines and their characteristics.

3. **Magnetic Effects of Electric Current**:
   - Explain the principle of an electromagnet and how its strength can be increased.
   - Calculate the force experienced by a current-carrying conductor in a magnetic field.
   - Discuss the applications of electromagnets in everyday life.
4. **Magnetic Flux and Faraday's Law**:
   - Define magnetic flux and explain how it is related to the number of field lines passing through a surface.
   - State Faraday's laws of electromagnetic induction and provide examples.
   - Solve problems involving the calculation of induced EMF in a coil due to changing magnetic flux.
5. **Magnetic Properties of Materials**:
   - Describe the difference between diamagnetic, paramagnetic, and ferromagnetic materials.
   - Explain the hysteresis loop in the context of ferromagnetic materials.
   - Discuss the role of domains in the magnetization of materials.
6. **Magnetic Fields in Various Scenarios**:
   - Analyze scenarios involving multiple current-carrying wires and determine the net magnetic field at a specific point.
   - Calculate the magnetic field inside and outside a solenoid.
   - Discuss the behavior of magnetic fields in toroids and magnetic dipoles.
7. **Applications and Modern Technologies**:
   - Explore the working principle of a magnetic resonance imaging (MRI) machine and its significance in medical diagnostics.
   - Explain the operation of a cyclotron in accelerating charged particles for nuclear research.
   - Discuss the role of magnets in particle accelerators and their contributions to particle physics.
8. **Challenging Problems**:
   - Present advanced problems involving magnetic forces

BEHAVIORIAL OBJECTIVE:

1. **Define and Explain Concepts**:
    - Accurately define terms related to magnetism, such as magnetic field, magnetic lines of force, magnetic moment, and magnetic permeability.
    - Explain the properties of magnets, including attraction, repulsion, and the fact that they always have two poles.
2. **Application and Problem Solving**:
    - Solve problems related to Earth's magnetism, including calculating the magnetic declination, angle of dip, and the horizontal component of Earth's magnetic field.
    - Apply the concept of magnetism to solve problems involving ferromagnetic, diamagnetic, and paramagnetic materials.
3. **Perform Experiments and Record Observations**:
    - Set up a simple experiment to visualize magnetic field lines using a bar magnet and iron filings.
    - Conduct experiments to determine the behavior of various materials in a magnetic field and categorize them based on their magnetic properties.
4. **Analyze and Infer**:
    - Analyze data from experiments involving magnetic materials to draw conclusions about their properties.
    - Infer the strength and direction of magnetic fields based on the behavior of magnetic materials or compass needles in specific scenarios.
5. **Construct and Use Tools**:
    - Construct a simple electromagnet and vary its strength by changing the number of coils or the current passing through it.
    - Use a magnetic compass to determine the direction of magnetic fields in different scenarios.
6. **Evaluate and Discuss**:
    - Evaluate the real-world implications of magnetic properties of materials in various applications like MRI machines, magnetic storage devices, and maglev trains.
    - Participate in discussions or debates about the environmental and social implications of mining and using magnetic materials in technology.
7. **Demonstrate Safe Practices**:
    - Handle magnets and magnetic equipment safely and responsibly during laboratory experiments.
    - Demonstrate awareness of the potential hazards of strong magnetic fields on electronic devices or individuals with medical implants.

8. **Relate and Integrate Knowledge**:
    - Relate the concept of magnetism to other areas of physics, such as electricity, emphasizing the interconnectedness of the two in the form of electrom

ASSESSMENT:

1. **Written Test/Quiz**:
    - Multiple-choice questions: Provide questions that test basic concepts like the right-hand rule, magnetic fields, and forces on moving charges.
    - Short answer questions: Ask students to explain key concepts, formulas, or principles related to magnetism and moving charges.
    - Problem-solving questions: Present numerical problems that require students to calculate magnetic forces, field strengths, or induced EMF in coils.
2. **Conceptual Diagrams**:
    - Provide students with diagrams of magnetic field configurations or scenarios involving moving charges and ask them to label key components, identify the direction of forces, or explain the behavior of charged particles.
3. **Laboratory Experiments**:
    - Conduct a laboratory experiment related to magnetism and moving charges, and assess students based on their lab reports, data analysis, and conclusions drawn from the experiment.
4. **Magnetic Field Mapping**:
    - Ask students to map the magnetic field around different magnets or current-carrying wires using a compass needle and draw the field lines.
5. **Application-Based Scenarios**:
    - Present real-world scenarios where magnetism and moving charges are involved, such as the operation of an electric motor or the principles behind magnetic resonance imaging (MRI). Ask students to analyze these scenarios and explain the physics involved.
6. **Case Studies**:
    - Provide case studies related to the use of magnets in industries, medical devices, or transportation systems. Ask students to evaluate the benefits and challenges associated with these applications.
7. **Project or Presentation**:
    - Assign students to research and prepare a presentation on a specific aspect of magnetism and moving charges, such as the history of

magnetic research, innovative magnetic technologies, or the environmental impact of magnetic materials.

8. **Peer Teaching**:
    - Have students work in pairs or small groups to create educational materials (e.g., videos, posters, or presentations) explaining a particular concept related to magnetism and moving charges. They can then present their materials to the class.
9. **Concept Maps**:
    - Ask students to create concept maps that illustrate the connections between various topics within the unit, showing how concepts like magnetic fields, electromagnetic induction, and magnetic materials are interrelated.
10. **Open-Ended Questions**:
    - Pose open-ended questions that require students to think critically and apply their knowledge creatively. For example, "How can magnetic levitation technology be used to improve transportation systems in urban areas?"

LEARNING OUTCOME:

Cognitive Learning Outcomes:

1. **Conceptual Understanding**: Students should have a solid understanding of the fundamental concepts related to magnetism, including magnetic fields, magnetic forces, and the behavior of magnetic materials.
2. **Application of Principles**: Students should be able to apply the principles of magnetism to solve complex problems involving moving charges, electromagnetic induction, and the behavior of magnetic materials.
3. **Integration with Other Physics Concepts**: Students should be able to integrate their knowledge of magnetism with other physics concepts, such as electricity, electromagnetism, and classical mechanics.
4. **Mathematical Skills**: Students should develop strong mathematical skills, including the ability to use mathematical equations and formulas to describe and analyze magnetic phenomena.
5. **Critical Thinking**: Students should be able to think critically and analyze magnetic situations, make predictions, and draw conclusions based on their understanding of the principles of magnetism.

Affective Learning Outcomes:

6. **Appreciation of Real-World Applications**: Students should gain an appreciation of the practical applications of magnetism in various fields, such as engineering, medicine (e.g., MRI technology), and transportation (e.g., maglev trains).
7. **Ethical Awareness**: Students should be aware of the ethical considerations related to the use of magnetic materials, including the environmental impact of rare earth mining and electronic waste disposal.
8. **Curiosity and Inquiry**: Students should develop a sense of curiosity and an inclination to ask questions about magnetism and its role in the natural world.

Psychomotor Learning Outcomes:

9. **Experimental and Laboratory Skills**: Students should acquire practical skills related to conducting experiments and investigations involving magnetism, including the use of magnetic instruments and data analysis.
10. **Construction of Electromagnetic Devices**: Students should be able to design and build basic electromagnetic devices, such as simple electric motors, solenoids, and magnetic levitation systems.
11. **Use of Tools and Equipment**: Students should become proficient in using tools and equipment commonly employed in the study and application of magnetism, such as compasses, Gaussmeters, and oscilloscopes.
12. **Problem-Solving Skills**: Students should develop strong problem-solving skills, particularly in the context of magnetic forces, fields, and materials, and be able to apply these skills to both theoretical and practical scenarios.