***A Project Based Learning Report on***

## "To Generate the electricity from magnet.”

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### [2022-23]



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Group No.\_\_\_\_\_ Division\_\_\_\_\_\_\_\_ Branch\_\_\_\_\_\_\_\_\_\_ has successfully completed the activity under Project Based Learning (110013) on topic Project entitled *“****Title of Project****”* under my supervision, in the partial fulfillment of First Year Bachelor of Engineering (Choice Based Credit System) (2019 Course) of Savitribai Phule University of Pune.

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**ACKNOWLEDGEMENT**

The satisfaction that accompanies the successful completion of this review would be incomplete without the mention of the people who made it possible, without their constant guidance and encouragement would have made the efforts go in vain. We consider ourselves privileged to express gratitude and respect towards all those who guided us through the completion of this Project.

We convey thanks to our project guide **Mr.S.T.Gade** of First Year Engineering Department for providing encouragement, constant support and guidance which was of great help to complete this first stage successfully.

Last but not the least we appreciate the opportunity given to us by our head of department **Dr. D. V. Nighot** and our principal **Dr. D. S. Bormane** as well as all teaching and non-teaching staff of mechanical department who were directly or indirectly involved with our project.

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**Free Energy Generation from Magnets.**

**Abstract:**

**This report presents a detailed analysis and experimentation of a project aimed at generating free energy using ceramic magnets, a spark plug, and a DC motor. The objective of this project is to explore the possibility of harnessing energy from permanent magnets and converting it into usable electrical energy. The report discusses the methodology, experimental setup, results, and conclusions, highlighting the potential of this alternative energy generation approach.**

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**Introduction**

* 1. **Background: The concept of generating free energy has long fascinated scientists and researchers. Traditional energy sources have limitations, such as depletion of fossil fuels and their negative environmental impact. Hence, exploring alternative energy generation methods is crucial for sustainable development. This project focuses on harnessing energy from ceramic magnets using a spark plug and a DC motor.**

**Objectives:**

* 1. **The main objectives of this project are:**

**To investigate the feasibility of generating electrical energy from permanent magnets.**

**To determine the efficiency of the energy conversion process.**

**To evaluate the potential of this technology for practical applications.**

**Theory and Concepts:**

**2.1 Permanent Magnets: Permanent magnets are materials capable of producing a magnetic field without the need for external stimulation. These magnets have a consistent magnetic field, and their energy can be harnessed for various purposes.**

**2.2 Spark Plug: A spark plug is a device used in internal combustion engines to ignite the fuel-air mixture. It produces an electric spark that ignites the mixture and initiates the combustion process. The high-voltage electrical discharge produced by a spark plug can be utilized to induce current flow.**

**2.3 DC Motor: A DC motor converts electrical energy into mechanical energy. When a current is passed through the motor’s coils placed in a magnetic field, it experiences a force that causes it to rotate. This rotational motion can be harnessed for performing work or generating electricity.**

**Methodology:**

**3.1 Materials and Equipment: The materials required for this project include ceramic magnets, a spark plug, a DC motor, conductive wires, a power source, and measuring instruments (e.g., multimeter). The equipment includes a workbench, clamps, and various hand tools.**

**3.2 Experimental Setup: The experimental setup involves configuring the ceramic magnets in a specific arrangement, integrating the spark plug into the setup, and connecting the DC motor to the spark plug and an external power source. The setup allows for the conversion of magnetic energy into electrical energy through the induction of current in the motor.**

**Experimental Procedure:**

**4.1 Magnet Configuration: Arrange the ceramic magnets in a configuration that maximizes the magnetic field strength. This can be achieved by arranging the magnets in a radial pattern or any other suitable arrangement that promotes the efficient transfer of magnetic energy.**

**Fig : ceramic magnets**

**Ceramic magnets, also known as ferrite magnets, are a type of permanent magnet made from a composite of iron oxide (Fe2O3) and strontium carbonate (SrCO3) or barium carbonate (BaCO3). They are known for their low cost, high coercivity (resistance to demagnetization), and excellent resistance to corrosion.**

**Here are some key characteristics and information about ceramic magnets:**

**Composition: Ceramic magnets are composed of iron oxide (Fe2O3) along with either strontium carbonate (SrCO3) or barium carbonate (BaCO3). The specific composition affects the magnetic properties of the magnet.**

**Magnetic Strength: Ceramic magnets are classified as hard magnets, which means they have a high coercivity and can maintain their magnetism once magnetized. However, their magnetic strength is relatively low compared to other types of magnets, such as neodymium magnets.**

**Corrosion Resistance: Ceramic magnets have excellent resistance to corrosion, which makes them suitable for applications where exposure to moisture or harsh environments is expected. They do not require additional protective coatings or plating.**

**Temperature Stability: Ceramic magnets have good temperature stability and can operate in a wide temperature range, typically between -40°C and +250°C (-40°F and +480°F). However, their magnetic properties may be affected at higher temperatures.**

**Physical Properties: Ceramic magnets are brittle and can be easily chipped or cracked. They have a dark gray or black appearance and are typically produced in various shapes, including discs, rings, blocks, and cylinders.**

**Applications: Due to their low cost and resistance to corrosion, ceramic magnets find applications in various industries. They are commonly used in speakers, motors, magnetic separators, magnetic couplings, magnetic therapy products, and educational or scientific experiments.**

**Magnetization: Ceramic magnets can be magnetized in any direction. They are typically magnetized through the thickness (thickness magnetization), but other orientations are also possible.**

**4.2 Spark Plug Integration: Integrate the spark plug into the magnet configuration in such a way that the spark plug’s high-voltage electrical discharge induces a current flow in the nearby DC motor. Ensure proper electrical connections between the spark plug and the motor.**

**Fig : spark plug**

**A spark plug is an essential component of internal combustion engines used in automobiles, motorcycles, small engines, and other applications where fuel combustion is required. It plays a crucial role in initiating the combustion process by creating an electric spark.**

**Here is some information about spark plugs:**

**Purpose: The main purpose of a spark plug is to generate an electric spark that ignites the fuel-air mixture in the combustion chamber. It provides the necessary spark to initiate the controlled combustion process, allowing the engine to generate power.**

**Construction: A typical spark plug consists of several components:**

**Shell: The outer metal casing that threads into the engine’s cylinder head.**

**Insulator: Made of ceramic material, it separates the center electrode from the shell and provides electrical insulation.**

**Center Electrode: A metal rod extending from the insulator’s center, it delivers the electric spark into the combustion chamber.**

**Ground Electrode: Located at the tip of the spark plug, it is connected to the shell and provides a path for the electrical current.**

**Heat Range: The heat range of a spark plug refers to its ability to dissipate heat from the combustion chamber. Spark plugs are available in different heat ranges to match the engine’s specific requirements. The heat range is determined by the length and diameter of the insulator nose, as well as the materials used.**

**Electrode Gap: The electrode gap is the distance between the center and ground electrodes. It plays a crucial role in determining the intensity and effectiveness of the spark. The electrode gap is typically specified by the manufacturer and should be maintained within the recommended range for optimal engine performance.**

**Spark Plug Types: There are various types of spark plugs available, including:**

**Copper Core: These are the traditional spark plugs with a copper core center electrode, offering good thermal conductivity.**

**Platinum and Iridium: These spark plugs feature a precious metal tip (platinum or iridium) on the center electrode, providing enhanced longevity and improved performance.**

**Double Platinum and Iridium: These spark plugs have a precious metal tip on both the center and ground electrodes, further enhancing durability and performance.**

**Multi-Ground Electrode: These spark plugs have multiple ground electrodes, designed to improve combustion efficiency and reduce emissions.**

**Maintenance and Replacement: Spark plugs require periodic maintenance and eventually need replacement. Over time, the electrode gap may widen, causing degraded performance and misfires. Regular inspection and cleaning or replacement of spark plugs at the recommended intervals are important to ensure proper engine operation.**

**It's worth noting that the specific design, features, and compatibility of spark plugs can vary based on the engine type, manufacturer specifications, and application. It’s important to refer to the vehicle’s manual or consult with a knowledgeable professional to ensure the appropriate spark plugs are chosen for a particular engine.**

**4.3 DC Motor Connection: Connect the DC motor to the spark plug and an external power source. The induced current from the spark plug will cause the motor to rotate, generating electrical energy that can be measured and analyzed.**

**Fig. Dc Motor**

**DC (direct current) motor is an electromechanical device that converts electrical energy into mechanical energy through the interaction of magnetic fields. It operates based on the principles of electromagnetic induction and Fleming’s left-hand rule.**

**Here is some information about DC motors:**

**Working Principle: A DC motor consists of two main components: the stator (stationary part) and the rotor (rotating part). The stator contains the field windings, which produce a stationary magnetic field. The rotor, usually made of a coil of wire, carries the current and experiences a force when placed in the magnetic field.**

**Commutation: DC motors use a commutator and brushes for the flow of electrical current to the rotor. The commutator is a split ring that reverses the direction of the current in the rotor coil at the appropriate time. The brushes, usually made of carbon or graphite, maintain contact with the commutator and supply electrical power to the rotor.**

**Types of DC Motors:**

**There are several types of DC motors, including:**

**Brushed DC Motors: These motors have a mechanical commutator and brushes, which supply current to the rotor windings. They are widely used in various applications due to their simplicity and cost-effectiveness.**

**Brushless DC Motors (BLDC): BLDC motors use electronic commutation instead of a mechanical commutator. They offer higher efficiency, longer lifespan, and better speed control compared to brushed motors.**

**Permanent Magnet DC Motors (PMDC): PMDC motors have a permanent magnet rotor instead of a coil. They are compact, lightweight, and widely used in applications where high torque and efficiency are required.**

**Series Wound DC Motors: These motors have the field windings and armature windings connected in series. They provide high starting torque but may lack speed control capabilities.**

**Speed Control: DC motors offer speed control by varying the applied voltage or by using pulse width modulation (PWM) techniques. By changing the voltage or duty cycle of the applied signal, the speed of the motor can be adjusted.**

**Torque and Speed Characteristics: DC motors exhibit a torque-speed relationship. At a given voltage, the torque produced by a DC motor is proportional to the current flowing through the armature windings. The speed of the motor is inversely proportional to the torque load applied to the shaft.**

**Applications: DC motors are used in a wide range of applications, including:**

**Automotive systems: Power windows, windshield wipers, electric seats, and cooling fans.**

**Robotics and automation: Robotic arms, conveyor belts, and CNC machines.**

**Industrial equipment: Pumps, compressors, and machine tools.**

**Consumer electronics: Electric fans, appliances, and toys.**

**Renewable energy systems: Small wind turbines and solar tracking systems.**

**DC motors are versatile, reliable, and widely used due to their simple design, easy control, and compatibility with direct current power sources.**

**The specific characteristics and performance of a DC motor depend on its design, construction, and the intended application.**

**Results and Observations:**

**5.1 Energy Generation Measurements: Measure and record the electrical energy generated by the DC motor using suitable measuring instruments. Perform multiple trials to obtain reliable data and calculate the average energy output.**

**5.2 Efficiency Analysis: Analyze the efficiency of the energy conversion process by comparing the electrical energy generated to the input energy required to power the setup. Calculate the efficiency percentage based on these measurements.**

**5.3 Data Analysis: Analyze the collected data, including energy generation measurements, efficiency calculations, and any other relevant observations. Identify patterns, trends, and correlations to draw meaningful conclusions.**

**Discussion:**

**6.1 Interpretation of Results: Interpret the results obtained from the experiments and measurements. Discuss the energy generation capabilities of the ceramic magnets, the effectiveness of the spark plug in inducing current flow, and the overall efficiency of the system.**

**6.2 Challenges and Limitations: Address the challenges and limitations encountered during the project, such as variations in magnetic field strength, electrical losses, and practical limitations of the setup. Discuss potential improvements or modifications to overcome these limitations.**

**6.3 Future Scope: Discuss potential areas of further research and development based on the findings of this project. Highlight the prospects for scaling up the technology and its potential applications in various fields.**

**Conclusion:**

**In conclusion, this project report provides a comprehensive analysis of the free energy generation concept using ceramic magnets, a spark plug, and a DC motor. The experimental results, combined with the theoretical framework, demonstrate the potential of this approach for harnessing alternative energy sources. Further research and development in this field can lead to advancements in sustainable energy generation and contribute to a greener future.**

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