



**M.KUMARASAMY**  
**COLLEGE OF ENGINEERING**

**NAAC Accredited Autonomous Institution**

Approved by AICTE & Affiliated to Anna University

ISO 9001:2015 Certified Institution

**Thalavapalayam, Karur, Tamilnadu.**

## **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**TITLE: POWER WHEELED EV**

### **TEAM MATES:**

- **20BEC4001 AARTHI P**
- **20BEC4031 DHANUSHKUMAR S**
- **20BEC4042 GOKUL S C**
- **20BEC4046 GOWSHIK N**
- **20BEC4049 GOWTHAM R**
- **20BEC4053 HARINI S**

## **INTRODUCTION TO PIEZOELECTRIC WHEEL E-BICYCLES:**

Piezoelectric wheel e-bicycles represent an innovative and sustainable approach to electric transportation. These bicycles incorporate piezoelectric materials into their wheels, harnessing the mechanical energy generated during riding to produce electrical power. By utilizing the unique properties of piezoelectricity, these bicycles aim to enhance energy efficiency, extend range, and reduce reliance on external power sources.

### **OBJECTIVE:**

The objective of a piezoelectric wheel on an electric bicycle is to harness the energy generated from the mechanical stress and strain applied to the wheel while riding and convert it into electrical energy.

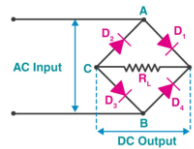
Piezoelectric materials have the unique property of generating an electric charge when subjected to mechanical pressure or deformation. By utilizing this phenomenon, a piezoelectric wheel can capture the energy produced during the rotation of the wheel and convert it into electricity.

## BLOCK DIAGRAM:

### PIEZOELECTRIC WHEEL



### RECTIFIER



### SUPER-CAPACITOR BATTERY



### LITHIUM BATTERY



### BLDC MOTOR



## **WORKING OF PIEZOELECTRIC:**

The piezoelectric material converts the pressure applied to it into electrical energy. The source of pressure can be either from the weight of the moving vehicle.

The output of the piezoelectric material is not a steady one. So a bridge circuit is used to convert this variable voltage into a linear one. Again an AC ripple filter is used to filter out any further fluctuations in the output. The output dc voltage is then stored in a rechargeable battery.

## **ADVANTAGES:**

- Higher Efficiency: Piezoelectric wheels generally have higher efficiency compared to dynamos. While dynamos rely on mechanical friction to generate electricity, piezoelectric materials directly convert mechanical stress or strain into electrical energy. This direct conversion process results in less energy loss and higher overall efficiency.
- Lightweight and Compact Design: Piezoelectric wheels are typically lighter and more compact than dynamos. Piezoelectric materials can be embedded directly into the wheel structure, eliminating the need for additional bulky components. This lightweight and compact design contribute to improved overall bike performance and handling. Self-generating, so no need of external source.

## **COMPLETE SET-UP:**



## **CONCLUSION:**

Piezoelectric wheel e-bicycles present an exciting and environmentally friendly approach to electric transportation. By incorporating piezoelectric materials into the wheels, these bicycles can harvest and convert the mechanical energy generated during riding into electrical power. This energy harvesting capability improves energy efficiency, extends the range of the e-bicycle, and reduces reliance on external power sources.