EDL Project Report

on

WIRELESS POWER TRANSFER SYSTEM

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR AWARD OF DEGREE OF BACHELOR OF TECHNOLOGY IN ELECTRICAL ENGINEERING

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JALANDHAR

(January 2025-June 2025)

CANDIDATE'S DECLARATION

We hereby certify that the work which is being presented in the project entitled " WIRELESS POWER TRANSFER SYSTEM " by Aman, Gurkirat Singh, Yuvraj, Gagandeep Janjua, Sahil kaundal, Anuraj in partial fulfillment of requirements for the award of degree of Bachelor of Technology (Electrical Engineering) submitted to the department of Electrical Engineering at Sant Baba Bhag Singh University, Jalandhar, is an authentic record of our own work carried out during the period from January 2025 to June 2025.The matter presented in this project has not been submitted to any other University/Institute for the award of Bachelor of Technology (Electrical Engineering) degree.

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This is to certify that the above statement made by the candidates is correct to the best of my /our knowledge.

The EDL Project Viva-Voce Examination of this group has been held on 16/05/2025 and accepted.

Signature of Internal Examiner

Signature of External Examiner

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CHAPTER -1

1.1 Introduction

Wireless Power Transfer System

One of the major problems in power system is the losses occurring during the transmission of electrical power. The loss of percentage during the transmission is approximated as 26%. The main cause for power loss during transmission is the resistance of wires used in the grid. According to WRI (world resource institute), the electricity grid of India has the highest percentage (27-40%) of power transmission losses in the world. For this reason, Telsa has proposed methods of electricity transmission using an electromagnetic induction method.

The Serbian scientist "Nikola Telsa" was the first one to research and propose the concept of wireless power transfer in the year 1899, since then many scientists have been working to make his vision a reality. In the same year he has continued research on wireless power transmission in Colorado Springs and writes, the inferiority of the induction method would come into view immense as compared with the distributed charge of ground and air method. In the year 1961, William C. Brown publishes an article exploring possibilities of microwave power transmission. In the year 2009, Sony shows a wireless electrodynamics induction powered TV set.

CHAPTER – 2

2.1 Circuit diagram

It is a diagram of wireless power transmission system , it consist many components which are shown in fig2.1

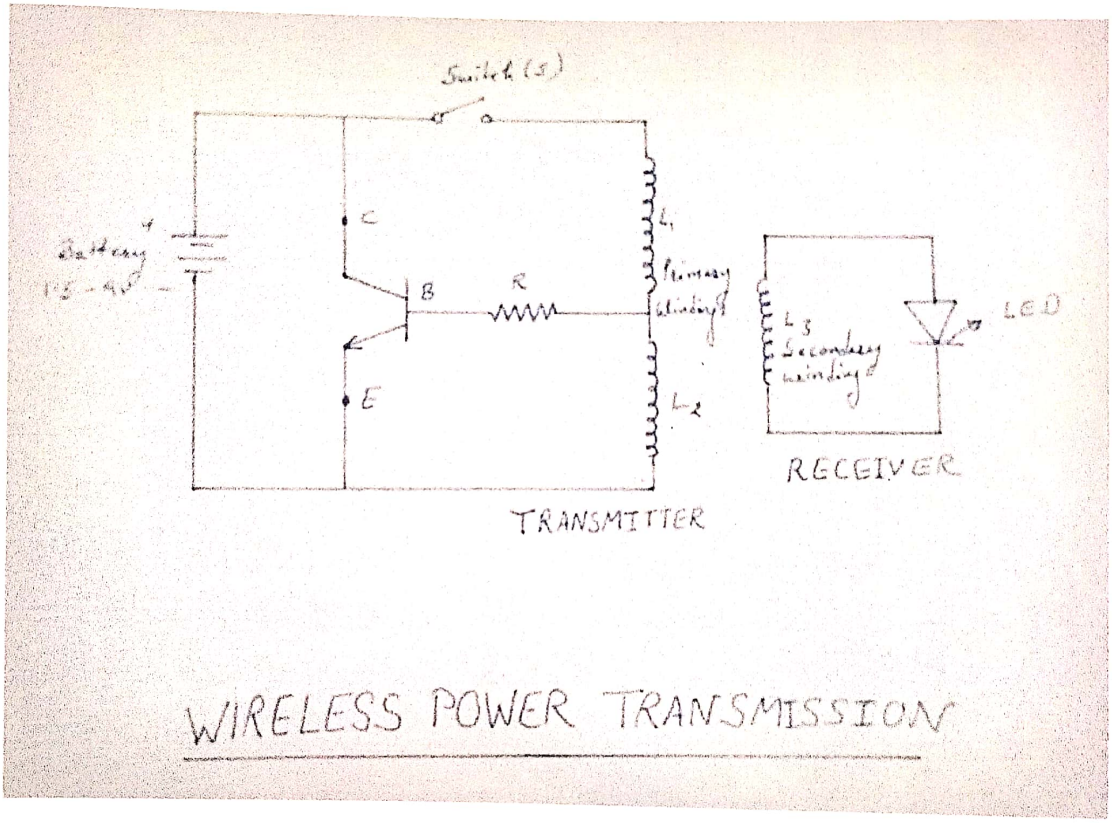

Figure2.1-Circuit diagram of wireless power transmission system.

2.2 Transmitter Circuit:

- **Oscillator Circuit:** Create a basic oscillator using a transistor to generate a high-frequency signal. The transistor alternates current through the transmitter coil, creating an oscillating magnetic field.

2.3 Receiver Circuit:

- **Receiver Coil:** Positioned to pick up the magnetic field generated by the transmitter coil.
- **Rectifier:** The AC voltage induced in the receiver coil is rectified by the diode.
- **Capacitor and Voltage Regulator:** Smooth out the rectified voltage and regulate it to power the load.

CHAPTER-3

3.1Components used

- **Transmitter Coil:** Copper wire wound into a coil.
- **Receiver Coil:** Copper wire wound into a coil.
- **Transmitter Circuit:**
  - **Power Supply**). : DC source (e.g., 12V battery)
  - **Transistor (e.g., NPN Transistor like 2N2222):** To drive the transmitter coil.

- **Load: Demonstrates power transfer (e.g., an LED or small motor).**

3.2 Description of the Components

3.2.1 Transmitter Coil & Receiver coil :

In a wireless charging system, you have a charging pad or base station. This pad contains a coil of wire. When electricity flows through this coil, it generates an electromagnetic field around it. Think of it like a magic ring of energy.

In the device you want to charge, such as a smartphone, there's another coil of wire. This is called the receiver coil. It's designed to pick up the energy from the electromagnetic field created by the transmitter coil.

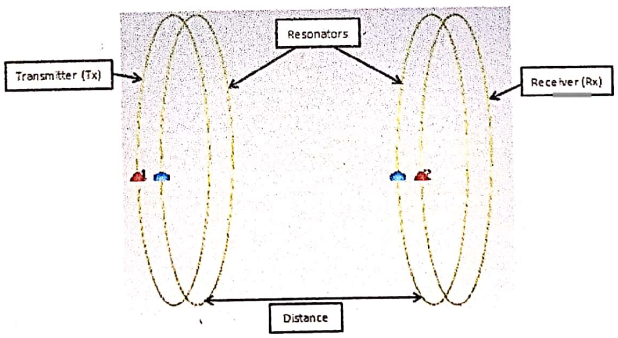

Figure3.2.1- Diagram of transmitter coil and recevier coil

3.2.2 Transistor

Transistors play a crucial role in wireless transmission by acting as amplifiers and switches, enhancing and controlling signals. In wireless communication, they are used to amplify weak radio signals received by antennas, making them strong enough for further processing and playback. Transistors also act as switches, selectively allowing signals to pass or block them, which is essential for modulating and demodulating wireless signals.

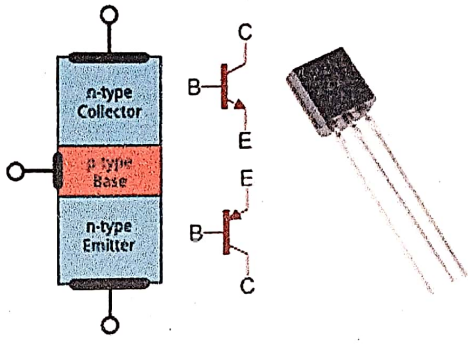

Figure3.2.2- diagram of transistor

3.2.3 Power supply

DC batteries are often used in small electrical equipment, such as UPS, golf carts, and home energy storage. As the name suggests. DC stands for direct current, and DC battery are the batteries that provide direct current.

Almost all batteries belong to DC battery, but in many large-scale application scenarios, we need inverters to convert the DC current in the battery into AC current for the load to use. After the battery is out of power, the charger needs to convert the alternating current into direct current and store it in the battery. This is also why we need inverter and charger appliances.

Figure3.2.3- battery

3.2.4 Light Emitting Diode (LED)

LED is a two-lead semiconductor light source. Like an ordinary diode, the LED diode works when it is forward biased. In this case, the n-type semiconductor is heavily doped than the p-type forming the p-n junction. When it is forward biased, the potential barrier gets reduced and the electrons and holes combine at the depletion layer (or active layer), light or photons are emitted or radiated in all directions. A typical figure blow showing light emission due electron-hole pair combining on forward biasing. It is a PN-junction diode, which emits light when activated. The explanation behind the emission of photons in an LED diode lies in the energy band theory of solids. According to this theory, whether the electron-hole combining will give out photons or not depends on whether the material has a direct band gap or indirect band gap. Those semiconductor materials which have a direct band gap are the ones that emit photons. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

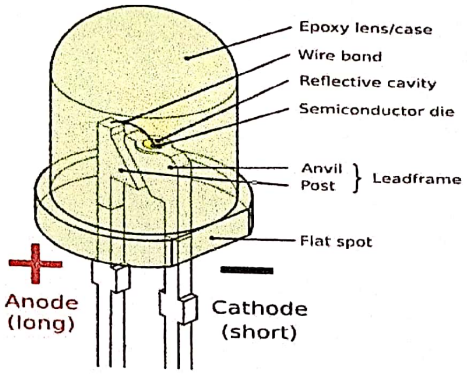

Figure3.2.4- Light Emitting Diode

3.2.5 Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits. In electronic circuits resistors are used to limit current flow, to adjust signal levels, bias active elements, terminate transmission lines among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test roads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity. Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated. The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance will fall within a manufacturing tolerance. The main function of resistors in a circuit is to control the flow of current to other components. Take an LED (light) for example. If too much current flows through an LED it is destroyed. So a resistor is used to limit the current.

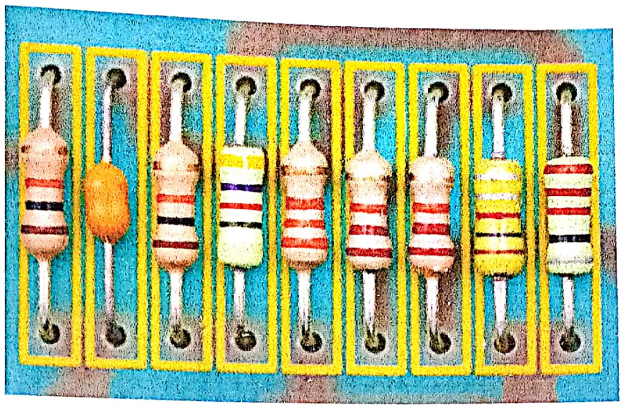

Figure3.2.5- Resistors

3.2.6 Connecting Wires

A wire is a flexible strand of metal, usually cylindrical. Wires are used for establishing electrical conductivity between two devices of an electrical circuit. They possess negligible resistance to the passage of current. The wires are covered by an insulated coating of different colours. The colour codes are used to distinguish between neutral and ground, and live wire, which differs from one country to another.connecting wires are one of the most important components in an electrical circuit because these are the components through which electricity flows from one electrical component to another. It is with the help of wire that electricity flows from cell to light bulb. Wires are made up of metals which are good conductors of electricity and allow the current to flow through them. The connecting wires are all insulated to prevent people from getting electrical shocks and also to maintain the path through which electricity is supposed to flow.

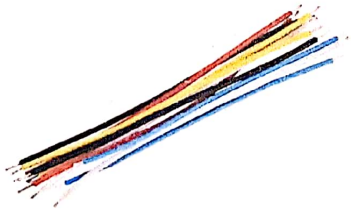

Figure3.2.6- Wires

CHAPTER-7

7.1 PRECAUTIONS

- Make all connection tightly.
- Make all connection carefully according to circuit diagram.
- Use right type of transistor.
- Use right value of resistor.
- Make primary and secondary coil turns according to their flux production