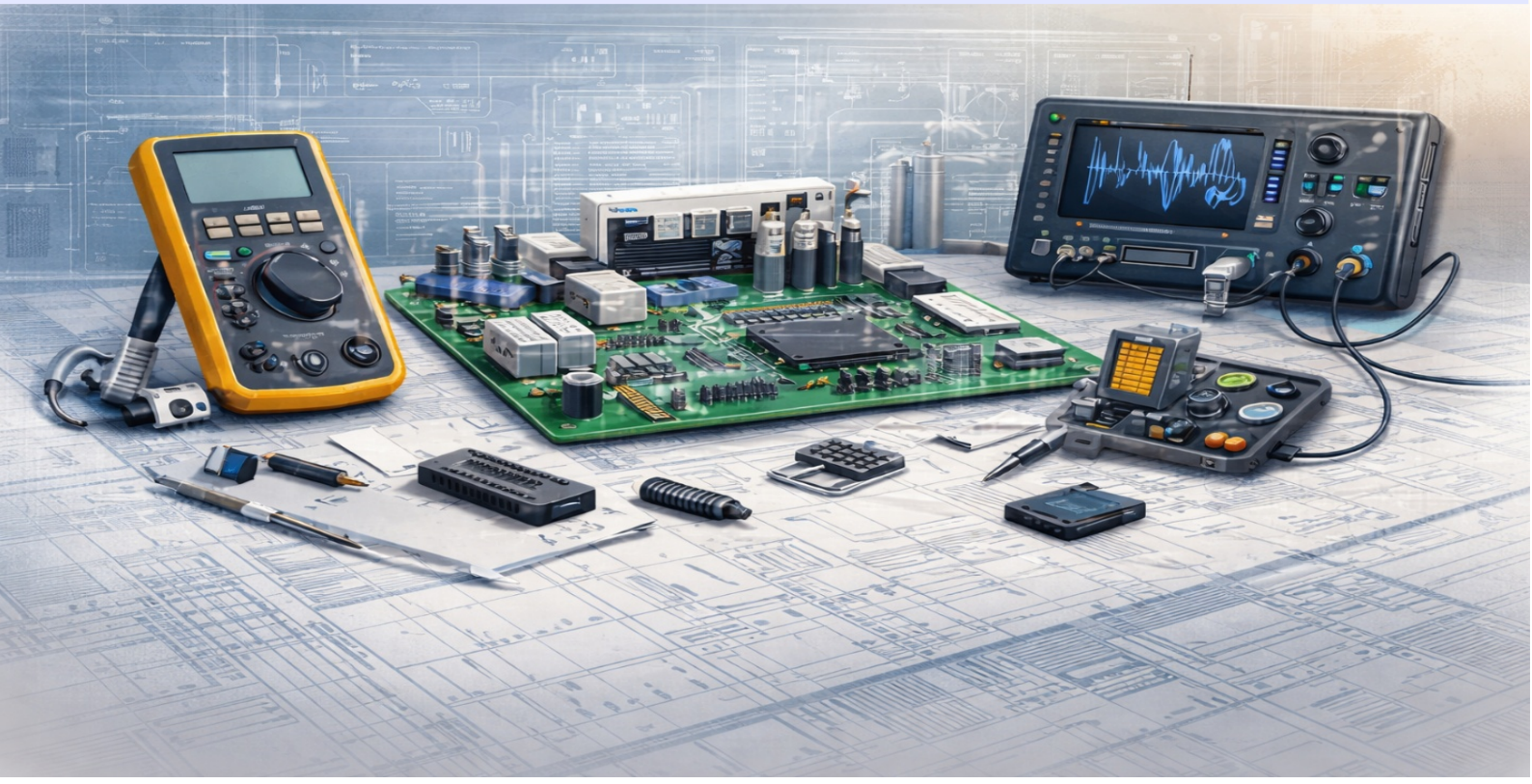
SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)

25 YEARS

DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING

ENGINEERING CLINIC – REPORT

(ANNUAL REPORT 2024- 2025)



Preface

The Engineering Clinic of the Department of Electrical and Electronics Engineering at Sri Manakula Vinayagar Engineering College functions as a structured academic platform designed to strengthen students' technical competence through experiential and application-oriented learning. The initiative is guided by the Dean, Head of the Department, and dedicated faculty coordinators, with the active support of committed teaching staff. It provides a systematic environment where undergraduate students participate in organized technical activities and hands-on training sessions. The clinic primarily focuses on the troubleshooting and maintenance of real-time electrical and electronic appliances, allowing students to connect theoretical concepts with practical implementation.

Through these activities, students gain exposure to fault identification, component-level analysis, and system-level diagnostics. They are trained to follow structured problem-solving methodologies, use appropriate testing instruments, and adopt safe working practices. The Engineering Clinic also encourages interdisciplinary learning, technical documentation, and collaborative teamwork among students. By working on real-world problems, students improve their analytical thinking, technical accuracy, and decision-making skills.

In addition, the clinic promotes professional ethics, responsibility, and effective communication, which are essential qualities for modern engineers. Regular technical sessions, demonstrations, and guided practice help students build confidence in handling electrical and electronic systems. The initiative not only enhances practical knowledge but also prepares students to meet industry expectations. Overall, the Engineering Clinic plays a significant role in producing competent, industry-ready engineers and contributes to the academic excellence and technological development of the institution.

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ABOUT THE INSTITUTE

Sri Manakula Vinayaga Educational Trust was founded to provide quality and affordable education to the weaker sections of society. The trust established Sri Manakula Vinayagar Engineering College (SMVEC) in 1999. SMVEC is an autonomous institution affiliated to Pondicherry University. It offers 13 undergraduate, 8 postgraduate and 11 Research programme in engineering. SMVEC has been accredited by NAAC with "A" grade and NBA. The institution is also accredited by TATA consultancy services. The college has a good placement record with students getting job offers from top companies in India and abroad. SMVEC students have won many awards and accolades for their academic achievements.

Vision

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society

Mission

M1: Quality Education: To provide comprehensive academic system that amalgamates the cutting-edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill-based training.

M4: Ethical Values: To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

Vision

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship

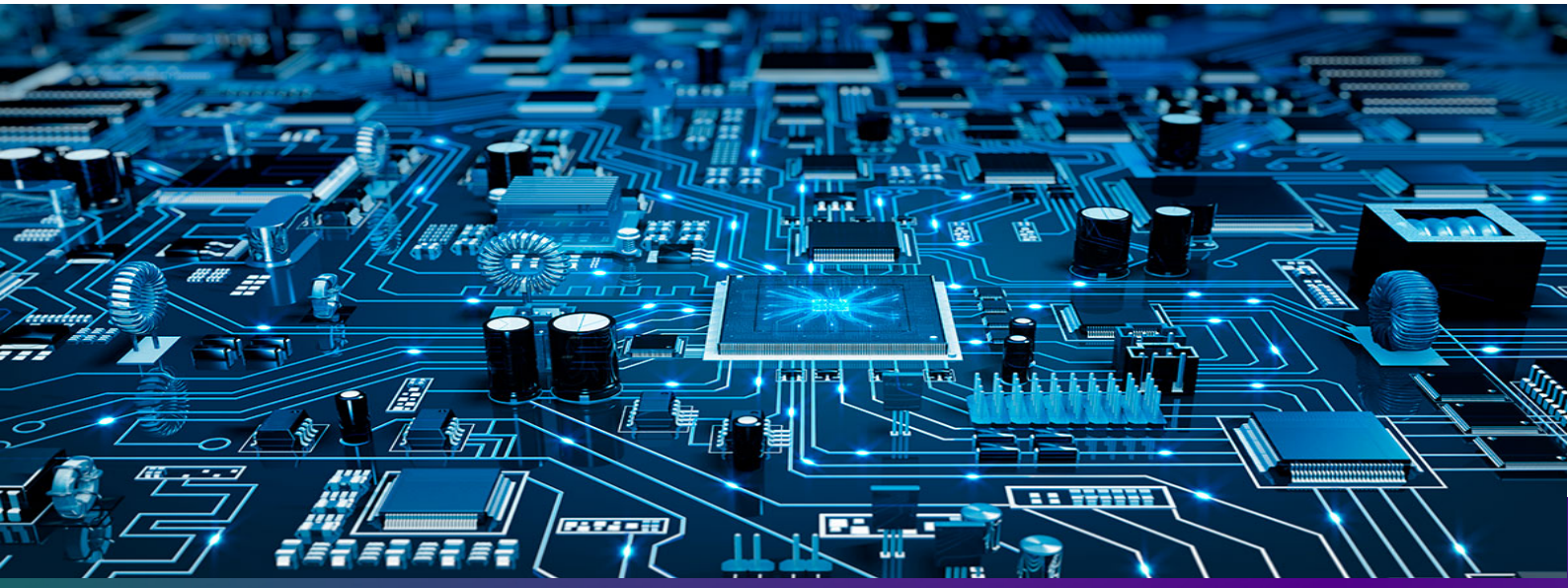
Mission

M1: Quality Education: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal Needs: To cater the dynamic needs of the industry and society by strengthening industry-institute interaction.

M3: Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.



Objective of Engineering clinic club

- To provide students with practical exposure to electrical and electronic systems used in daily life.
- To develop hands-on skills in troubleshooting, servicing, and repairing domestic electrical appliances.
- To enhance students' understanding of electrical components, circuits, and their functions through real-time applications.
- To train students in essential electrical practices such as wiring, soldering, component testing, fuse replacement, and earthing.
- To strengthen problem-solving and fault diagnosis abilities through systematic analysis of equipment failures.
- To bridge the gap between theoretical concepts learned in the classroom and practical industrial requirements.
- To improve technical competency, safety awareness, and maintenance skills in handling electrical equipment.
- To encourage innovation, self-learning, and confidence in addressing real-world electrical and electronic challenges.
- To prepare students for employment and entrepreneurial opportunities in electrical maintenance and service sectors.
- To promote community service by enabling students to provide basic repair and maintenance support for electrical appliances.

Functions of Engineering Clinic

- Hands on - Students apply what they are learning about.
- Integrated - Demonstrate correlations with supporting course work.
- Multidisciplinary - Involve students as a community of problem solvers.
- Teamwork - Emphasize the advantage of effective teaming.
- Entrepreneurial - Reinforce value-based engineering.
- Contextual - Help students understand the big picture.
- Every Saturday Faculties have to explain about the troubleshooting of domestic electrical appliances.
- The faculty members have to train the students to identify the Fault in an electrical appliance.
- The Faculty members need to provide the hands on training to the students.

Student Members of the Club :

All I Year, II Year & III Year students of the Department

OFFICE BEARERS AND THEIR PORTFOLIOS

SL.NO	NAME OF THE FACULTY	DESIGNATION	POSITION
1.	Dr.S. Anbumalar	Dean Academics	**Convener**
2.	Dr. P. Jamuna	Professor / EEE	Faculty Coordinators
3.	Dr. D. Raja	Professor / EEE	
4.	Mr.Parthiban,B	AP/EEE	
5.	Mr. R. Ragupathy	AP/EEE	
6.	Mr. G. Rajavel	AP/EEE	
7.	Dr.S. Ganesh Kumaran	Assoc. Prof. /EEE	
8.	Dr.Sivaraj	AP/EEE	Member
9.	Mr.A. Janagiraman	AP/EEE	Member
10.	Mr.K. Thangaraj	AP/EEE	Member
11.	Mr.J.Muruganandham	AP/EEE	Member
12.	Mr.Adrien Periyanayagam	AP/EEE	Member
13.	Mr.I. Shivasankkar	AP/EEE	Member
14.	Mr.R. Vignesh	AP/EEE	Member
15.	Mrs.K.Kavinelavu	AP/EEE	Member
16.	Ms. Abinayasaraswathi	AP/EEE	Member
17.	Mr.Elanthamizh	AP/EEE	Member

Dr. D.Raja
Professor

Mr .G. Rajavel
Assistant Professor

Dr.s.Ganesh Kumaran
Associate Professor
Member

Mr.A.Janagiraman
Assistant Professor
Member

Mr.K.Thangaraj
Assistant Professor
Member

Mr.J.Muruganandham
Assistant Professor
Member

ACTIVITIES CONDUCTED BY ENGINEERING CLUB – (2024 – 2025)

Sl. No	Activity	Date	Year/Sem/Batch
1.	Transformer less 230v light activated switch	31.08.2024	III/V/A/2022-2026
2.	Trouble shooting of induction stove	23.11.2024	I/I A&B/2024-2028
3.	Designing zero crossing pulse detector and firing circuit	31.08.2024	III/V/A/2022-2026
4.	Practical troubleshooting of fan, iron box and induction stove.	22.02.2025	I / II / 2024-2028

Engineering Clinic – Activity Report-1

Academic Year	:	**2024 – 2025**	
Date/Day	:	**31.08.2024/Saturday**	**Year/Sem/Sec: III/V/A**
Activity	:	**TRANSFORMERLESS 230V LIGHT ACTIVATED SWITCH**	

INTRODUCTION:

- Voltage Step-Down: The circuit uses a capacitor to step down the voltage from 230V to a lower level, eliminating the need for a traditional transformer.

- Capacitor Impedance: The capacitor's impedance creates a significant voltage drop without heat dissipation, making it a more efficient solution than using a resistor.

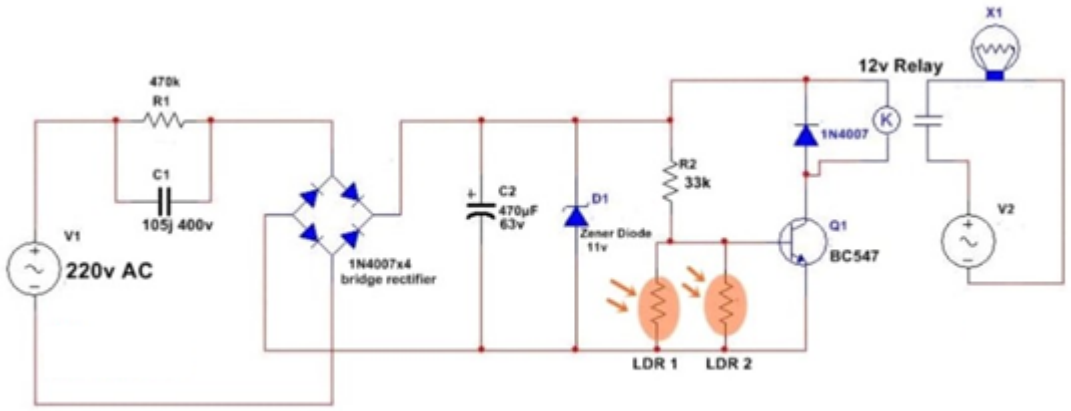
- AC-DC Conversion: The reduced voltage is processed through a rectifier and filter circuit, converting it from AC to DC for use in the switching circuit.

- Automatic Switching: A Bipolar Junction Transistor (BJT) functions as a switch, automatically turning on the lamp when the Light Dependent Resistor (LDR) detects low light levels.

- Energy Efficiency: The circuit is widely used in applications like automatic street lighting, providing efficient and responsive illumination.

APPLICATIONS:

- Automatic street lighting
- Garden and landscape lighting
- Security lighting
- Pathway and walkway illumination
- Automated indoor lighting
- Energy-saving lighting solutions



WORKING:

- The input 230V is fed into 1micro farad Capacitor (non polarized with high voltage rating and reactance) used which will step down 230V into 12V.
- Here the property of capacitance reactance plays a vital role in step down of AC voltage as input frequency is low in nature, reactance will be high so a maximum voltage drop can be made as per design.
- Then the voltage is fed into full wave bridge rectifier to convert AC into pulsating DC.
- Then they are passed through capacitor to filter the output of rectifier.
- Then its connected to BC547's Collector through 1N4007 diode and Voltage Divider circuit(with resistor and LDR) to feed supply to Base.
- If light falls on LDR, then current pass to ground instead to base so BJT turns off and relay will not turned on.
- If no light falls on LDR, base is triggered BJT switch turns on and supply flow through coil of relay and lamp get turns ON.

SUMMARY:

If BJT conducts lamp turns on when no light falls on LDR. If light falls on LDR, BJT turns off and lamp turns off.

DESIGN CALCULATION:

CALCULATING R_1:

$$R_1 = \frac{V_{AC}}{I_{max}}$$

$$R_1 = \frac{230}{10^{-3}} = 230K\Omega$$

CALCULATING C_1:

$$C_1 = \frac{1}{2\pi X_C}$$

$$X_C = \frac{V_{rms}}{I_{rms}} = \frac{230}{I_{rms}}$$

$$I_{rms} = \frac{P}{V} = \frac{0.24}{12} = 0.02mA$$

$$X_C = \frac{230}{0.02} = 11.5K\Omega$$

$$C_1 = \frac{1}{2\pi(11000)} = 2.89uF \simeq 1uF$$

1uF is used for standardization

CALCULATING C_2:

$$C_2 = \frac{I}{2F\Delta V} = \frac{0.02}{2(50)(1)}$$

$$C_2 = 200uF$$

$C_2 \simeq 470uF$ is used for ensuring minimal ripple.

CALCULATING V_{dc}:

$$V_{dc}=V_{rms}*1.414 - V_{diode\_drop}$$

$$V_{dc}= 12*1.414 - 1.4$$

Total voltage drop across each diode is 0.7V

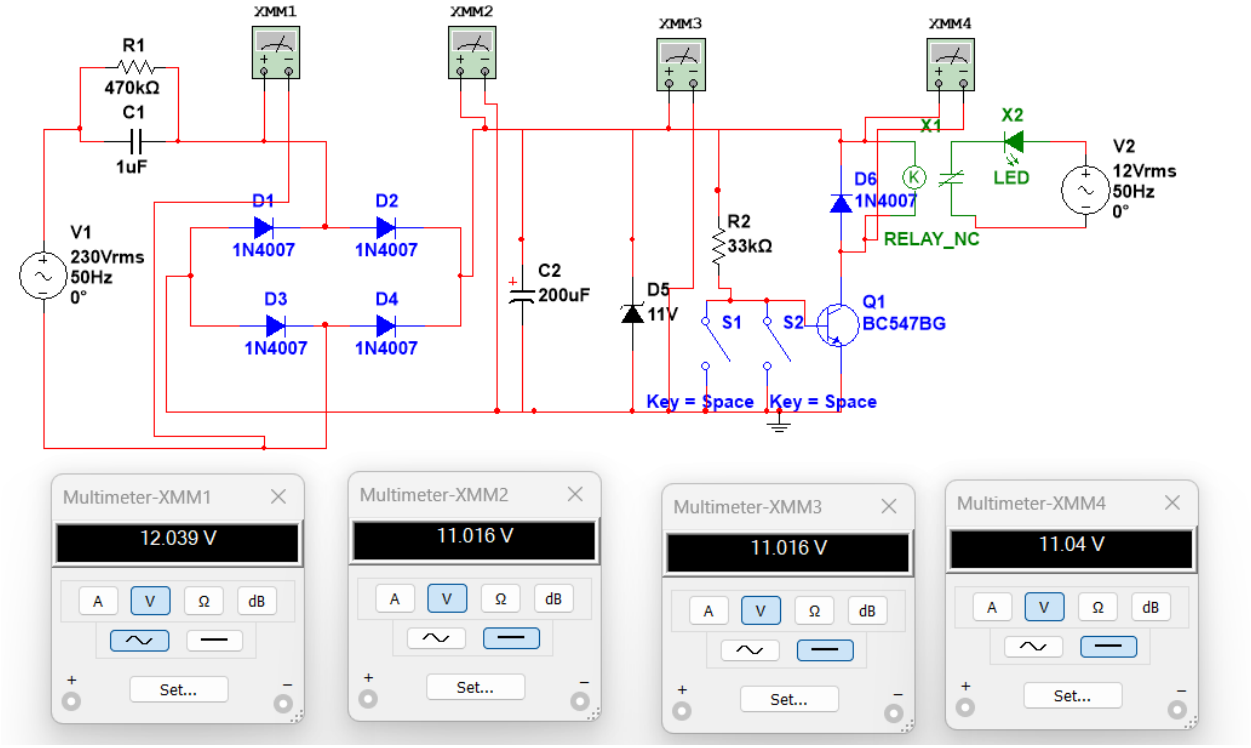
Thus, the voltage drop in each half cycle is 1.4V

$$V_{dc}=15.5V$$

COMPONENTS REQUIRED FOR CIRCUIT:

S.No:	Components	Specification	Quantity
1	1.5 sq.mm (Dual Core)	-	1 metre
2	Resistor	470KΩ,33KΩ	1 each
3	Diode	1N4007	5
4	Capacitor	105J/400V, 470µF/63V	1 each
5	Zener Diode	-	1
6	Transistor	BC547	1
7	LED	5mm (Any Colour)	1
8	2 Pin Top	-	1
9	Matrix PCB	Zero matrix	1
10	LDR	-	2
11	Single Strand Wire	-	1 metre

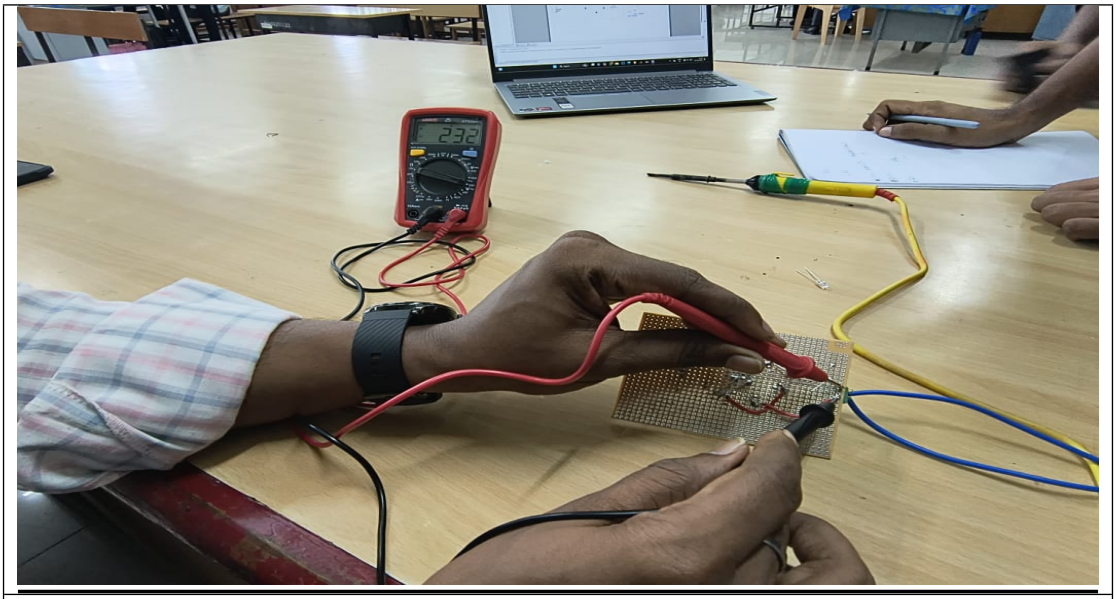
SIMULATION DIAGRAM:



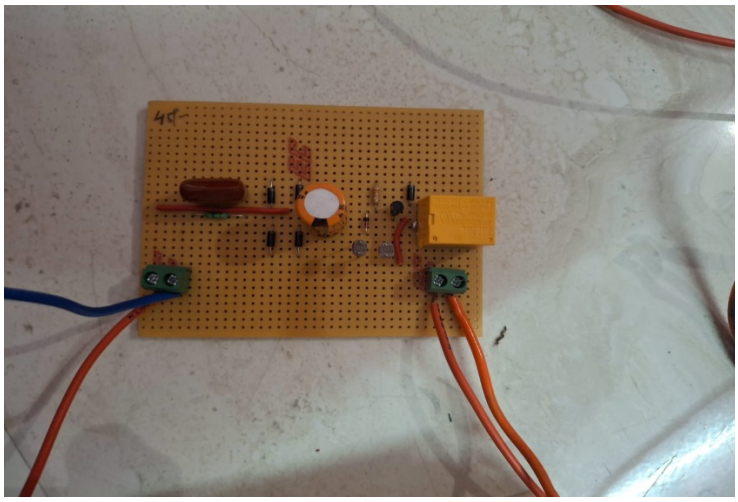
OUTPUT:

PARAMETERS	THEORETICAL VALUE	SIMULATION VALUE	PRACTICAL VALUE
Input Voltage	230V	230.169V	232V
Step down input voltage	12V	12.04V	12.1V
Voltage after rectifer without capacitor	15.5V	11.2V	14V
Voltage after rectifier with filter	10.8V	10.99V	12.1V
Voltage across Relay	12V	11.01V	12.2V
Voltage across zener diode	15V	11.01V	12.2V

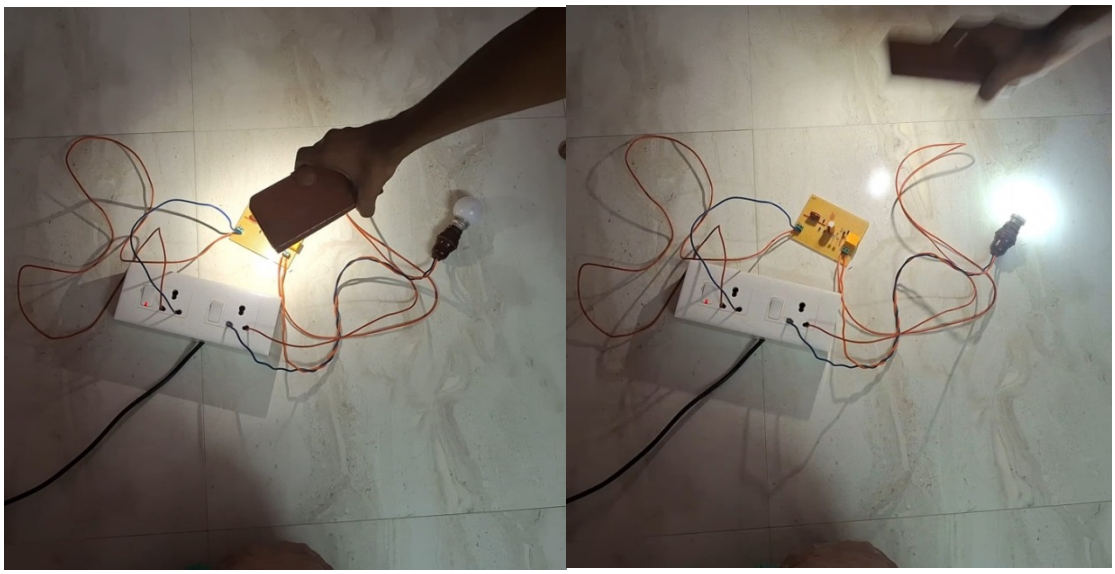
Students of EEE Department, III-year, A section are performing the construction of Transformerless 230V Light Activated Switch circuit under the guidance of Mr.G.RAJAVEL AP/EEE and Mrs.A.S.AMATHULLAH



Here the circuit input is tested whether the rated 230V supply is fed as input. As the input appears here is 230V, it stepped down.



Here the voltage across the relay is nearly of 12V which is actual output required so to activate relay if no light falls on LDR.



Year / Sem / Sec: I / I/A& B **DATE: 23.11.2024**

Engineering Clinic – Activity Report-2

Academic Year	:	**2024 – 2025**	
Date/Day	:	**23.11.2024/Saturday**	**Year/Sem/Sec: I/I A&B**
Activities	:	**"TROUBLE SHOOTING OF INDUCTION STOVE "**	

TROUBLE SHOOTING OF INDUCTION STOVE

INTRODUCTION:

Induction stoves have revolutionized modern cooking with their efficient, fast, and safe heating technology. However, like any electronic appliance, they can encounter issues that disrupt their functionality. This guide focuses on identifying and resolving common problems associated with induction stoves

APPLICATIONS:

1..Ensuring Safety:

Detecting and addressing problems such as electrical faults or overheating reduces risks of accidents, such as fires or electric shocks.

2.Cost Savings:

Proper troubleshooting prevents unnecessary replacement of parts or the entire appliance, saving money on repairs or new purchases.

3.Prolonging Appliance Lifespan:

Timely identification and resolution of minor issues prevent them from escalating into major problems, thereby extending the stove's service life.

4.Supporting Maintenance Practices:

Regular troubleshooting allows early detection of wear and tear, enabling preventive maintenance to keep the appliance in optimal condition.

FAULT OCCURS FREQUENTLY:

1. Power cord
2. Filter Capacitor
3. Heating Coil
4. Heating Sensor

CIRCUIT DIAGRAM:

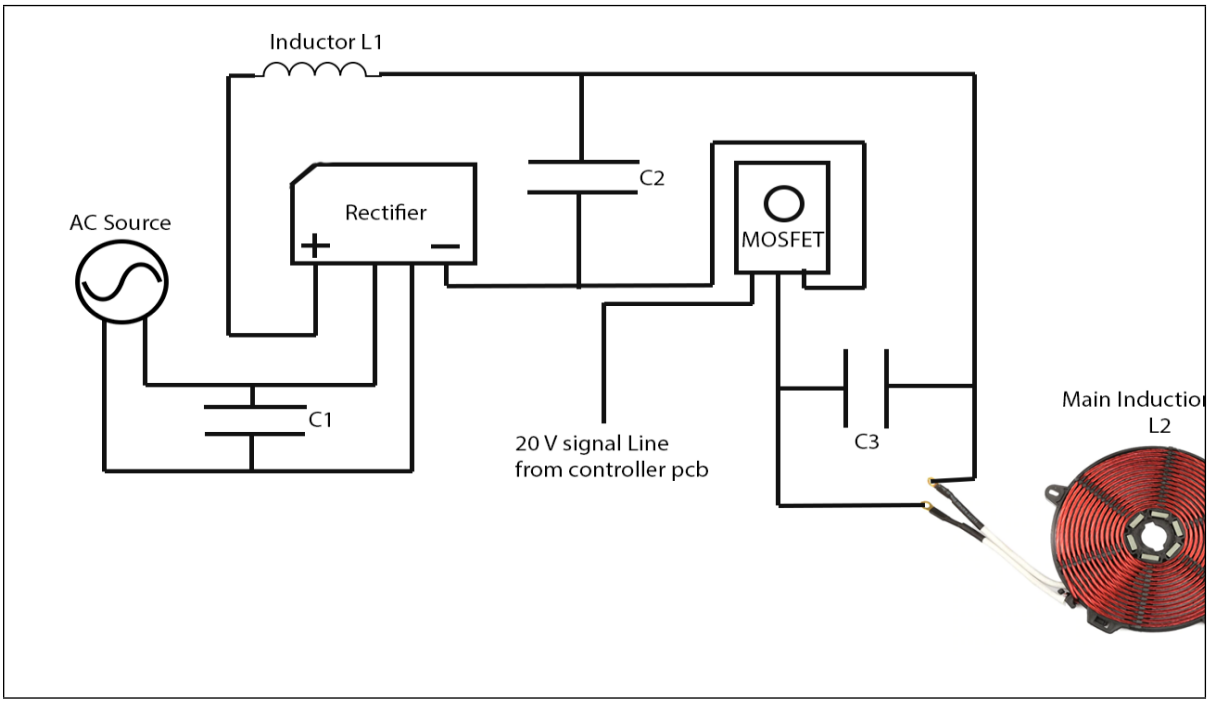


Fig (1). Circuit diagram for Induction Stove

Components Required:

S. No:	Components	Specification	Quantity
1	Electric Induction	-	1
2	Multimeter	-	1
3	Test Lamp set	-	1

INTERNAL VIEW OF INDUCTION STOVE

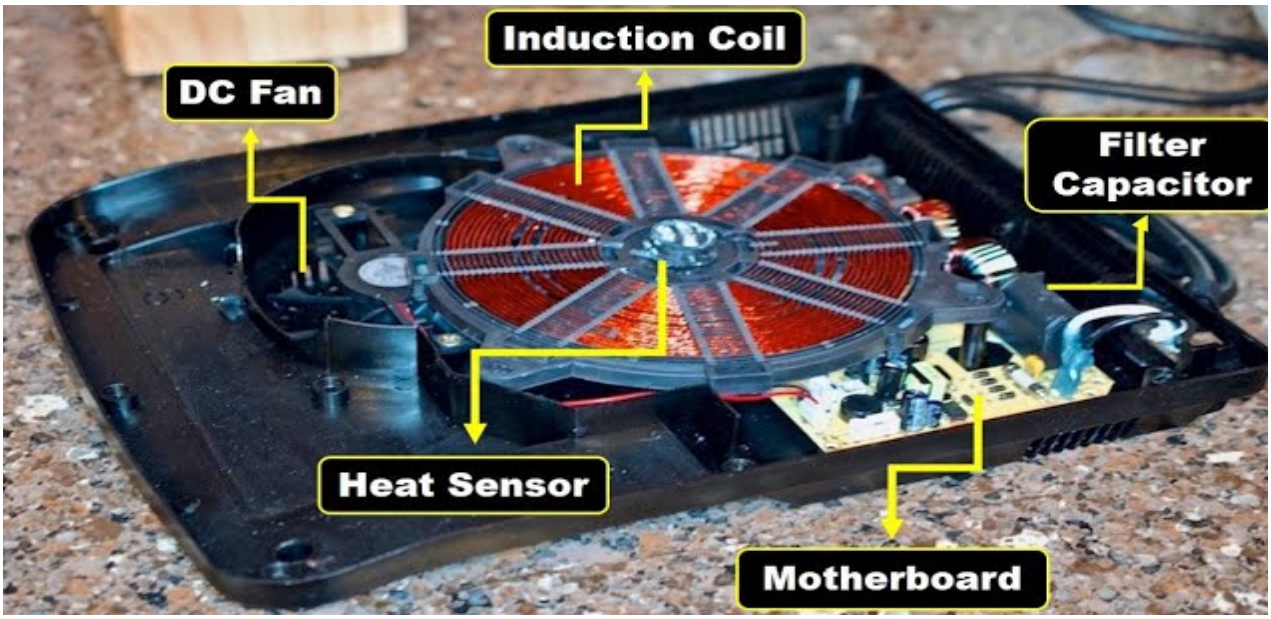
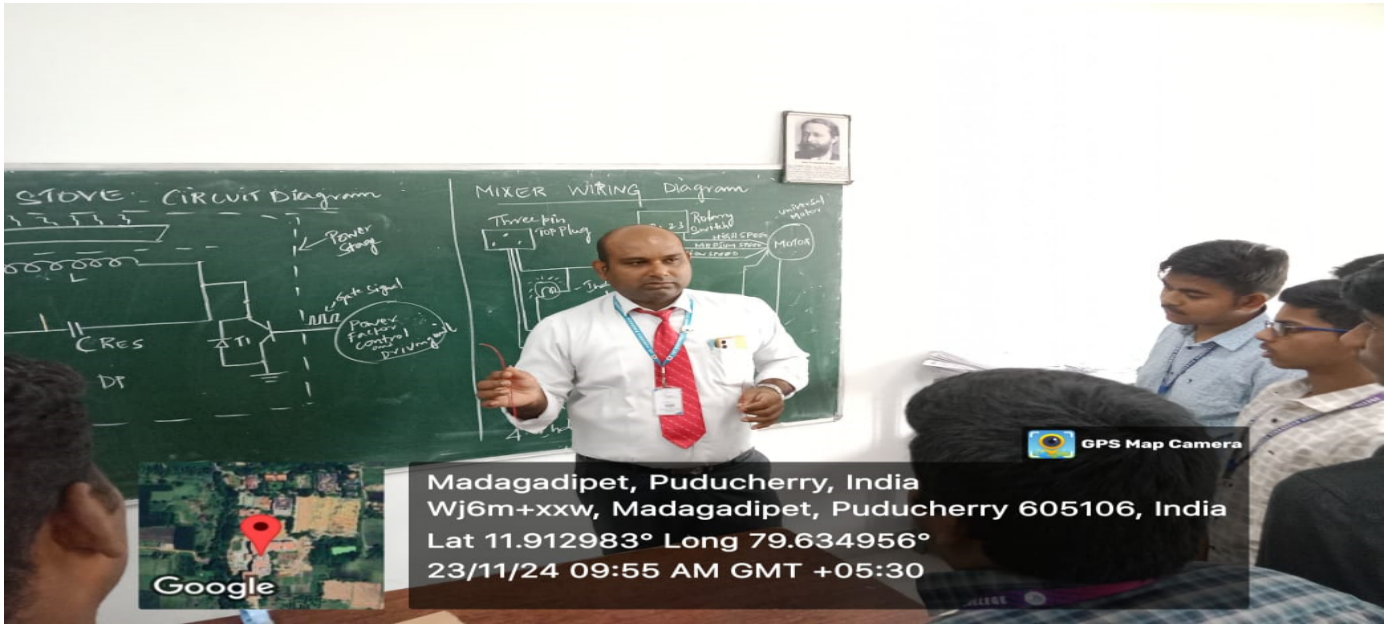


PHOTO GALLERY:

The faculty of the EEE Department Mr.J.Gnanavel and Mr.R.Vignesh giving a demonstration on troubleshooting an electric induction stove to the I-year, A&B section students.



Mr. Parthiban, faculty member in the EEE Department, is explaining the circuit connections of induction to EEE department Students on board.

The faculty member is practically demonstrating the internal circuit of an induction stove to the first-year EEE Department students of A and B sections

Mr. J. Gnanavel, a faculty member in the EEE Department, is demonstrating to students how to use a multimeter and test lamp to check the continuity of a power cord and verify the input supply to a circuit board.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

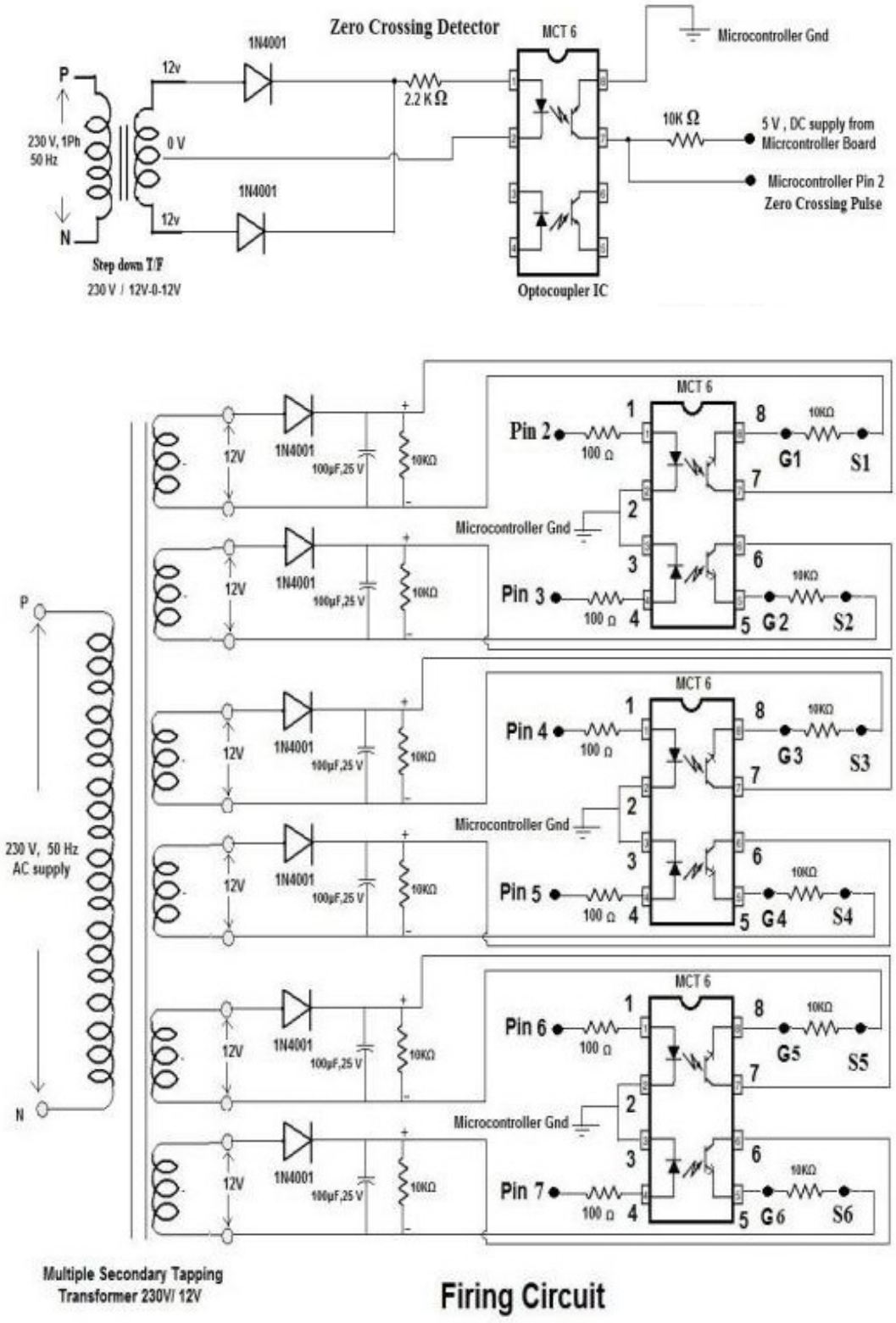
Engineering Clinic – Activity Report-3

Academic Year	:	**2024 – 2025**	
Date/Day	:	**31.08.2024/Saturday**	**Year/Sem/Sec: III/V/A**
Activity	:	**DESIGNING ZERO CROSSING PULSE DETECTOR AND FIRING CIRCUIT**	

COMPONENTS REQUIRED:

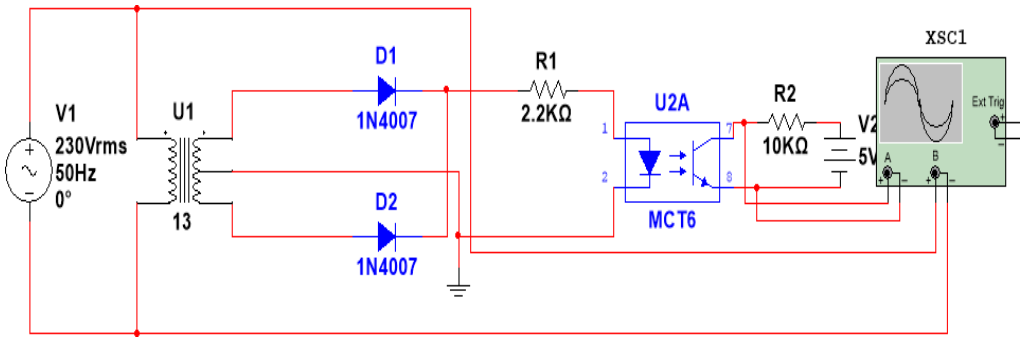
S.NO:	COMPONENTS	SPECIFICATION	QUANTITY
1	Diode	1N4007	8
2	Capacitor	100uF/25V	6
3	Resistor	10KΩ	13
4	Resistor	100Ω	6
5	Resistor	2.2KΩ	1
6	IC Optocoupler (8 Pin)	MCT6	4
7	IC Base 8 Pin	-	4
8	2 Pin Screw Block Connector	300V/10A	15
9	3 Pin Screw Block Connector	300V/10A	2
10	Zero Matrix PCB	2x3, 6x4	Each 1
11	Connecting Wires	Single Strand	As required

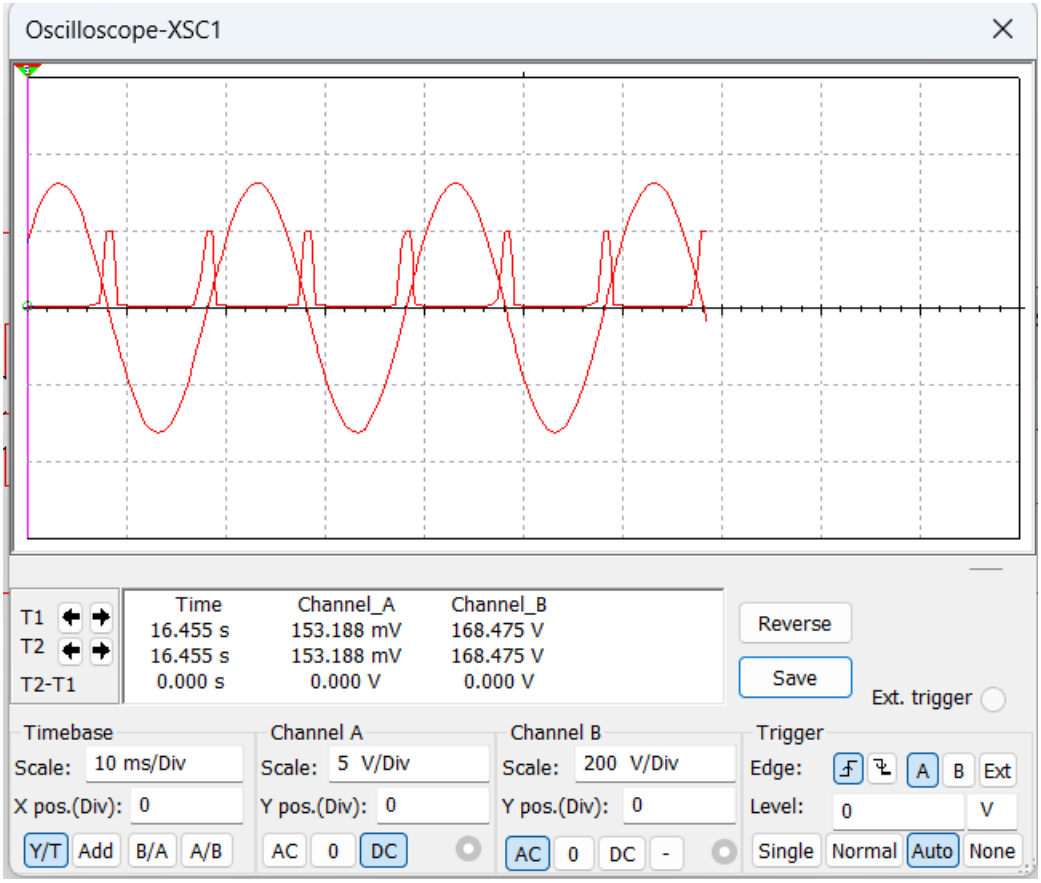
CIRCUIT DIAGRAM:



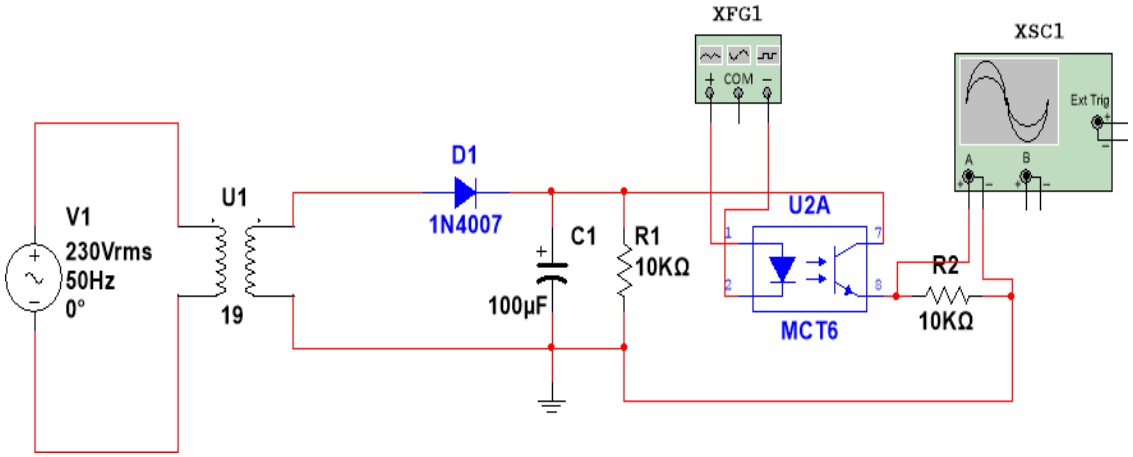
SIMULATION DIAGRAM:

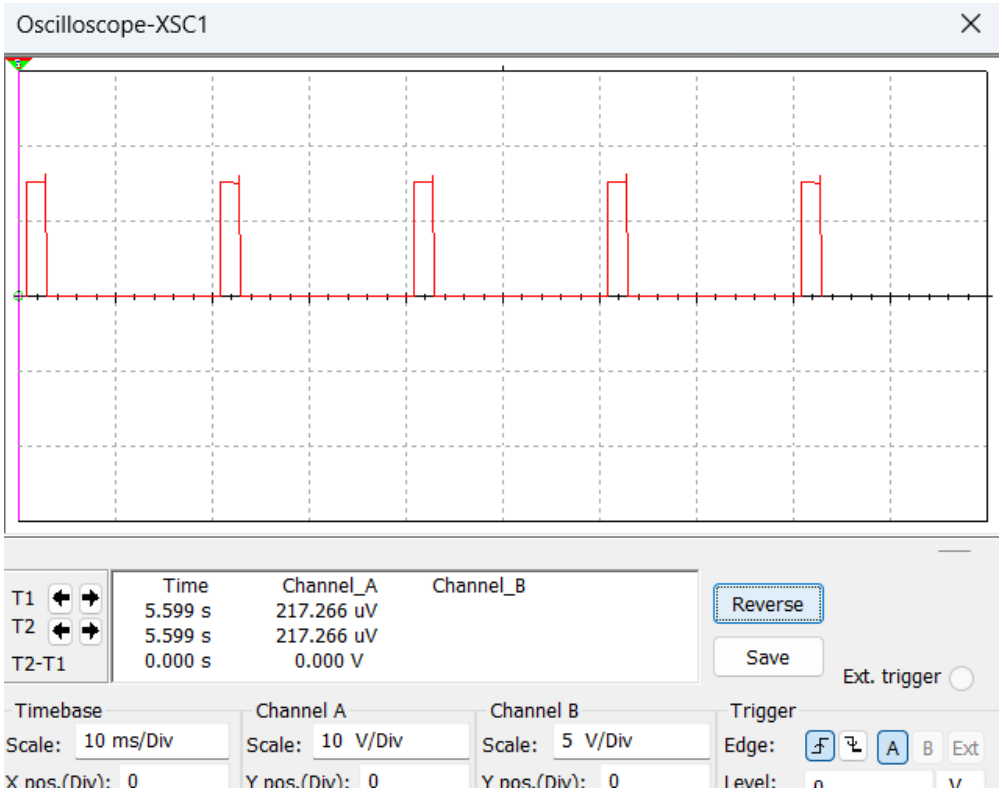
ZERO CROSSING PULSE DETECTOR





FIRING CIRCUIT





Students of EEE Department, III-year, A section are performing the construction of Zero Crossing Detector and Firing Circuit under the guidance of Mr.G.RAJAVEL AP/EEE and Mrs.A.S.AMATHULLAH

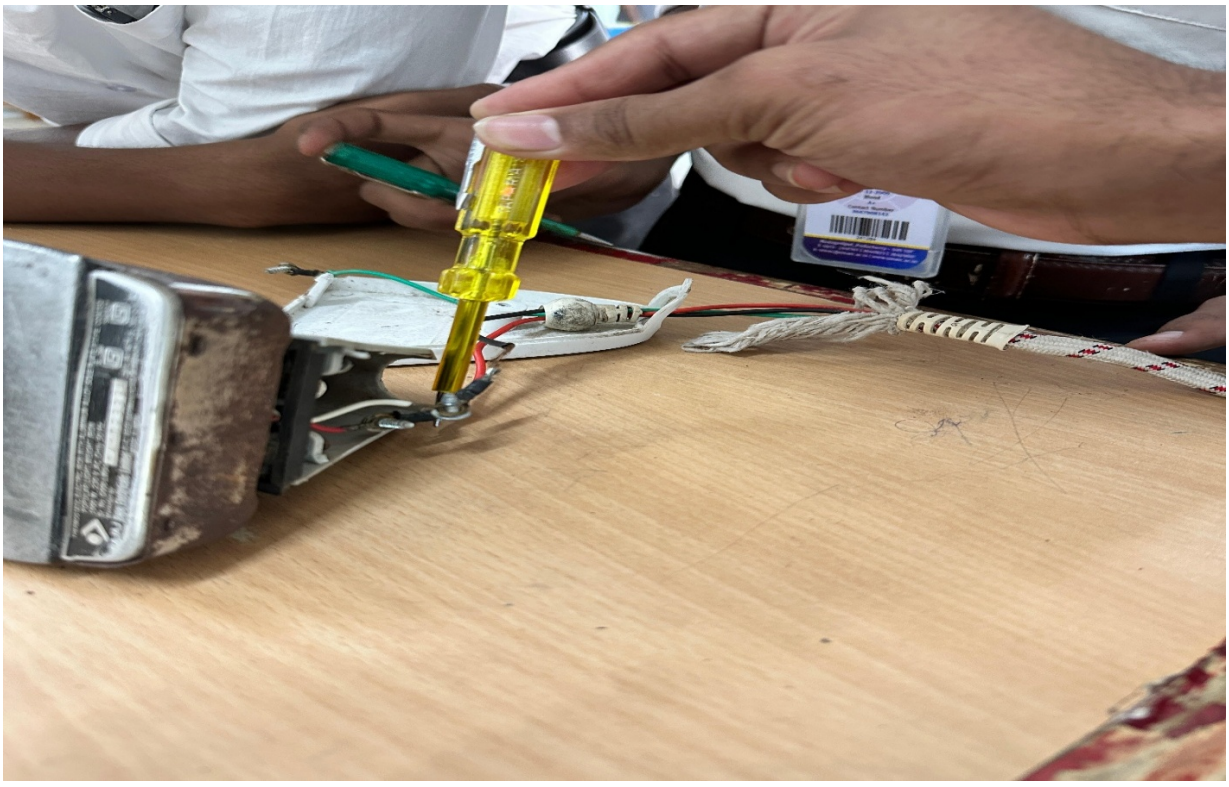
Engineering Clinic – Activity Report-4

Academic Year	:	**2024 – 2025**
Date/Day/Time	:	**22.02.2025/Saturday / 8.45 Am to 12.20 Pm**
Year/Sem/Batch	:	**I / II / 2024-2028 – Section 'A & B'**
Activities	:	**Practical Troubleshooting of Fan, Iron box and Induction stove.**

The students test a circuit board with a digital multimeter to check for continuity. This helps them find open or broken connections.

The students carefully remove the faulty components from the DVD player's circuit board and replace them with new parts, applying proper soldering techniques to ensure reliable electrical connections and restore the device's functionality.

Fan Troubleshooting: The students are carefully inspecting the fan's capacitor and switch mechanism to diagnose potential issues



After rectifying the iron box, the students verify the power supply using an electrical tester to ensure proper voltage and secure connections

This session helped the students understand the practical troubleshooting of home appliances and encouraged their innovative thinking in electrical engineering applications.