## Best Practice-1- TITLE OF THE PRACTICE

Extension of zoology laboratory for the benefit of society.

## BLOOD GROUP DETECTION AND HAEMOGLOBIN CHECK-UP.

1. **OBJECTIVES OF THE PRACTICE**:
   - To promote awareness about the importance of knowing one's blood group for medical emergencies and blood transfusions.
   - To provide accurate and reliable blood group detection services to individuals, helping them understand their blood compatibility and potential health risks.
   - To help in the early detection of anaemia and other haemoglobin-related disorders.
   - To contribute to public health by facilitating early diagnosis and timely intervention for blood-related conditions.
   - To maintain high-quality laboratory standards, ensuring precise and error-free test results for the benefit of society.
   - To collaborate with medical professionals and institutions, supporting the healthcare system in managing blood-related health issues effectively.

   **The underlying principle of the practice is to promote public health and ensure early detection of potential blood-related issues**.

2. **THE CONTEXT**:

   In designing and implementing the practice following contextual features and challenging issues were addressed.
   - Ensured the availability of trained personnel and appropriate equipment.
   - Addressed ethical concerns related to privacy and data protection of individuals.
   - Designed an efficient process for registration, testing, and result dissemination.
   - Catered to diverse socioeconomic backgrounds in society.
   - Conducted awareness campaigns and educational outreach to promote the benefits of the practice and encourage participation.

3. **THE PRACTICE**:

   The practice focused on promoting health awareness and facilitating early detection of potential health issues related with blood. The Department of Zoology has organised the one week "**Blood group detection and haemoglobin check-up camp"** from 17-22 February 2020. The process involved the following steps.
   - To communicate to all students and people in the local region before a week.
   - To register a participant with basic information.
   - To arrange awareness lecture on important of hemoglobin for normal health.
   - To collect blood samples by trained students.
   - To detect the blood group and haemoglobin level.
   - To provide blood group card and haemoglobin level report.

**The uniqueness of the practice lies in its multifaceted impact on social health as stated below**.

- Enhance health literacy and consciousness among students, faculty and the community.
- Demonstrates the institute's commitment to holistic student welfare and community outreach, especially in remote areas where medical facilities are limited.
- Instils social responsibility in students and emphasizes community engagement and proactive healthcare.

- Integrates Zoology with health education fosters interdisciplinary learning and provides students with hands-on medical experience.
- Addresses the critical issue of anaemia.

**In implementing the practice, the department faced several constraints and limitations as mentioned below**.

- Funding for the necessary medical equipment and supplies.
- Availability of qualified medical professionals or trained personnel to perform the tests and interpret the result.
- Logistical challenges, such as transportation and setting up temporary clinics.
- Ensure the accuracy and reliability of the tests while providing appropriate follow-up.

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**4. EVIDENCE OF SUCCESS:**

The evidences of success of the practice includes;

- The positive surveys or feedback regarding the level of awareness created among the students about blood group importance and maintaining good haemoglobin levels.
- The total number of 250 students and villagers who attended the camp and received blood group detection and haemoglobin check-ups.
- Positive feedback from the students about their experience with the camp and the usefulness of the provided services.
- The cost-effectiveness of the camp in terms of resources used and health benefits achieved.

**5. PROBLEMS ENCOUNTERED AND RESOURCES REQUIRED:**

**Implementing the practice has significant benefits to the community's health. However, the following challenge were encountered while implementing the practice.**

- Funding for medical equipment, consumables and logistics.
- Facilities for conducting blood tests, storing samples, and maintaining privacy for participants.
- Effective communication and promotion to aware community members about the camp and its benefits.

**Resources required in implementing the practice include**.

- Blood group detection requires A/B/O/Rh test kits, and haemoglobin check-up needs haematology analysers and reagents.
- Suitable location with power supply, sanitation facilities, and proper seating arrangements for participants.
- Posters, banners, and leaflets to raise awareness about the camp.
- Incentives/ refreshments to encourage more people to attend.

**6. NOTE (OPTIONAL):**

The institute prioritized academic excellence, fostering a culture of inclusivity, diversity, and respect among its students and staff. It encourages innovative teaching methodologies, promotes research and critical thinking, and emphasizes ethical conduct and community engagement. Continuous improvement and adaptability are integral to its best practices.




## Best Practice-2-TITLE OF THE PRACTICE

Extension of Electronics laboratory for skills development among students.

## PRINTED CIRCUIT BOARD DESIGN

### 1. OBJECTIVES OF THE PRACTICE:

The objectives/intended outcomes of the practice include:

- To understand the principles of PCB design, including layout, circuitry, and component placement.
- To provide hands-on experience in designing and fabricating PCBs using software tools and equipment.
- To develop critical thinking abilities to troubleshoot and rectify design issues during the PCB development process.
- To become proficient in creating complex and functional PCB layouts.
- To choose appropriate components and optimise their placement for improvement of PCB design and accuracy.
- To foster collaboration, communication, and project management abilities among students.
- To prepare students for careers in the electronics industry.

- To explore innovative approaches to PCB design, and foster creativity and problem-solving skills.

## 2. THE CONTEXT:

Designing and implementing the practice has posed the following contextual features and challenging issues that were carefully addressed.

- The students were provided with well-structured learning materials and hands-on guidance to understand complex concepts like schematic capture, layout design, and signal integrity.
- Encouraged teamwork and effective communication among students during the design process.
- Emphasized safety protocols and ethical considerations to prevent accidents and promote responsible engineering practices.
- Developed appropriate assessment criteria to evaluate students' understanding, creativity, and problem-solving skills.
- Prepared students for practical challenges they might have encountered in their professional careers.
- Ensured access to necessary resources such as PCB fabrication facilities, components, and testing equipment to translate students' designs into real-world prototypes.

## 3. THE PRACTICE:

The practice involved the following steps.

- Understand the concept of PCBs and its importance in electronic circuit design.
- Familiarize with PCB design software, such as Eagle, KiCad, or Altium Designer.
- Create a schematic diagram of an electronic circuit using the software.
- Choose suitable electronic components for circuit design based on the schematic.
- Translate the schematic into a physical PCB layout.
- Create the physical board from the designed layout.
- Use processes like etching, drilling, and solder mask applications.
- Demonstrate the process of printing the PCB design onto a copper-clad board and transferring the layout using the toner transfer method.
- Remove unwanted copper from the board using an etchant to create the copper traces.
- Drill holes for component placement and mounting.
- Solder and assemble electronic components onto the PCB.
- Test completed PCBs to ensure circuits function correctly.
- Debug any potential issues and make pre-necessary adjustments.
- Review the students' completed PCB designs, provide feedback, and evaluate their understanding of the PCB design process.

**The uniqueness of the practice in the context of Indian higher education are as stated below.**

- It provides hands-on experience to students, allowing them to design, prototype, and fabricate PCBs.
- It helps students bridge the gap between theoretical knowledge and real-world applications.
- It prepares students for the industry by equipping them with practical skills and problem-solving abilities.

**In implementing the practice, the following constraints/ limitations were faced by the department.**

- The budget constraints of the department affected the availability of advanced PCB design software, fabrication equipment, or materials.
- The coordination of time-consuming PCB design and fixed academic schedules affects the comprehensive design and testing.

- The different Skill Levels of students in PCB design impacted the overall success of the practice.

**4. EVIDENCES OF SUCCESS:**

**The evidence of success of the practice were measured against various targets and benchmarks.**

- The student understood the design principles, practical skills in PCB layout, and their ability to troubleshoot and debug circuits.
- Overall, 33 PCBs were designed
- The student demonstrated proficiency in soldering skills.
- The designed PCB circuits were implemented successfully.
- The positive student reviews and feedback indicated satisfaction with the teaching methods, laboratory equipment, and overall learning experience.
- The above-average results of students in assessments, exams, or competitions also indicated successful practice.

**These results indicate the effectiveness of the practice in imparting practical knowledge and skills to students in this field**.

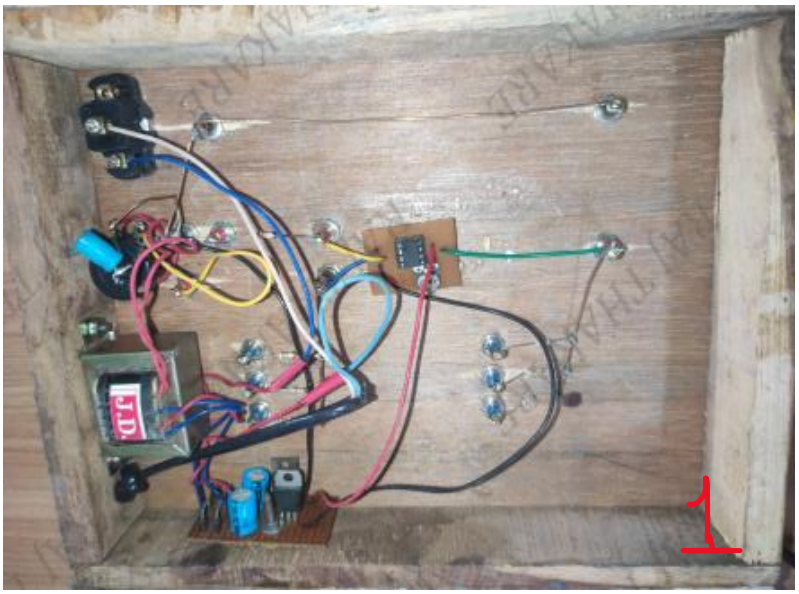
**5. PROBLEMS ENCOUNTERED AND RESOURCES REQUIRED:**

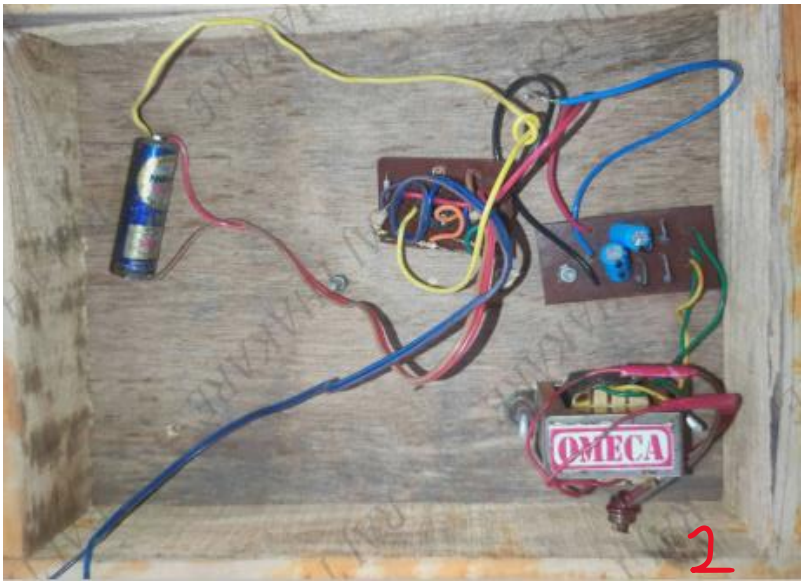
**In implementing the practice following problems were raised**.

- Limited access to PCB design software, components, and fabrication tools hinder students' hands-on experience.
- The complex PCB design process, leads to difficulties for students, especially beginners.

**6. NOTE (OPTIONAL):**

The institute prioritized academic excellence, fostering a culture of inclusivity, diversity, and respect among its students and staff. It encourages innovative teaching methodologies, promotes research and critical thinking, and emphasizes ethical conduct and community engagement. Continuous improvement and adaptability are integral to its best practices.

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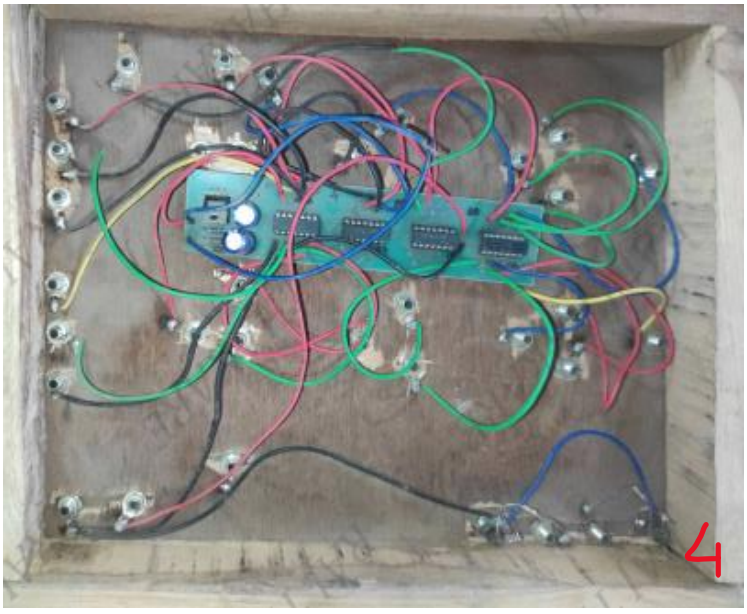
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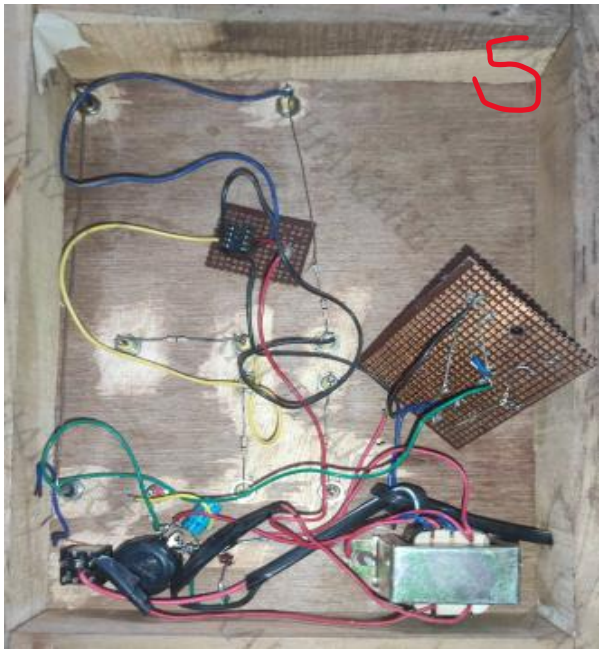
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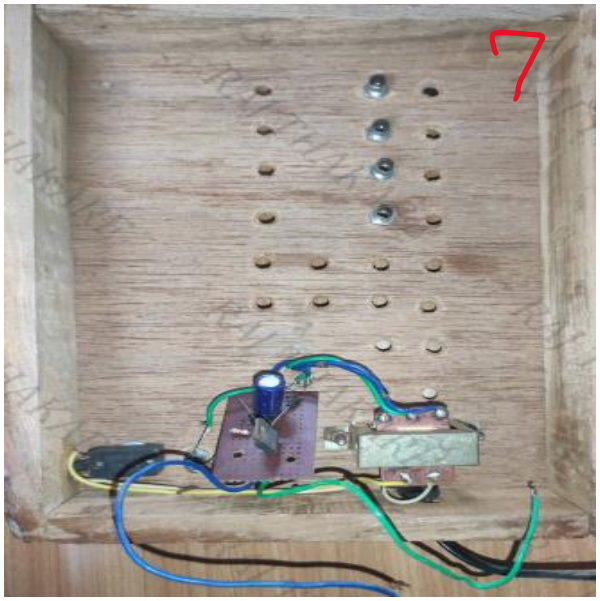
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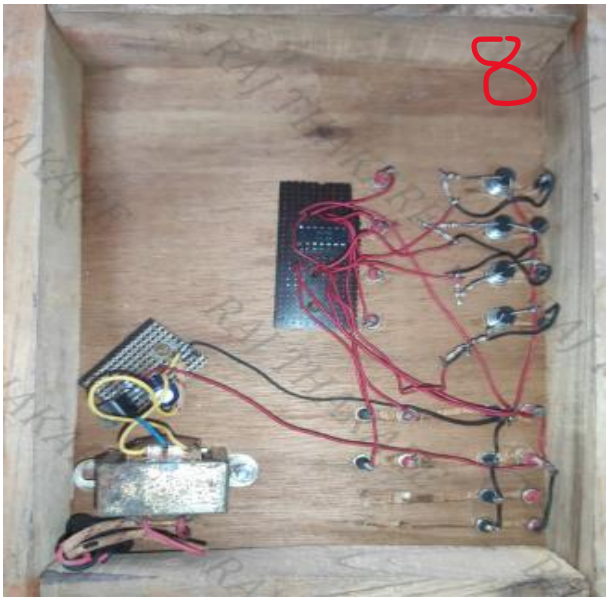
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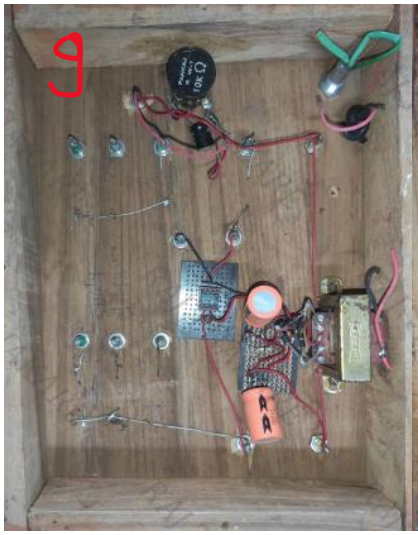
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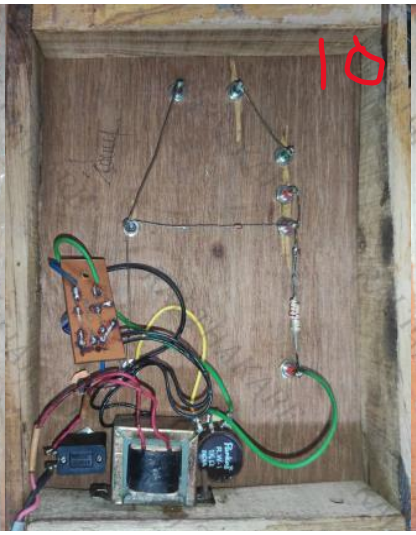
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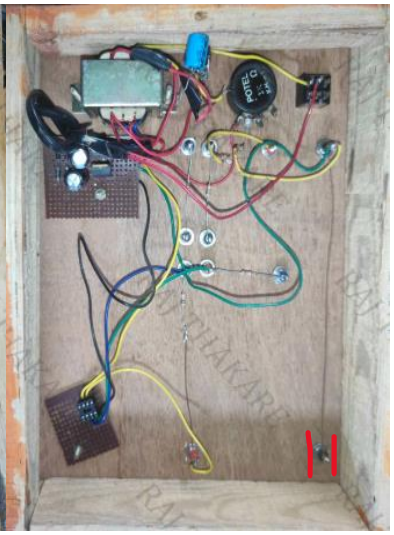
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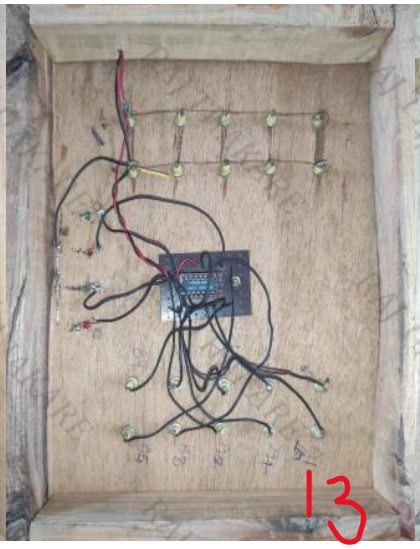
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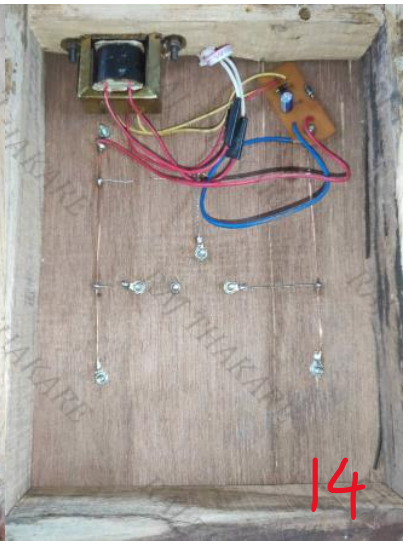
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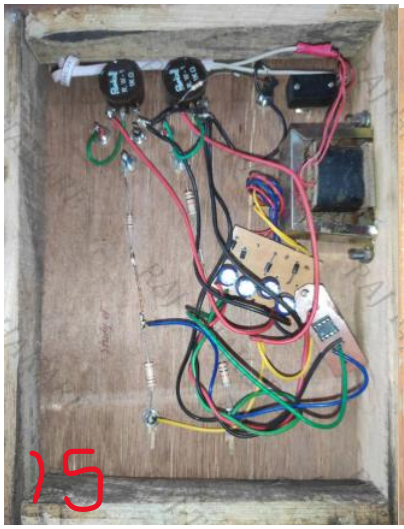
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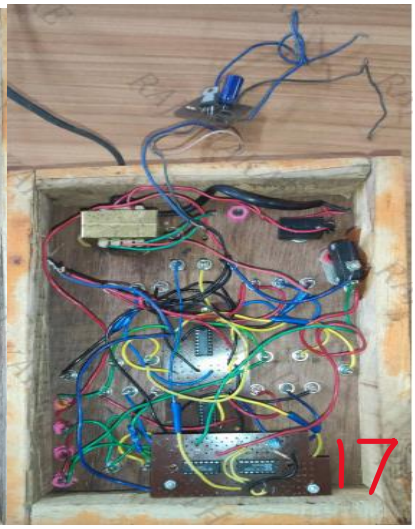
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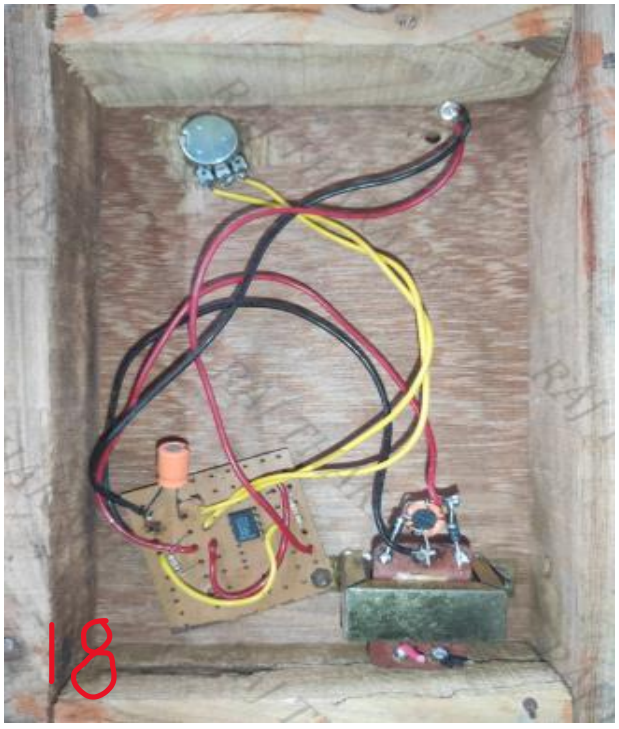
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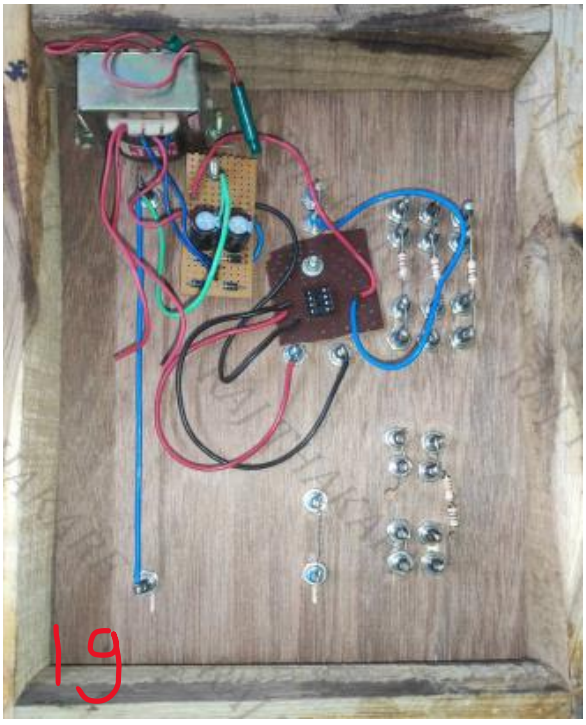
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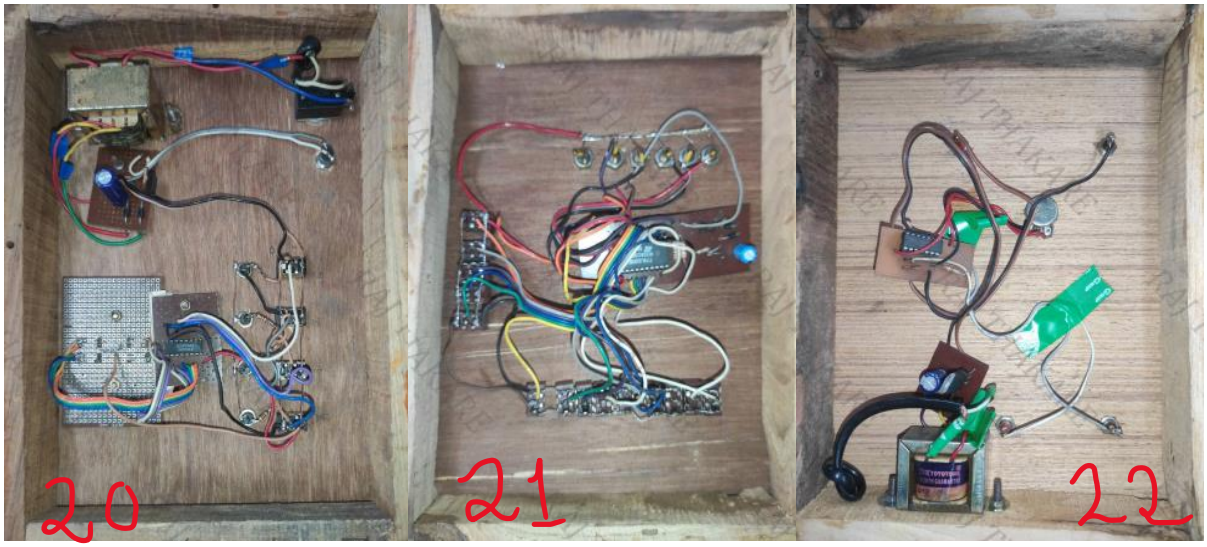
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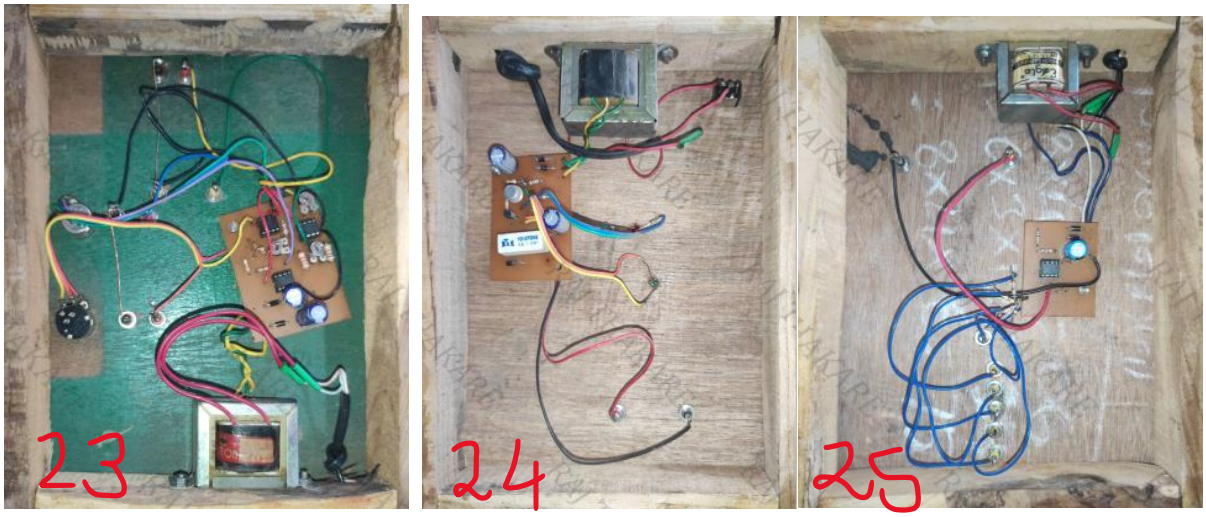
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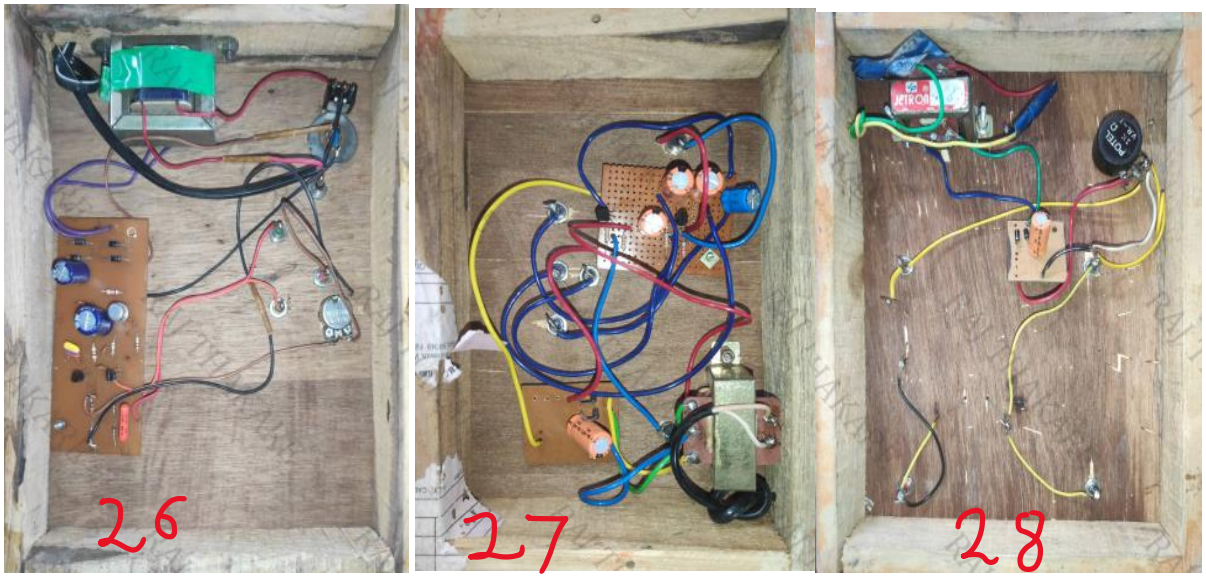
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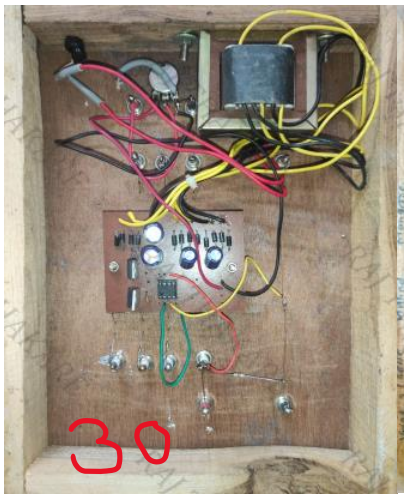


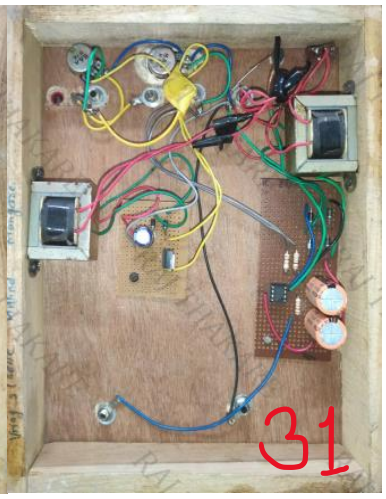


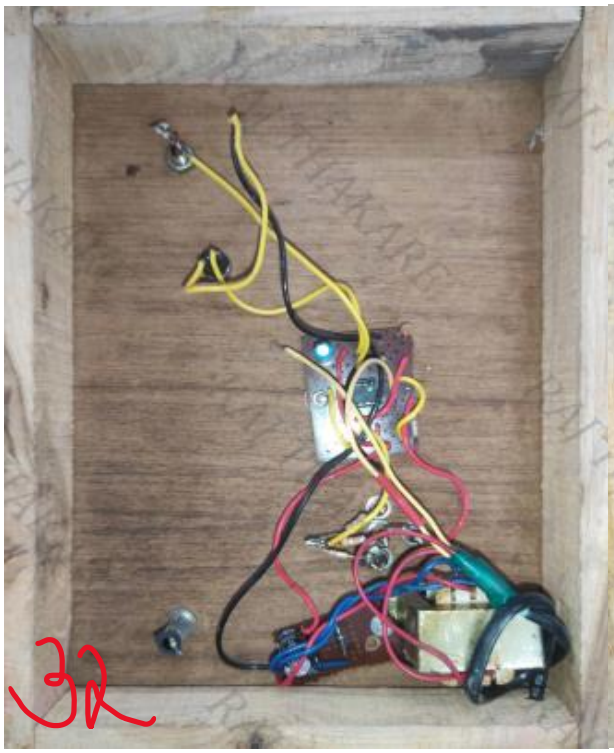


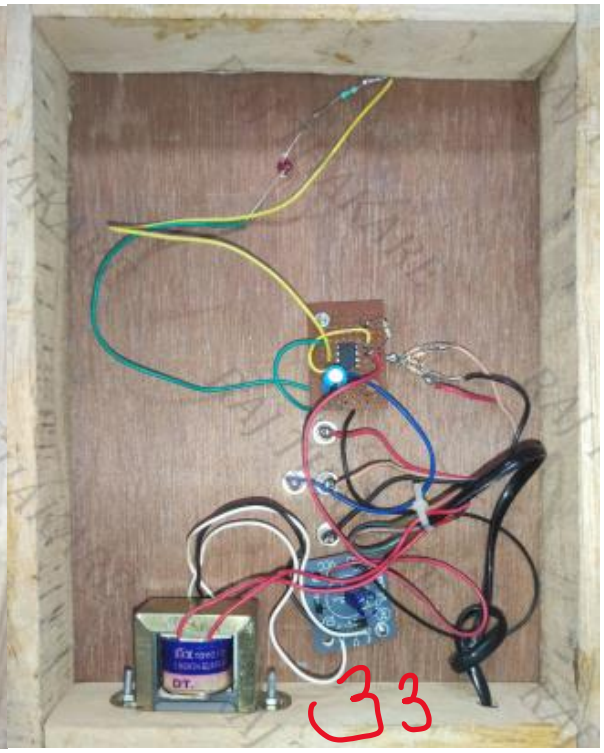


## LIST OF PCBs

| Sr No. | Title of PCB | Name of Students |
|---|---|---|
| 1 | Study of inverting and non-inverting amplifier | Angad Rathod |
| | | Dipak Ajmire |
| 2 | Study of bistable multivibrator | Pooja Barde |
| | | Sanjana Chatap |
| 3 | Study of arithmetic logic unit Chip 74181 | Shetal Jaiswal |
| | | Samiksha Petlewar |
| 4 | Study of JK and JKMS flip flop using NAND gate | Manish Dube |
| | | Mohan Butale |
| 5 | Study of operational amplifier as subtracter | Amreen Sattar |
| | | Sanobar Ali |

| | | |
|---|---|---|
| 6 | Study of operational amplifier as an adder | Neha Kudwe |
| | | Nayan Satpute |
| 7 | Study of Shift register | Devyani Rathod |
| | | Ahefuz sheikh |
| 8 | Study of Shift register | Danish Rehman |
| | | Namrata Jivtode |
| 9 | Study of operational amplifier | Kalyani Bhujbal |
| | | Chaitali Thakare |
| 10 | Study of Zener diode as a voltage regulator | Vaishnavi Sahu |
| | | Shrusthi Shahade |
| 11 | Study of OP-AMP inverting and non-inverting amplifier | Swamini Kulkarni |
| | | Anjikya Sakam |
| 12 | Study of 7 segment display | Rohan Makade |
| | | Vrushabh Kakade |
| 13 | Study of binary adder | Karan Bansod |
| | | Rushikesh Kamde |
| 14 | Study of transistor as a C E amplifier | Nikhil Hemake |
| | | Sumit Dighade |
| 15 | Study of operational amplifier as subtracter | Prachi Dukare |
| | | Sumit Devtale |
| 16 | Study of series pass transistor | Rahebar Shah |
| | | Shahid |
| 17 | Study of flip flops | Farheen |
| | | Sanobar |
| 18 | Study of IC 555 | Shivani Sundale |
| | | Bhuvneshwari Nimkar |
| 19 | Study of Universal board | Darshana Anjkar |
| | | Sakshi Durge |
| 20 | Study of IC 7447 | Vaishnavi Urkude |
| | | Minal Madavi |
| 21 | Study of arithmetic logic unit | Harsha Khoke |
| | | Anjali Futane |
| 22 | Study of square wave generator | Dipali Jaiswal |
| | | Ravi Raut |
| 23 | Study of multi waveform generator using IC 3140 | Achal Bonde |
| | | Sweta Thakare |
| 24 | Study of short circuit indicator | Mayuri Bhopate |
| | | Charushila Patil |
| 25 | Study of timer IC generator circuit | Snehal Milmile |
| | | Kalyani Vadurkar |
| 26 | Study of soil moisture metre | Sanchita Madavi |
| | | Vaishnavi Gulhane |
| 27 | Study of astable multivibrator | Shivani Purdake |
| | | Bhagyashri Hedau |
| 28 | Study of Zener diode as a voltage regulator | Mayuri Landge |
| | | Nutan Virutkar |

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| 29 | Study of monostable multivibrator using operational amplifier | Gauri Purohit |
| | | Pratiksha Bhoyar |
| 30 | Study of operational amplifier as an integrator | Amol Nehare |
| | | Mayuri Tiwane |
| 31 | Study of operational amplifier as an adder | Rajat Thakare |
| | | Shubham Bhosale |
| 32 | Study of monostable multivibrator using IC 555 | Shivani Dagwar |
| | | Vaibhav Pohekar |
| 33 | Study of astable multivibrator using IC 555 | Sarika Madavi |
| | | Akshay Yelkar |