A TECHNICAL REPORT ON
STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

HELD AT

MATH'S ELECTRICAL ENGINEERING

NO. 4, NIGER ROAD, TAIWO ISALE AREA, ILORIN, KWARA STATE, NIGERIA.

BY

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SUBMITTED TO

DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING TECHNOLOGY,

INSTITUTE OF TECHNOLOGY,

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CERTIFICATION

This is to certify that the report was based on SIWES experience gained by **ABDULMUTOLIB ABDULMUIZ OLASHENY** with matric. number **ND/23/EEE/PT/0018** of Department of Electrical Electronics Engineering Technology, Institute of Technology, Kwara State Polytechnic, Ilorin, Held at **MATH'S ELECTRICAL ENGINEERING, NO. 4, NIGER ROAD, TAIWO ISALE AREA, ILORIN, KWARA STATE, NIGERIA** as Part of the requirement of the course.

DEDICATION

This Technical report is dedicated to Almighty GOD, the Author of all Knowledge and it is equally dedicated my Parent (MR. AND MRS. ABDULMUTOLIB) and all my family members for their Spiritual, Moral and Financial Support throughout the period of this programme, wishing them long life and a healthy life (Amen).

ACKNOWLEDGEMENT

I acknowledge the Highest GOD for His power and mighty work of love in my life helping me through the years of my studies.

My sincere gratitude and appreciation to my Parent (MR. AND MRS. ABDULMUTOLIB) and all my other family for their moral and financial assistance at all times.

To all my lecturer goes this gratitude creating time to impact knowledge and making understand the importance of studying.

Finally, to my SIWES coordinator who has find time to help me out during the course of the programme.

PREFACE

The writing of this report was motivated by the experience gained during my SIWES attachment **MATH'S ELECTRICAL ENGINEERING, NO. 4, NIGER ROAD, TAIWO ISALE AREA, ILORIN, KWARA STATE, NIGERIA**, This report is meant to be a guideline to every student.

The purpose of writing this report is to relate the various area which I participated during the Industrial Training Attachment in my place of work. It is indeed very encouraging that all students to get acquainted with what is been done in class, so as to be familiar with what is been done in the practical field.

Finally, This Industrial Training Attachment is required for every student because it tends to backup and build the students physically, morally and educationally for the task after graduation.

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CHAPTER ONE

1.0 INTRODUCTION

It has been widely spoken and dispersed in the society that Tertiary Institution graduates are not practically oriented rather theoretical oriented owning to this; it has affected them both on the labour market and the society at large.

As a result of this, the Industrial Training Fund (ITF) came into existence which was founded by decree 47 of 1971 constitution introduced the Student Industrial Work Experience Scheme (SIWES) in 1973. Since its inception, SIWES has a suitable program which has been paving way for student in higher institution of learning to have practical knowledge of what they have been taught in their various institution of learning. It has since then been one of the pre-requisite for the polytechnic.

1.1 DEFINITION OF SIWES

The student industrial work experience scheme (SIWES) can be defined as a technical skill and acquisition of knowledge from the organization, industrial sector. It also serves as a motive that compliments the learning which student have acquired in the classroom or theoretically.

SIWES can be simply defined as a programme established and which is aimed at making a student practically oriented in their respective course of study for labour market and expose them to methods and techniques of handling future occurrence.

1.2 GENERAL OBJECTIVES OF SIWES

Objectives of the Students Industrial Work Experience Scheme include:

1. Provide an avenue for students to acquire industrial skills for experience during their course of study.
2. Expose students to work methods and techniques that may not be available during their course of study.
3. Bridging the gap between theory and practice by providing a platform to apply knowledge learnt in school to real work situations.
4. Enabling the easier and smoother transition from school by equipping students' with better contact for future work placement.
5. Introduce students to real work atmosphere so that they know what they would most likely meet once they graduate.

1.3 IMPORTANCE OF SIWES

All Nigerian students who study technology and science must know about SIWES. Partaking in SIWES has become a prerequisite for the award of diploma and degree certificates in many Nigerian Institutions according to the Nigerian Government Educational policy. Undergraduate students of the following disciplines are expected to be a part of the scheme: Natural sciences, Engineering and Technology, Education, Agriculture, Medical Sciences, Environmental, and pure and applied sciences.

CHAPTER TWO

2.0 HISTORICAL BACKGROUND OF THE ORGANIZATION.

Overview

Math's Electrical Engineering has a rich history that spans several decades, with significant contributions to the field of electrical engineering.

Early Developments

1. Founding: Math's Electrical Engineering was founded by the manager who sought to innovate and push the boundaries of electrical engineering.
2. Initial Focus: The company initially focused on developing electrical systems for industrial applications, including power generation and distribution.
3. Expansion: Over time, the company expanded its scope to include control systems, electronics, and telecommunications.

Key Milestones

1. Breakthroughs in Power Systems: Math's Electrical Engineering made significant breakthroughs in power systems, including the development of more efficient transmission and distribution systems.
2. Advances in Control Systems: The company developed innovative control systems for various industries, including manufacturing and processing.
3. Electronics and Telecommunications: Math's Electrical Engineering made significant contributions to the development of electronic circuits and communication networks.

Notable Projects

1. Large-Scale Power Generation: The company worked on several large-scale power generation projects, including hydroelectric and thermal power plants.
2. Industrial Automation: Math's Electrical Engineering developed automated systems for various industries, including manufacturing and processing.
3. Telecommunications Networks: The company designed and optimized communication networks for various applications, including wireless and wired networks.

Legacy and Impact

1. Innovative Solutions: Math's Electrical Engineering has provided innovative solutions to various challenges in the field of electrical engineering.
2. Industry Leadership: The company has established itself as a leader in the industry, with a reputation for excellence and innovation.

3. Future Directions: Math's Electrical Engineering continues to evolve and adapt to new technologies and challenges, with a focus on sustainable energy solutions and advanced automation systems.

MISSION AND VISION OF THE ORGANIZATION

Mission

Math's Electrical Engineering is dedicated to providing innovative electrical engineering solutions that exceed our clients' expectations. We strive to deliver high-quality services, foster long-term relationships, and contribute to the advancement of the electrical engineering field.

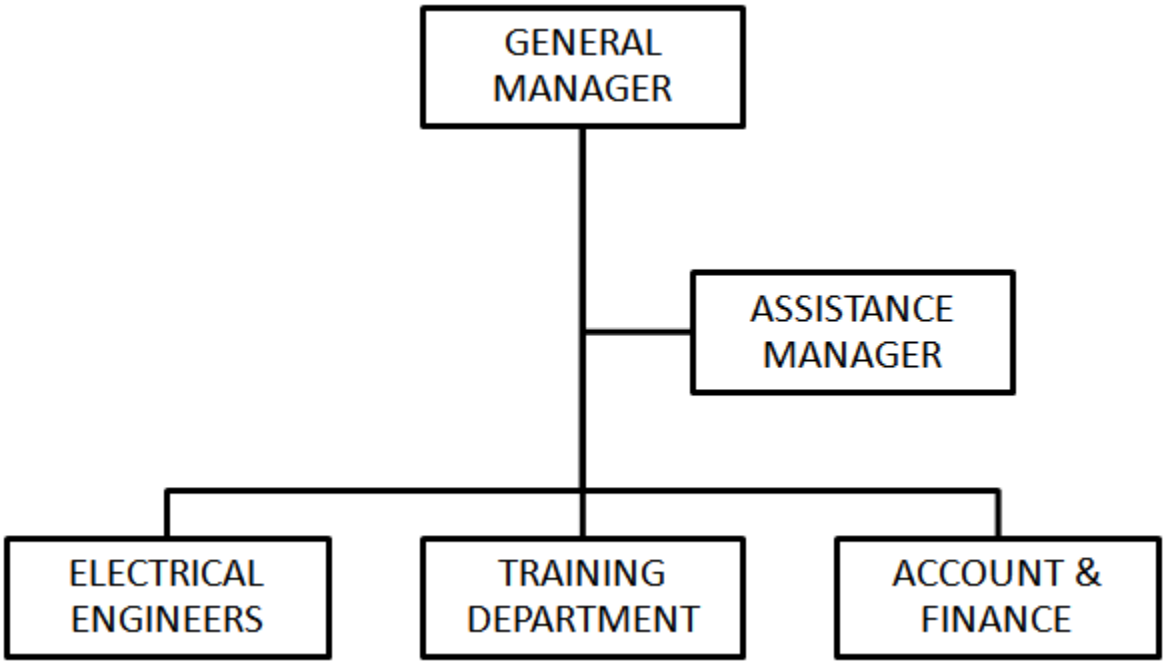
Vision:

Our vision at Math's Electrical Engineering is to be a leading provider of electrical engineering solutions, recognized for our expertise, innovation, and commitment to excellence. We aim to shape the future of electrical engineering and make a positive impact on our clients and the communities we serve..

2.1 DEPARTMENTS AT THE ORGANIZATION

1. Design and Development: Responsible for designing and developing electrical systems, including power generation, transmission, and distribution.
2. Project Management: Oversees project planning, execution, and delivery, ensuring that projects are completed on time, within budget, and to the required quality standards.
3. Research and Development: Focuses on researching and developing new technologies and innovations in electrical engineering.
4. Testing and Quality Assurance: Conducts testing and quality assurance activities to ensure that electrical systems and components meet the required standards.
5. Sales and Marketing: Responsible for business development, sales, and marketing of Math's Electrical Engineering's services and products.
6. Operations and Maintenance: Oversees the operation and maintenance of electrical systems, including troubleshooting and repair.
7. Finance and Administration: Handles financial management, human resources, and administrative tasks.

2.2 ORGANOGRAM OF THE ORGANIZATION.



CHAPTER THREE

3.0 INFORMATION ON RELEVANCE TRAINING EXPERIENCE

Introduction to 20KVA Alternator

A 20KVA alternator is a type of electrical generator that converts mechanical energy into electrical energy. It is a crucial component in various applications, including power generation, industrial, and commercial settings.

Key Features

1. Power Rating: The 20KVA alternator has a power rating of 20 kilovolt-amperes, which is a measure of its electrical output capacity.
2. Alternating Current (AC): The alternator produces alternating current (AC) electricity, which is suitable for most industrial and commercial applications.
3. Three-Phase Output: The 20KVA alternator typically has a three-phase output, which provides a more efficient and balanced electrical supply.
4. Voltage Regulation: The alternator is equipped with a voltage regulator, which ensures that the output voltage remains within a specified range, even under varying load conditions.

Applications

1. Power Generation: The 20KVA alternator is commonly used in power generation applications, such as diesel generator sets, gas turbine generators, and hydroelectric power plants.
2. Industrial Applications: The alternator is used in various industrial applications, including manufacturing, processing, and construction.
3. Commercial Applications: The 20KVA alternator is also used in commercial applications, such as office buildings, shopping centers, and hospitals.

Benefits

1. Reliable Power Supply: The 20KVA alternator provides a reliable power supply, which is essential for critical applications.
2. Efficient Operation: The alternator is designed to operate efficiently, which reduces energy losses and minimizes operating costs.
3. Low Maintenance: The 20KVA alternator requires minimal maintenance, which reduces downtime and extends its lifespan.

Technical Specifications

1. Power Rating: 20KVA
2. Voltage: 400/230V (three-phase)
3. Frequency: 50Hz

4. Speed: 1500rpm
5. Efficiency: 90%.

Introduction to Welding a Coil

Welding a coil is a process that involves joining two or more metal coils together using heat and pressure. This technique is commonly used in various industries, including manufacturing, construction, and automotive.

Types of Welding Processes

1. Shielded Metal Arc Welding (SMAW): Also known as stick welding, this process uses a consumable electrode covered in flux to protect the arc and molten metal from atmospheric gases.
2. Gas Metal Arc Welding (GMAW): Also known as MIG (Metal Inert Gas) welding, this process uses a continuous wire electrode and an inert gas to shield the arc.
3. Gas Tungsten Arc Welding (GTAW): Also known as TIG (Tungsten Inert Gas) welding, this process uses a non-consumable tungsten electrode and an inert gas to shield the arc.
4. Flux Cored Arc Welding (FCAW): This process uses a special electrode that produces a flux to shield the arc and molten metal.

Equipment and Materials

1. Welding Machine: A device that produces the electrical current needed for welding.
2. Electrodes: Consumable or non-consumable rods or wires used to create the arc.
3. Shielding Gases: Inert gases used to protect the arc and molten metal from atmospheric gases.
4. Coils: Metal coils to be welded together.

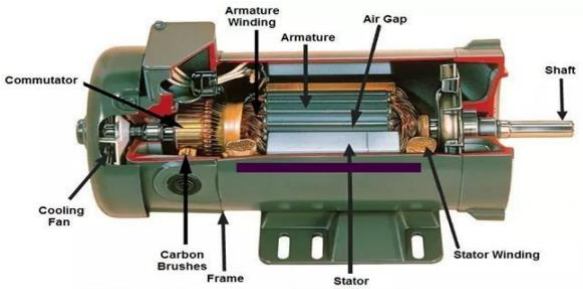
Applications

1. Manufacturing: Welding coils are used in the production of various products, such as appliances, machinery, and equipment.
2. Construction: Welding coils are used in the construction of buildings, bridges, and other infrastructure projects.
3. Automotive: Welding coils are used in the manufacture of vehicles and automotive parts.

Benefits

1. Strong and Durable Joints: Welding coils produce strong and durable joints that can withstand various loads and stresses.

2. High Efficiency: Welding coils can be welded quickly and efficiently, reducing production time and costs.
3. Versatility: Welding coils can be used in various applications and industries.
Safety Precautions
1. Personal Protective Equipment (PPE): Wear PPE, such as gloves, safety glasses, and a welding helmet, to protect against heat, sparks, and UV radiation.
2. Ventilation: Ensure good ventilation to prevent inhalation of fumes and gases.
3. Fire Safety: Take precautions to prevent fires and burns.



Basic Parts of the Motor

Introduction to Coil Pitch
Coil pitch is a critical parameter in the design and construction of electrical coils, such as those used in motors, generators, and transformers. It refers to the distance between the centerlines of two adjacent coil turns.
Coil pitch is typically measured in inches or millimeters and is calculated as the distance between the centerlines of two adjacent coil turns, divided by the number of turns per pole.
Types of Coil Pitch
1. Full Pitch: A full pitch coil has a pitch equal to the pole pitch, which is the distance between the centerlines of two adjacent poles.
2. Short Pitch: A short pitch coil has a pitch less than the pole pitch, which can result in a more compact design and improved performance.
3. Long Pitch: A long pitch coil has a pitch greater than the pole pitch, which can result in a less compact design and reduced performance.
Factors Affecting Coil Pitch
1. Number of Turns: The number of turns per pole affects the coil pitch, with more turns resulting in a shorter pitch.
2. Wire Diameter: The diameter of the wire used in the coil affects the coil pitch, with larger diameters resulting in a longer pitch.

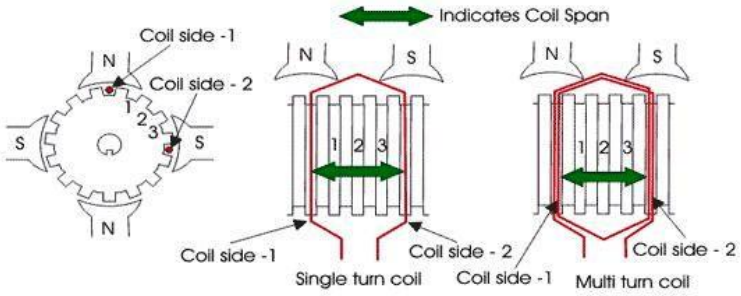
3. Insulation Thickness: The thickness of the insulation between coil turns affects the coil pitch, with thicker insulation resulting in a longer pitch.

Applications

1. Motors: Coil pitch is critical in motor design, as it affects the motor's performance, efficiency, and reliability.
2. Generators: Coil pitch is also important in generator design, as it affects the generator's output voltage, current, and efficiency.
3. Transformers: Coil pitch is used in transformer design to optimize performance, efficiency, and reliability.

Benefits

1. Improved Performance: Optimizing coil pitch can result in improved performance, efficiency, and reliability.
2. Reduced Size: Short pitch coils can result in more compact designs, reducing the overall size of the device.



Introduction to Armature Structure

The armature structure is a critical component of an electric motor or generator, playing a crucial role in the conversion of electrical energy into mechanical energy or vice versa. The armature is the moving part of the motor or generator, and its structure is designed to optimize performance, efficiency, and reliability.

Components of Armature Structure

1. Armature Core: The armature core is the magnetic core of the armature, typically made of laminated steel or other ferromagnetic materials.
2. Armature Windings: The armature windings are the coils of wire that carry the current in the armature, typically made of copper or aluminum.
3. Armature Shaft: The armature shaft is the rotating shaft that connects the armature to the motor or generator, typically made of steel or other strong materials.

4. Bearings: The bearings are the components that support the armature shaft and allow it to rotate smoothly.

Types of Armature Structures

1. Drum Armature: A drum armature is a type of armature structure that consists of a cylindrical drum with windings and a core.
2. Disc Armature: A disc armature is a type of armature structure that consists of a flat disc with windings and a core.
3. Ring Armature: A ring armature is a type of armature structure that consists of a ring-shaped armature with windings and a core.

Applications

1. Electric Motors: Armature structures are used in electric motors, including DC motors, AC motors, and synchronous motors.
2. Generators: Armature structures are used in generators, including DC generators and AC generators.
3. Other Applications: Armature structures are also used in other applications, such as actuators, servomotors, and stepper motors.

Benefits

1. High Efficiency: Armature structures are designed to optimize efficiency, reducing energy losses and improving performance.
2. High Power Density: Armature structures are designed to handle high power densities, making them suitable for a wide range of applications.

Introduction to Winding of an Electric Motor

The winding of an electric motor is a critical component that plays a crucial role in the motor's operation. The winding is responsible for converting electrical energy into mechanical energy, which is then used to power various devices and machines.

Types of Windings

1. Stator Winding: The stator winding is the stationary winding in the motor, which is connected to the power source.
2. Rotor Winding: The rotor winding is the rotating winding in the motor, which is connected to the shaft.
3. Armature Winding: The armature winding is the winding that carries the current in the motor, which is typically the rotor winding.
4. Field Winding: The field winding is the winding that produces the magnetic field in the motor, which is typically the stator winding.

Winding Configurations

1. Single-Phase Winding: A single-phase winding is a winding that has only one phase, which is typically used in small motors.
2. Three-Phase Winding: A three-phase winding is a winding that has three phases, which is typically used in larger motors.
3. Delta Winding: A delta winding is a winding that is connected in a delta configuration, which is typically used in three-phase motors.
4. Wye Winding: A wye winding is a winding that is connected in a wye configuration, which is typically used in three-phase motors.

Winding Materials

1. Copper Wire: Copper wire is the most common material used for windings, due to its high conductivity and durability.
2. Aluminum Wire: Aluminum wire is also used for windings, particularly in smaller motors, due to its lower cost and weight.
3. Insulation Materials: Insulation materials, such as varnish or enamel, are used to insulate the windings and prevent electrical shorts.

Applications

1. Industrial Applications: Electric motors are widely used in industrial applications, such as manufacturing, processing, and construction.
2. Commercial Applications: Electric motors are used in commercial applications, such as office buildings, shopping centers, and hospitals.
3. Residential Applications: Electric motors are used in residential applications, such as homes and apartments.

Benefits

1. Efficient Energy Conversion: Electric motors are efficient at converting electrical energy into mechanical energy.
2. High Power Density: Electric motors have a high power density, making them suitable for a wide range of applications.
3. Low Maintenance: Electric motors require low maintenance, making them a reliable choice for many applications.

CHAPTER FOUR

4.0 EXPERIENCE GAINED TO STUDENT FIELD

After the SIWES program I gained how to operate in an Electrical Engineering Company and a bit experience on how to manage in any Electrical Engineering Field in general.

Furthermore, I was introduced to other section, where I was taught how to engage to different works, such as follows:

a. I learn about the meaning, features, and its components of a 20 KVA Alternator.

b. I participated in loosing 20 KVA Alternator, removing the bamboos, removing of wire and how to re-couple it back.

c. I learn about how to loose and note binding tape for connection side and opposite side for the traced of connection in coil.

d. I watched and participated in the process of winding of an electric motor.

e. I also taught about the rewind the armature, how to bind the wires with the binding tape to tightened the wires.

f. Learning about the process in knocking nails on a straight plane plank, wind the wires with clean small cloth inorder to make it straight.

4.1. INTERPERSONAL RELATIONSHIP WITH THE ORGANIZATION

During my stay at the **MATH'S ELECTRICAL ENGINEERING, ILORIN, KWARA STATE**, I enjoy every bit of it until the last hour of my departure as a SIWES student.

Starting with the Manager and to all the Engineers, and my supervisor showed love and care to me like parent to his son.

My cordial relationship with the instructor in my section helps me a lot in the sense that, he never relent in answering my question both theoretical and practical.

CHAPTER FIVE
SUMMARY AND RECOMMENDATIONS

5.0 PROBLEM/CONCLUSION

Even though there was a little hardship especially when the work of the organization is pilled up on me and payment was very meager for transportation.

The SIWES program at the organization give me a wonderful and everlasting experience. The program is readily helped to bridge the gap between theoretical aspect and practical work in the industrial training.

5.1 RECOMMENDATION TO THE ORGANIZATION

Since the SIWES cannot be overemphasized in all aspects in the recent times, I therefore think it is standard enough for any student of Electrical Electronics Engineering to be giving opportunity after school in this organization to serve and possible employed if he/she deem it.

5.2 SUGGESTION FOR IMPROVEMENT OF THE SCHEME

Base on the experience and knowledge acquired at the course of the SIWES training, I hereby give the following recommendation base on my observations;

- Proper orientation should be given to the students by the Polytechnic before they go on SIWES.
- The placement letter should be given to students early enough so as to avoid attachment in irrelevant organization.
- Institution should ensure that students are attached at relevant establishment for effective training, experience and exposure.
- Government, ITF and the Institution should ensure that students do not pay any amount of money before accepted in any organization. This organization should be sensitized on the objective of SIWES training and the need why they should not collect money before accepting students.