TECHNICAL REPORT

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (S.I.W.E.S)

UNDERTAKEN AT

EASY SOLUTION TECHNICAL WORKS

Adewole Area Along Henry George Hotels, Ilorin Kwara State

COMPILED AND COMPLETED BY

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SUBMITTED TO THE DEPARTMENT OF ELECTRICAL ELECTRONICS ENGINEERING
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DEDICATION

I dedicate this write up to Almighty Allah who made this program a success for me and my lovely parents for their support and words of encouragement rendered to me during my industrial training, also the entire staff of standard focus venture for accepting me with arms wide open undoubtedly. May Allah and reward you all. AMEN

ACKNOWLEDGEMENT

To God be the glory for allowing me through a very successful training. I will like to appreciate and acknowledge my industry based supervisor, Engineer Tunji and Engineer Abdulrasheed for taking their time in explaining everything I found difficult to understand through my training. i specially appreciate the field engineer (Engineer Tunji) and all staff of standard focus venture, also to all my institution lecturers in the department of electrical electronics engineering. i will like to specially appreciate my parents for their love kindness and disciplinary support. I thank God for the lives of my friends and fellow IT student for helping me through a stress free industrial training.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

SIWES stands for acronym for Student Industrial Work Experience Scheme. The Student Industrial Work-Experience Scheme (SIWES) is a planned and supervised training intervention based on stated and specific learning and career objectives, geared towards developing the occupational competencies of the participants. It is a programme required to be undertaken by all students of tertiary institutions in Nigeria pursuing courses in "specialized engineering, technical, business, applied sciences and applied arts and Mass Communication". The Federal Government on 8th October 1971 established the industrial training (ITF) to acquaint the students on the industrial work method. The SIWES which is a subsidiary formed in 1973 was initiated to improve the students' technical abilities to expose them to industrial culture thereby getting the acquainted with the role to play towards the technological advancement of the nation. It creates an avenue on environment in which the students are exposed to areas of their various disciplines to enhance their mental and creative minds the aspects of Practical. It is therefore a practical aspect of the academic work, which students may not have opportunity to carry out throughout their stay in the higher institutions.

1.2 IMPORTANCE AND OBJECTIVES OF SIWES

The Students Industrial Work Experience Scheme (SIWES) is the accepted skills training programme, which forms part of the approved Minimum Academic Standards in the various degree programmes for all the Nigerian universities. It is an effort to bridge the gap existing between theory and practice of engineering and technology, science, agriculture, medial, management and other professional educational and Mass Communications programmes in the Nigerian tertiary institutions. It is aimed at exposing students to machines and equipment, professional work methods and ways of safe-guarding the work areas and workers in industries and other organization.

1.3 OBJECTIVES OF SIWES

i. Specifically, the objectives of the student's industrial work experience scheme are to
ii. Prepare students for the work situation they are likely to meet after graduation.
iii. Provide an avenue for students in the Nigerian Universities to acquire industrial skills and their course of study.
iv. Make the transition from the university to the world of work easier, and thus enhance students' contacts for later job placements.
v. Enlist and strengthen employers' involvement in the entire educational process of preparing university graduates for employment in industry.
vi. Provide students with an opportunity to apply their theoretical knowledge in real work situation, thereby bridging the gap between university work and actual practices; and expose students to work methods and techniques in handling equipment and machinery that may not be available in the universities.

1.4 IMPORTANCE OF SIWES

i. It provides students with an opportunity to apply their theoretical knowledge in real life situations.
ii. It exposes students to more practical work methods and techniques. iii.) It strengthens links between the universities employers, and industrial training fund (ITF). iv). It also prepares the after graduation. students for the labour

CHAPTER TWO

2.0 LOCATION AND BRIEF HISTORY OF EASY SOLUTION TECHNICAL WORKS

Easy Solution Technical Works at Adewole Area, Along Henry George Hotels, Ilorin, Kwara State. The company is situated in a prime industrial area that allows easy access to both suppliers and clients. The company's address is [insert address], providing a centralized location for operations and customer service.

Brief History: Easy Solution Technical Works was founded with the vision of providing high-quality, reliable technical solutions in the field of electrical systems, engineering services, etc. Since its founding, the company has grown significantly, earning a reputation for excellence in delivering a variety of services, including electrical installations, maintenance, repairs, etc.

Starting as a small local business, Easy Solution Technical Works expanded its operations by investing in state-of-the-art equipment, skilled labor, and cutting-edge technologies. Over the years, the company has successfully completed numerous projects, gaining the trust and satisfaction of both corporate and individual clients. Today, it stands as one of the leading players in its industry, known for its commitment to safety, innovation, and customer satisfaction.

2.1 Objectives of Easy Solution Technical Works (Hypothetical)

1. **Deliver High-Quality Technical Solutions** – Provide top-notch electrical and mechanical services that meet industry standards.
2. **Ensure Customer Satisfaction** – Prioritize customer needs by offering reliable and efficient technical solutions.
3. **Promote Safety and Compliance** – Adhere to national and international safety regulations in all operations.
4. **Expand Technical Expertise** – Continuously improve services through training, innovation, and the use of advanced technology.
5. **Develop a Skilled Workforce** – Train and empower employees to become industry leaders in technical services.
6. **Enhance Technological Advancement** – Invest in modern tools and equipment to improve service efficiency and reliability.
7. **Encourage Innovation and Creativity** – Continuously develop new solutions and approaches to meet evolving industry demands.
8. **Improve Energy Efficiency** – Offer solutions that help clients reduce energy consumption and operational costs.
9. **Maintain High Standards of Professionalism** – Uphold integrity, transparency, and ethical business practices in all operations.
10. **Ensure Timely Project Delivery** – Complete projects within agreed timelines while maintaining quality and safety.
11. **Expand Service Offerings** – Diversify into new areas such as renewable energy, home automation, and industrial automation.
12. **Provide Excellent After-Sales Support** – Offer maintenance, troubleshooting, and customer assistance even after project completion.

2.2 Organizational Structure of Easy Solution Technical Works (Hypothetical)

1. Executive Leadership

- **Chief Executive Officer (CEO) / Managing Director** – Oversees overall business operations, strategic direction, and company growth.
- **General Manager (GM)** – Manages day-to-day operations and ensures alignment with company goals.

2. Administrative & Support Team

- **Human Resources (HR) Manager** – Handles recruitment, staff training, and employee relations.
- **Finance & Accounts Manager** – Manages financial planning, budgeting, and payroll.
- **Customer Service & Relations Officer** – Ensures customer satisfaction and handles inquiries.

3. Technical & Operations Team

- **Operations Manager** – Supervises technical projects and ensures efficiency.
- **Electrical Engineers / Technicians** – Specialize in wiring, electrical installations, and maintenance.
- **Mechanical Engineers / Technicians** – Handle machine repairs, HVAC systems, and industrial maintenance.
- **Field Supervisors** – Monitor on-site work and ensure compliance with safety regulations.
- **Quality Control & Safety Officer** – Ensures adherence to quality standards and workplace safety.

4. Logistics & Procurement Team

- **Procurement Officer** – Sources materials, tools, and equipment needed for projects.
- **Logistics Manager** – Manages transportation and delivery of technical equipment.

2.3 Departments/Units of Easy Solution Technical Works & Their Functions

1. Administrative & Management Department

📌 **Function:**

- Oversees company operations and strategic decision-making.
- Manages company policies, planning, and organizational growth.
- Handles human resources, recruitment, and employee welfare.

2. Electrical Engineering Department

📌 **Function:**

- Handles installation, maintenance, and repair of electrical systems.
- Ensures compliance with electrical safety standards.
- Conducts wiring, power distribution, and electrical fault troubleshooting.

3. Mechanical Engineering Department

📌 **Function:**

- Maintains and repairs mechanical systems and industrial machinery.
- Provides HVAC (Heating, Ventilation, and Air Conditioning) solutions.
- Conducts metal fabrication, welding, and structural works.

4. Operations & Project Management Department -

📌 Function:

- Manages technical projects and service delivery.
- Ensures timely completion of projects within budget.
- Coordinates fieldwork, logistics, and workforce scheduling.

5. Quality Control & Safety Unit -

📌 Function:

- Ensures that all projects meet industry quality and safety standards.
- Conducts inspections, testing, and compliance assessments.
- Implements workplace health and safety protocols.

6. Customer Service & Client Relations Department -

📌 Function:

- Handles customer inquiries, complaints, and feedback.
- Provides after-sales support and maintenance services.
- Ensures customer satisfaction and relationship management.

7. Finance & Accounts Department -

📌 Function:

- Manages company financial records, payroll, and budgeting.
- Handles invoicing, taxation, and financial reporting.
- Ensures financial compliance and cost control.

9. Procurement & Logistics Unit -

📌 Function:

- Sources and purchases materials, equipment, and spare parts.
- Ensures timely supply chain management for ongoing projects.
- Manages transportation and inventory control.

10. Research & Development (R&D) Unit -

📌 Function:

- Innovates and improves technical solutions and services.
- Stays updated with industry trends and new technologies.
- Develops sustainable and energy-efficient solutions.

CHAPTER THREE & FOUR

EXPERIENCE GAINED

3.0 ACTIVITIES DURING SIWES

The activities carried out during the program are as follows;
Practical exploration of some workshop hand tools and machineries
TOOLS

1. Reciprocating saw
2. Vacuum pump
3. Refrigerant pressure gauge
4. Insulated screwdrivers
1. Pipe wrenches and Pliers
2. Multimeter
3. Hack saw
4. Pcychometer
5. Manifold Guage
6. Gas welding tools

3.1.1 HAC (HEATING VENTILATION AND AIR-CONDITIONING)

HAC which means (Heating Ventilation and Air-Conditioning) is about indoor and environmental comfort. HVAC system design is a sub-discipline of Mechanical Engineering, based on the principles of thermodynamics, fluid mechanics and heat transfer. Refrigeration is sometimes added to the field's abbreviation as HVACR.

HVAC is important in the design of industrial and office buildings, from medium to large, such as skyscrapers, high-rises, factories, etc, where safe and healthy building conditions are regulated with respect to temperature and humidity, using the fresh air from outdoors.

The HVAC industry is a worldwide enterprise, with roles including operation and maintenance, system design and construction, the equipment manufacturing and sales, as well as education and research.

3.2 AIR CONDITIONING SYSTEMS

INTRODUCTION

Air conditioning often referred to as A/C, Air-condition, or AC is the process of altering the properties of air (primarily temperature and humidity) to more comfortable conditions, typically with the aim of distributing the conditioned air to an occupied space such as a building or a vehicle to improve thermal comfort and indoor air quality. In common use, an air conditioner is a device that removes heat from the air inside a building or vehicle, thus lowering the air temperature. The cooling is typically achieved through a refrigeration cycle, but sometimes evaporation or free cooling is used. In the most general sense, air conditioning can refer to any form of technology that modifies the condition of air (heating, cooling, (de- humidification, cleaning, ventilation, or air movement). However, in construction, such a complete system of heating, ventilation, and air conditioning is referred to as heating, ventilation, and air conditioning HVAC

- REFREGERATION SYSTEM

The term refrigeration refers to the process of removing heat from an enclosed space or substance for the purpose of lowering the temperature. Refrigeration can be considered an artificial, or human-made, cooling method.

- COMMERCIAL REFRIGERATION

Refrigeration refers to the process by which energy, in the form of heat, is removed from a low-temperature medium and transferred to a high-temperature medium.

This work of energy transfer is traditionally driven by mechanical means, but can also be driven by heat, magnetism, electricity, laser, or other means. Refrigeration has many applications, including household refrigerators, industrial freezers, cryogenics, and air conditioning. Heat pumps may use the heat output of the refrigeration process, and also may be designed to be reversible, but are otherwise similar to air conditioning units.

Refrigeration has had a large impact on industry, lifestyle, agriculture, and settlement patterns. The idea of preserving food dates back to the ancient Roman empire. Mechanical refrigeration has rapidly evolved in the last century, from ice harvesting to temperature-controlled rail cars. The introduction of refrigerated rail cars contributed to the westward expansion of the United States, allowing settlement in areas that were not on main transport channels such as rivers, harbors, or valley trails. Settlements were also developing in infertile parts of the country, filled with newly discovered natural resources.

These new settlement patterns sparked the building of large cities which are able to thrive in areas that were otherwise thought to be inhospitable, such as Houston, Texas, and Las Vegas, Nevada. In most developed countries, cities are heavily dependent upon refrigeration in supermarkets in order to obtain their food for daily consumption. The increase in food sources has led to a larger concentration of agricultural sales coming from a smaller percentage of farms. Farms today have a much larger output per person in comparison to the late 1800s. This has resulted in new food sources available to entire populations, which has had a large impact on the nutrition of society

TYPES OF AIR CONDIONER

- Window air condition
- Split air condition
- Packaged air condition
- Central Air Conditioner

3.3 MAJOR COMPONENTS IN REFRIGERATION AND AIR-CONDITION

3.3.1 COMPRESSOR

A compressor is a device that increases the pressure of a substance (usually a gas) by reducing the volume of the substance. Compressors are used in many applications, most of which involve increasing the pressure inside a gas storage container.

3.3.2 FUNCTIONS OF THE COMPRESSOR

The purpose of the compressor is to circulate the refrigerant in the system under pressure, this concentrates the heat it contains. At the compressor, the low pressure gas is changed to high pressure gas.

3.3.3 TYPES OF COMRESSORS THAT ARE USED IN REFREGERATION

- Reciprocating compressors.
- Rotary vane compressors.
- Scroll compressors.
- Screw compressors.
- Centrifugal

Compressor

3.4 CONDENSER

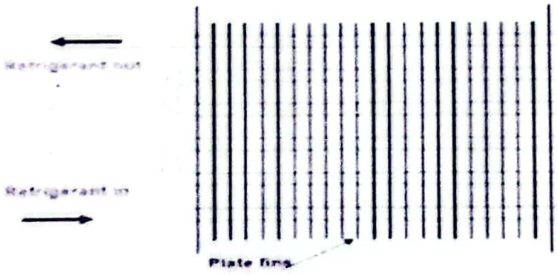
A condenser is a heat exchanger used to condense a gaseous substance into a liquid state through cooling. In so doing, the latent heat is released by the substance and transferred to the surrounding environment. Condensers are used for efficient heat rejection in many industrial systems. Condensers can be made according to numerous designs, and come in many sizes ranging from rather small (hand-held) to very large (industrial-scale units used in plant processes). For example, a refrigerator uses a condenser to get rid of heat extracted from the interior of the unit to the outside air.

The condenser coil of refrigerator

Condensers are used in air conditioning, industrial chemical processes such as distillation, steam power plants and other heat-exchange systems. Use of cooling water or surrounding air as the coolant is common in many condensers.

MAIN TYPES OF CONENSERS

- Air-cooled condensers
- Water-cooled condensers
- Combined air and water-cooled



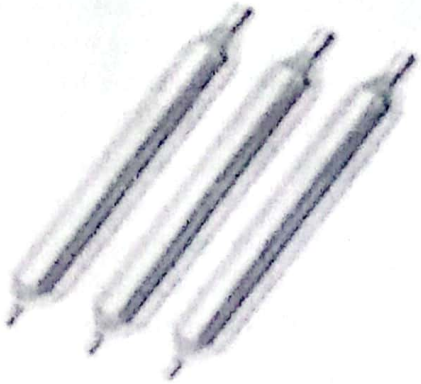
Condenser

3.5 DRYER

The purpose of a refrigerant drier is to ensure the refrigerant system stays clean and dry. It removes contaminants including moisture, dirt, acid and solder flux, beads and filings. Whenever the refrigerant system is opened for repair or to replace a component, always replace the filter drier.

When replacing the liquid line filter drier, make sure the replacement size equals the size of your system and refrigerant line connections.

Also, make sure the replacement drier is compatible with the system refrigerant.



3.6 CAPILLARY TUBE

A tube with a calibrated inside diameter and length used to control the flow of refrigerant. It also connects the remote bulb to the thermostatic expansion valve, and/or the remote bulb to the thermostat.

3.7 EVAPORATOR

Evaporator is one of the main parts of the cooling system. Evaporator absorbs heat from the area that needs cooling. As the refrigerant in the system occupies this area, it turns into a gas.

The heat is transferred through the surface of the refrigerant tubes in the system which causes the temperature around the evaporator to drop.

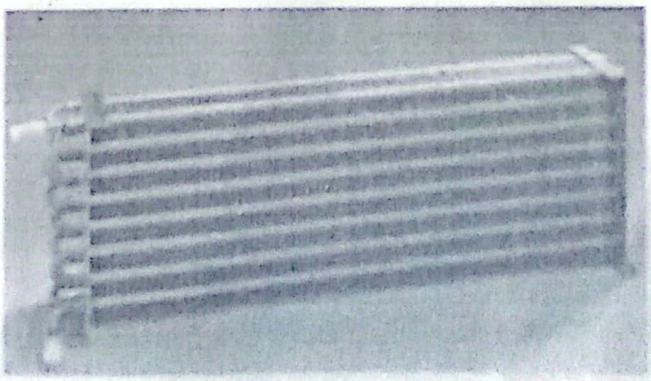
3.7.1 TYPES OF EVAPORATORS

-Bare Tube Evaporators,

-Plate Surface Evaporators,

-Finned Tube Evaporators, and.

-Shell and Tube Evaporators



Evaporator

3.8 VACUUM PUMP

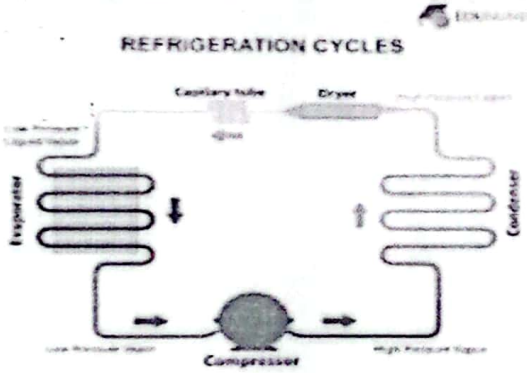
A Vacuum Pump is a type of industrial pump that removes gas molecules or air particles from a restricted area to create a pressure difference and a partial vacuum. Depending on the application and pressure requirements, vacuum pumps are made using a number of technologies.

Sizing a vacuum pump system to the correct settings is critical for maximum efficiency. Mechanical machinery can be powered or assisted by a vacuum. A vacuum is created in hybrid and diesel automobiles by a pump positioned on the engine (usually on the camshaft). Instead, in petrol engines, a vacuum is formed as a result of the engine's operation and the flow restriction imposed by the throttle plate, but an electrically powered vacuum pump can reinforce it to increase braking assistance or reduce fuel consumption.

VACUUM PUMP

3.9 REFREGIRATION CYCLE

Refrigeration cycle is a cycle of mechanical system in which transmission of heat flow from one place at a lower temperature (the source) to another place at a higher temperature (the sink or heat sink) by continuously circulating, evaporating, and condensing a fixed supply of refrigerant in a closed system.



REFRIGERATION CYCLE

3.10 HOW TO INSTALL A SPLIT SYSTEM AIR CONDITIONER

The steps are as follows:-

1. Setting up The indoor unit Select an unobstructed Location on your interior wall to mount the indoor unit.

- Secure the mounting Plate SDAY to The interio wall. -Drill a 3 in (7.6cm) hole Through

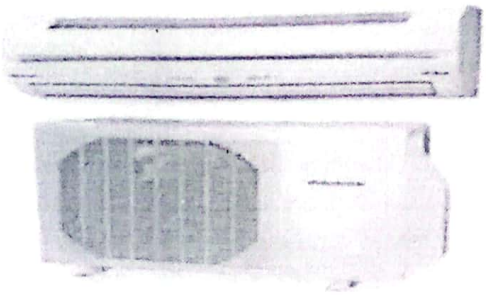
  The wall so you can food The Pipes outside. - Check the electrical connection on the indoor unit.
- Run The Pipes and cables Th The hole in the hote wall, The Connect Them to the unit.
- Secure The
- Secure the indoor unit to the mounting plate.

2 installing the outdoor condense

- Position The outdoor unit away from the any heavily trafficked, dusty, or hot areas
- Lay a concrete Pad on the ground.
  Secure the outdoor unit on top of The Concrete Pad.
- Check the electrical wiring in the outdoor unit
- Connect the Piping and cable to the outdoor unit.

3 Completing the Project

- Bleed the air and humidity from the refrigerant Circuit.
- Affix the Piping to the wall with clamps.
- Seal up the hole in the wall using expanding Polyurethane foam.
- Turn on The unit and enjoy the cool air.



Air Conditioner set

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

The SIWES programmed has contributed positively to my exposure and training in the field of Electrical ad Electronics Engineering. It has also helped me to put into Practice the know gained in classroom with the actual industry experience. Also to develop a critical and realistic approach to problem with their solution in the Electrical field.

RECOMMENDATION:

In view of my experience during my industrial training, the following recommendations are made to the students, university, industrial training fund (I.T.F) and the companies:

- Students should personally ensure that they get a good placement for the program in time to commence and gain the best from the six-months.
  Students should make sure that the entire period for the attachment is completed before bowing out of the program.
  Also, student should have a focused mind and interest as it will help them get the maximum knowledge attainable from the company attached to.
- Not all students have the opportunity of getting good industrial training placement, so the university should ensure they establish good relationships with companies, firms and Organizations capable of assisting in the SIWES program on a yearly basis thereby helping the less privileged students.
  On the part of I.T.F, Student supervision should also be intensified to make the program more effective.
- The firms should ensure that a well-structured program for the period of training is spelt out and be seriously adhered to, so that students can benefit.

Also, the firms should see their role in the program as one of contributing to the nation's educational system and not as a means of exploiting I.T students as cheap labor.