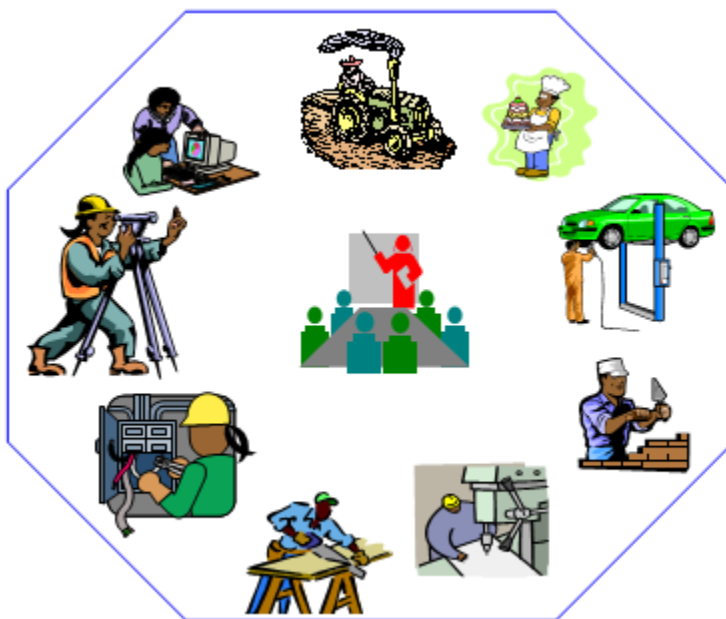




# **BASIC HOME/OFFICE ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING Level-II**

**Based on May 2011 Version 2 Occupational standards and  
October 2019 Curriculum**



**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code: EEL HOS2 M09 LO (1-5) LG (31-35)**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

October 2019  
Adama, Ethiopia

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# Learning Guide-31

## LO 1: Analyze the problem



<b>Instruction Sheet</b>	<b>Learning Guide #31</b>
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Evaluating Issues/concerns
- Identifying Possible cause
- Developing causes of problem

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to:**

- Evaluate Issues/concerns
- Identify Possible cause
- Develop causes of problem

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3
4. Accomplish the “Self-check 1, Self-check t 2, and Self-check 3 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet
6. Do the “LAP test”



<b>Information Sheet-1</b>	<b>Evaluating Issues/concerns</b>
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### 1.1. Evaluate Issues/concerns

Being able to make decisions and solve problems effectively is a necessary and vital part of the job for every technician. This module is designed to improve your decision-making skills. It addresses:

- The decision-making process
- Decision-making style
- Attributes of an effective decision maker

Decision making and problem solving are critically important skill areas for technician. As a professional, your ability to identify current and potential problems and to make sound, timely decisions before and during an emergency can affect problems of the electronic equipment. Your decisions can impact the ability of problem happening.

Good decision-making skills are one of your most critical assets as an emergency management professional. This course will help you develop those skills.

#### **Problem Solving Versus Decision Making**

Decision making and problem solving are two processes that people consider whenever resolving a problem. They follow the same technique in order to come up with a solution but this does not mean that decision making is similar with problem solving.

While decision making primarily refers to the process that involves identifying alternative solutions and choosing an appropriate alternative,

Problem solving on the other hand deals with a much bigger process that mainly begins with defining the problem and ends with an assessment on the usefulness of the chosen solution.

#### **Steps of the Decision-Making Process**

1. Identify the major problem
2. Determine major causes of the problem
3. Determine potential solutions
4. Evaluate the potential solutions
5. Select the best solution
6. Implement the solution
7. Verify the solution is correct

- **Positive aspects of group decision-making**

- ✓ The total sum of the group's knowledge is greater
- ✓ Groups generally develop a much wider range of alternatives.

✓ Participation increases the acceptability of the decision to the group.

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- ✓ Group members understand better why a decision was made.
- **Negative aspects of a group decision-making**
  - ✓ More time is needed
  - ✓ One individual or dominant group (sometimes based on gender) may control the group
  - ✓ Pressures to conform may inhibit group members from responding
  - ✓ Competition can become overly intense among group members
  - ✓ Groups tend to accept the first potentially positive alternative
  - ✓ The decision may be a compromise that may be unsatisfactory to some group members.

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: I. WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Decision making and problem solving are critically important skill areas for technician.
2. Your decisions can not impact the ability of problem happening.

**Direction: II: For each of the following questions choose the best answer**

1. Which one is Negative aspects of a group decision-making
  - A. The total sum of the group's knowledge is greater
  - B. Groups generally develop a much wider range of alternative
  - C. Group members understand better why a decision was made
  - D. More time is needed
2. Which one is positive aspects of a group decision-making
  - A. Participation increases the acceptability of the decision to the group.
  - B. The total sum of the group's knowledge is greater
  - C. Groups tend to accept the first potentially positive alternative
  - D. Competition can become overly intense among group members



<b>Information Sheet- 2</b>	Identifying Possible cause
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### 2.1. Identify possible cause

All machinery, no matter how well made, will from time to time need to be repaired.

Down time can be very expensive, not only the cost of the repair but also the cost of lost production. Some technicians use the shotgun approach to troubleshooting. This is where the technician replaces components until they finally replace the faulty one and the machine is running again. This approach usually results in greater down time and replacing multiple components unnecessarily.

To expertly troubleshoot electrical, pneumatic or mechanical problems the technician must solve the problem by replacing only the defective components and do it in the least amount of time. One of the most important factors in doing this is using the correct approach. An expert troubleshooter uses a system or approach that allows them to logically and systematically analyze a system and determine exactly what is wrong.

The approach described here is a logical, systematic approach called the 5 Step Troubleshooting Approach. It is a proven process that is highly effective and reliable in helping to solve problems with industrial equipment.

This approach differs from other troubleshooting procedures in that it does not tell you step by step how to troubleshoot a particular problem. It is more of a thinking process that is used to analyze a machine's behavior and determine what component or components are responsible for the faulty operation. This approach is general in nature allowing it to be used on any type of system problem.

In fact, the principles covered in this approach can be applied to many other types of problem solving scenarios, not just machinery.

The 5 Step Troubleshooting Approach consists of the following:

Preparation

Step 1 Observation

Step 2 Define Problem Area

Step 3 Identify Possible Causes

Step 4 Determine most Probable Cause

Step 5 Test and repair

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Let's take a look at these in more detail.

## **Preparation**

Before you begin to troubleshoot any piece of equipment, you must be familiar with safety rules and procedures for working on electrical equipment.

These rules and procedures govern the methods you can use to troubleshoot equipment and must be followed while troubleshooting.

Next, you need to gather information regarding the equipment and the problem. Be sure you understand how the equipment is designed to operate. It is much easier to analyze faulty operation when you know how it should operate. Operation or equipment manuals and drawings are great sources of information and are helpful to have available. If there are equipment history records, you should review them to see if there are any recurring problems. You should also have on-hand any documentation describing the problem.

## **Step 1 – Observe**

Most problems provide obvious clues as to their cause. Through careful observation and a little bit of reasoning, most problems can be identified as to the actual component with very little testing. When observing malfunctioning equipment, look for visual signs of mechanical damage such as indications of impact, chafed wires, and loose Components, parts lying in the bottom of the electrical cabinet or on the floor. Look for Signs of overheating, especially on wiring, relay coils, and printed circuit boards.

Don't forget to use your other senses when inspecting equipment. The smell of burnt insulation is something you won't miss. Listening to the sound of the equipment Operating may give you a clue to where the problem is located. Checking the temperature of components can also help find problems but be careful while doing this, some components may move unexpectedly or be hot enough to burn you.

Pay particular attention to areas that were identified either by past history or by the person that reported the problem. A note of caution here! Do not let these mislead you, past problems are just that – past problems, they are not necessarily the problem you are looking for now. Also, do not take reported problems as fact; always check for yourself if possible. The person reporting the problem may not have described it properly or may have

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made their own incorrect assumptions.

When faced with equipment which is not functioning properly you should

Be sure you understand how the equipment is designed to operate. It makes much easier to analyze faulty operation when you know how it should operate.

The condition of the equipment as found you should look at the state of the relays (energized or not), which lamps are lit, which auxiliary equipment is energized or running etc. This is the best time to give the equipment a thorough inspection (using all your senses).

Look for signs of mechanical damage, overheating, unusual sounds, smells etc. Test the operation of the equipment including all of its features. Make note of

any feature that is not operating properly. Make sure you observe these operations very carefully. This can give you a lot of valuable information regarding all parts of the equipment.

### Step 2 – Define Problem Area

It is at this stage that you apply logic and reasoning to your observations to determine the problem area of the malfunctioning equipment. Often times when equipment malfunctions, certain parts of the equipment will work properly while others not.

The key is to use your observations (from step 1) to rule out parts of the equipment or circuitry that are operating properly and not contributing to the cause of the malfunction. You should continue to do this until you are left with only the part(s) that if faulty, could cause the symptoms that the equipment is experiencing.

To help you define the problem area you should have a parts manual and schematic diagrams in addition to your noted observations.

Starting with the whole machine as the problem area, take each noted observation and ask yourself "what does this tell me about the machine's operation?" If an observation indicates that a section of the machine appears to be operating properly, you can then eliminate it from the problem area. As you eliminate each part of the machine from the

Problem area, make sure to identify them in your notes. This will help you keep track of all your information.

### Step 3 – Identify Possible Causes

Once the problem area(s) have been defined, it is necessary to identify all the possible causes of the malfunction. This typically involves every component in the problem area(s). It is necessary to list

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it occurring. Use your initial observations to help you do this. During the next step you will eliminate those which are not likely to happen.

#### **Step 4 – Determine Most Probable Cause**

Once the list of possible causes has been made, it is then necessary to prioritize each item as to the probability of it being the cause of the malfunction. The following are some rules of thumb when prioritizing possible causes.

Although it could be possible for two components to fail at the same time, it is not very likely. Start by looking for one faulty component as the culprit.

The following list shows the order in which you should check components based on the probability of them being defective:

First look for components which burn out or have a tendency to wear out, i.e.

mechanical switches, fuses, relay contacts, or light bulbs. (Remember, that in the case of fuses, they burn out for a reason. You should find out why before replacing them.)

The next most likely causes of failure are coils, motors, transformers and other devices with windings. These usually generate heat and, with time, can malfunction.

Connections should be your third choice, especially screw type or bolted type. Over time these can loosen and cause a high resistance. In some cases this resistance will cause overheating and eventually will burn open. Connections on equipment that is subject to vibration are especially prone to coming loose. Finally, what you should look for is defective wiring. Pay particular attention to areas where the wire insulation could be damaged causing short circuits.

Don't rule out incorrect wiring, especially on a piece of equipment you are not very familiar with. **Step 5**

#### **– Test and Repair**

Testing industrial equipment can be hazardous. The electrical energy contained in many circuits can be enough to injure or kill. Make sure you follow all your companies' safety precautions, rules and procedures while troubleshooting.

Once you have determined the most probable cause, you must either prove it to be the problem or rule it out. This can sometimes be done by careful inspection however, in many cases the fault will be such that you cannot identify the problem component by observation and analysis alone. In these circumstances, test instruments can be used to help narrow the problem area and identify the problem

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There are many types of test instruments used for troubleshooting. Some are specialized instruments designed to measure various behaviors of specific equipment, while others like the multi-meter are more general in nature and can be used on most electrical equipment. A typical multi-meter can measure AC and DC Voltages, Resistance, and Current.

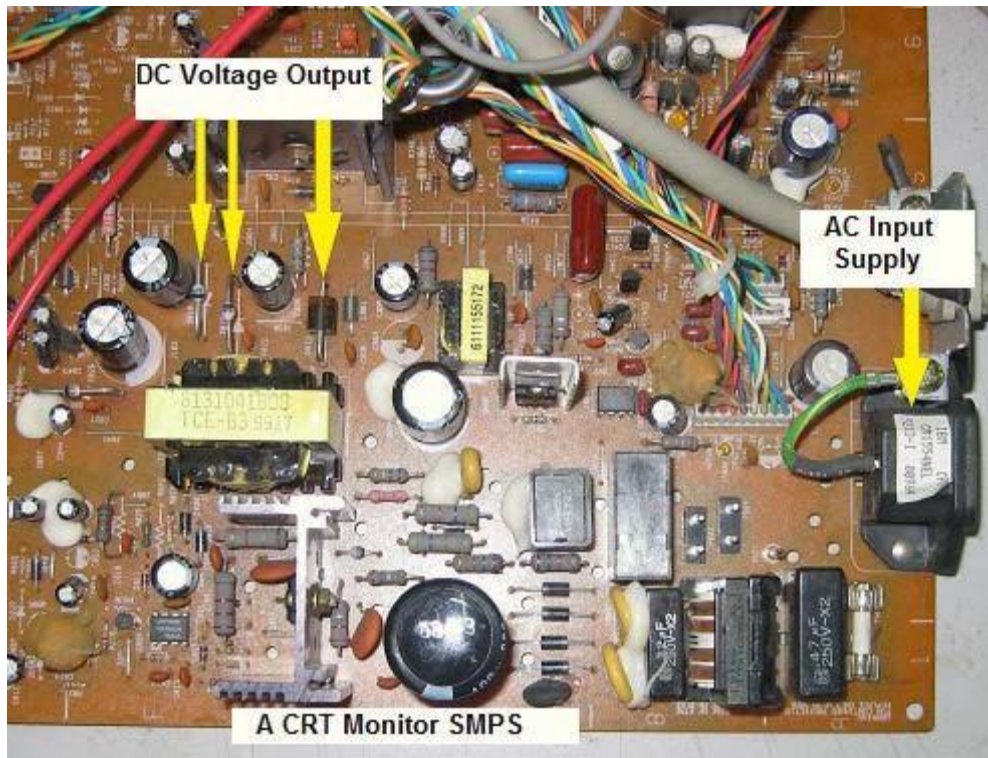
A very important rule when taking meter readings is to predict what the meter will read before taking the reading. Use the circuit schematic to determine what the meter will read if the circuit is operating normally. If the reading is anything other than your predicted value, you know that this part of the circuit is being affected by the fault.

Depending on the machine and type of fault, the problem area as defined by your observations, can include a large area of the machine. This will create a very large list of possible and probable causes. Under such circumstances, you could use a “divide and eliminate” testing approach to eliminate parts of the machine from the problem area. The result of each test provides information to help you reduce the size of the problem area until the defective component is identified.

Once you have determined the cause of the faulty operation of the machine you can proceed to replace the defective component. Be sure all of the power is locked out and you follow all safety procedures before replacing the component.

After replacing the component, you must test operate all features of the machine to be sure you have replaced the proper component and that there are no other problems with the machine. It can be very embarrassing to tell the operator that you have repaired the problem only to have him find another problem with the machine just after you leave.

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**Fig.2.1 CRT Monitor SMPS (switch mode power supply)**



Written Test

Self Check #1

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Observation is looking for visual signs only.
2. Look for signs of mechanical damage, overheating, unusual sounds, smells etc. is good inspection.
3. Follow up is trying to determine the reason for the malfunction.
4. Identifying possible causes is list every fault which could cause the problem no matter how remote the possibility of it occurring.
5. Replacing components and test operate all features of the machine is called test and repair.

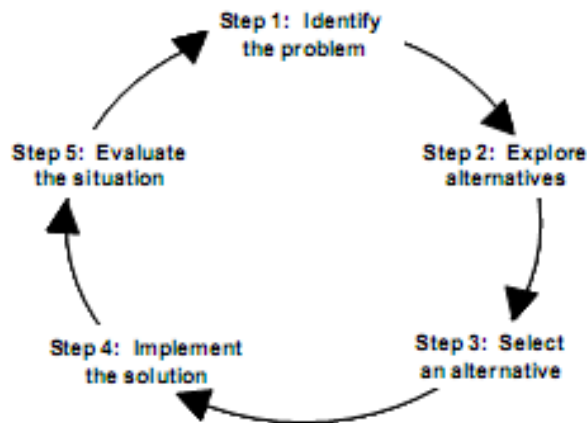


Information Sheet-3	Developing causes of problem
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### 3.1. Developing causes of problem

There are many different decision-making/problem-solving models that you can use. The five-step model shown below has proven effective in emergency situations.

When using this model, each step may be completed quickly, but every step must be considered. It is not necessary to document each step, but it is important to think through every step.



#### Step 1. Identify the Problem

N.B before starting solving the problem understands the faults by deferent means.

Problem identification is undoubtfully the most important and the most difficult step in the process. All Subsequent steps will be based on how you define and assess the problem at hand.

#### What Is a “Problem”?

A problem is a situation or condition of people or the organization that will in the future, and that is considered undesirable.

#### tep 2. Explore Alternatives

The second step in the decision-making process is to explore alternative

Solutions to the problem identified in Step 1. This step really consists of two parts:

Generating alternatives.

Evaluating alternatives.

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## Techniques for Generating Alternatives

There are three ways to generate alternatives.

### ***Brainstorming***

- can be done individually or in a group. Brainstorming requires an environment in which the participants (individuals or group members) are free to —think out loud. No evaluation of ideas is permitted so as to encourage the free flow of creative ideas. The ideas are recorded. When the specified time period ends, then evaluation of the ideas begins.

### ***Surveys***

- Economically tap the ideas of a large group of respondents. Surveys present respondents with the problem and a series of alternative solutions.

### ***Discussion groups***

- Should consist of those who are directly involved in decision making. In generating alternatives, the group members should:

Be comprehensive.

Avoid initial judgments (as in brainstorming).

Focus on the problem, not on the personalities of the people involved in the decision- making process.

## **Step 3. Select an Alternative**

The third step in the problem-solving model is to select one of the alternatives explored in Step 2 for implementation. After you have evaluated each alternative, one should stand out as coming closest to solving the problem with the most advantages and fewest disadvantages. Carefully consider how the solution will be implemented before selecting an alternative.

## **Step 4. Implement the Solution**

## **Step 5. Evaluate the solution**

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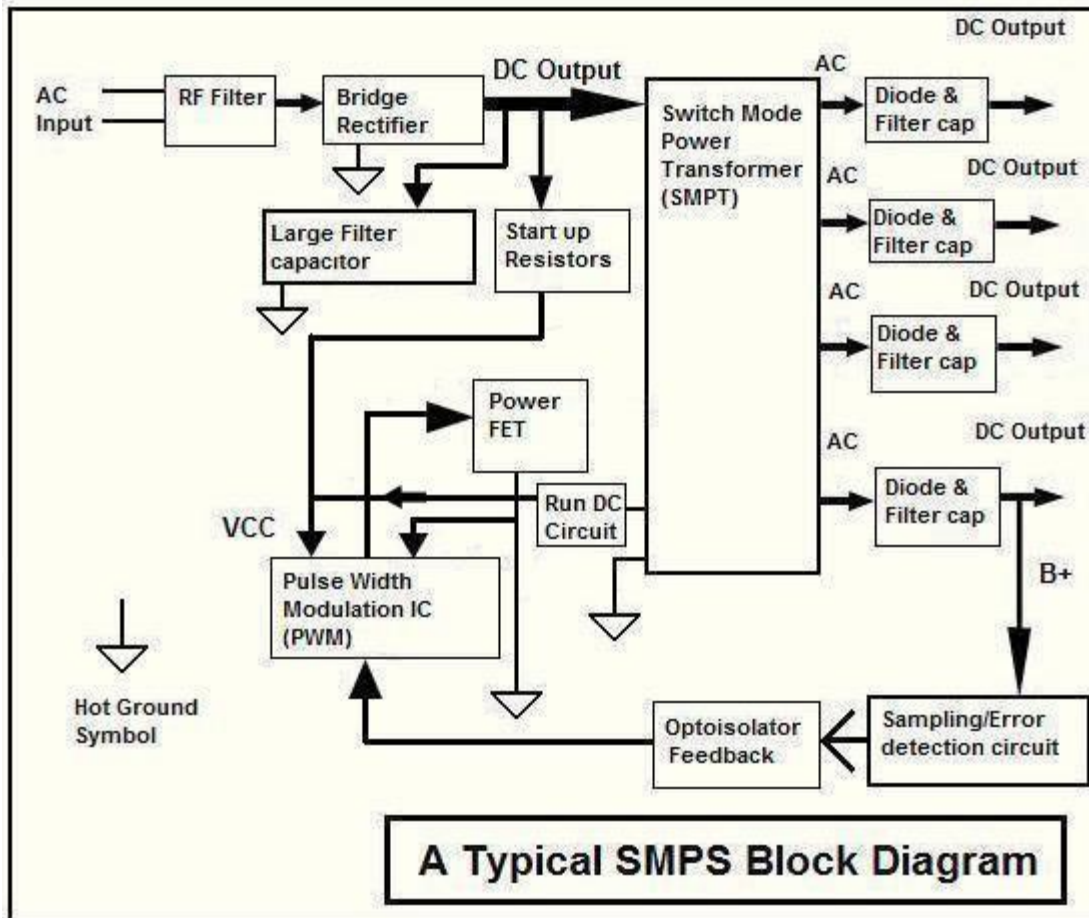


Figure – 3.1 Typical SMPS Block Diagram

Written Test	Self Check #1
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. In generating alternatives, the group members should not avoid initial judgments. 2. Brainstorming requires an environment in which the participants are free to think out loud.

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<b>Operation Sheet- 1</b>	<b>Evaluating Issues/concerns</b>
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Techniques for evaluating issues/concerns

Step 1 .asses all issues/concerns

Step 2. Classify the issues/concerns accordingly

Step 3. put appropriate parameters

Step 4. Evaluate issues/concerns.

<b>Operation Sheet- 2</b>	<b>Identifying Possible cause</b>
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Techniques for identifying Possible cause

Step 1. List out possible causes

Step 2. Put appropriate parameters

Step 3. Select the most probable cause

Step 4. Identify possible cause

<b>Operation Sheet- 3</b>	<b>Developing causes of problem</b>
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Techniques for developing causes of problem

Step1. Understand normal operations of the equipment

Step 2. List the probable cause that makes abnormal the equipment

Step 3. Classify the cause

Step 4. Develop the cause of problem.





<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks .

**Task 1:** Evaluating Issues/concerns

Task 2: Identifying Possible cause

Task 2: Developing causes of problem

References: **Electronic Repair Website**

- 1) [www.ElectronicRepairGuide.com](http://www.ElectronicRepairGuide.com)
- 2) [www.Anatekcorp.com](http://www.Anatekcorp.com)
- 3) [www.Epanorama.net/links/repair.html](http://www.Epanorama.net/links/repair.html)



# **BASIC HOME/OFFICE ELECTRICAL/ ELECTRONICS EQUIPMENT SERVICING**

**Level-II**

# **Learning Guide-32**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code :EEL HOS2 M09 -2 LG-32**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

**LO 2: Identify possible solutions**

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**Instruction Sheet 1****Learning Guide # 32**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Considering safety and operating procedures
- Considering Strengths and weaknesses
- Corrective action

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Consider safety and operating procedures
- Consider Strengths and weaknesses
- Corrective action

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 5.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
4. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
5. Do the “LAP test” (if you are ready).



## Information Sheet-1

Considering safety and operating procedures

### 2.1. Electrical safety

All systems which use electrical energy have the potential to cause serious harm.

#### Injuries caused by electric current

Electric current can pass through the body when the body becomes part of the electric circuit.

Electric current flowing through the body can cause:

- Electric shock
- Electrocution
- Burns caused by electric current and arc flash

The severity of the injury depends on:

- Amount of current flowing through the body.
- Path of the current through the body.
- Length of time the body is in the circuit.
- The voltage of the current.

A person receiving a shock caused by grabbing a bare conductor can generally release himself when the current passing through his body is less than 15 mA.

The high resistance of a dry skin is rapidly broken down by a high voltage. High voltages can cause violent muscular contraction, often so severe that the victim is thrown clear.

#### An electric shock may injure the human body in several ways:

Contraction of chest muscles causing interference with breathing, leading to asphyxiation.

Temporary paralysis of the nerve center leading to breathing failure.

Ventricular fibrillation which is an irregular movement of heart muscles leading to failure of blood circulation. The heart cannot spontaneously recover, causing death.

Hemorrhage and destruction of nerves, tissues and muscles, caused mainly by heat.

When electricity passes through the body, it can interfere with the normal electrical signals between the brain and other body systems.

Arc flashes result in intense heat causing burns or ignition of other materials.



Contact with high voltage can cause burns in internal tissues.

### **Precautions to be taken while working with electricity**

Check for damage on power plugs, wire and other electrical fittings. If found damaged, repair or replace damaged equipment immediately.

Keep electrical wires of equipment away from hot surfaces to prevent damage of the insulation.

Do not lay electric wires along passage. It can be a trip hazard. Further contact with sharp

edges can cause damage to insulation leading to short circuit.

Know the location of switches/circuit breaker boxes for use in case of an emergency.

All circuit breakers in the switch board must be clearly labeled for easy identification.

Access to circuit breakers must not be blocked.

Extension cords must be used only to supply power temporarily.

Do not handle electrical equipment when hands, feet or body are wet or perspiring, or when standing on a wet floor.

Consider all floors as conductive unless covered with insulating matting of suitable type for electrical work.

Whenever possible, use only one hand when working on circuits or control devices.

Do not wear rings, metallic watchbands, chains etc. when working with electrical equipment.

### **Precautions to be taken while using power tools**

before connecting the tool to the power supply, switch the tool OFF.

Disconnect power supply before making adjustments.

the tool must be properly grounded with a 3-wire cord with a 3-prong plug. Use double insulated tools wherever possible.

Do not use electrical tools in wet conditions or damp locations unless the tool is Connected to an Earth Leakage Circuit Breaker

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## Personal Protective Equipment

Personal Protective Equipment is an integral part of any employer's safety program. OSHA has determined that PPE although a good way to protect employees, should be used as a last line of defense and its important to understand the limitations of PPE in the workplace.

### PPE for the Head

Employees must wear nonconductive head protection helmet wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts .

### PPE for the Eyes & Face

Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

When working on energized parts, the possibility of arc flash exists and the employee must be protected. Dangers could include heat, flying hazards and molten metal, therefore the PPE must be durable, non-conductive, heat resistant and provide deflection qualities

### PPE for the Body (FR Clothing)

As we learned earlier, employees working in areas where there are potential electrical hazards must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed [see 1910.335(a)(1)(i)]. This would include flame resistant (FR) clothing.

During an arc flash event the temperatures can reach an excess of 35,000 degrees. Even at temperatures much lower, typical daily wear clothing would do little to protect the worker from being seriously injured. In fact, at such high temperatures, the clothing will ignite and continue to burn on the body well after the arc flash has dissipated. This is where serious injury and death often occur

### PPE for the Hands (Gloves)

Since employees working on energized electrical parts are using their hands, obviously that part of the body (hands and arms) are most susceptible to electric shock and must be protected. Insulating gloves provide an excellent means of protecting the workers from accidental electrical contact. To be effective the insulating gloves must have high insulation qualities, while also being comfortable, durable and flexible.

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**Written Test**

**Self Check #1**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: For each of the following questions choose the best answer**

1. Electric current flowing through the body can cause:  
A. electric shock  
B. paralyzes  
C. Burns caused  
D. All
  
2. Which of the following is not PPE?  
A. Glove  
B. T shirt  
C. helmet  
D. goggle



<b>Information Sheet-2</b>	Considering Strengths and weaknesses
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**a. Strengths and weaknesses**

Requires to study the process to detail

Dedicate sufficient time for the breakdown

Study the steps of the process, interact with people, get data, documents, and understand tools:

All problems can be divided into smaller defined problems: by region, location, department, product, channel, customers, etc.

Specify the point of cause: the problem is present in a specific part of the process

The Problem solving process is based upon; plan, do, check, act.

**Problem sol** Remove time lost in debate

Identify weak points in processes

Discover systemic causes

Explain with reasons why problem occurred

Gives a factual representation of the problem

Compare what actually happened against what happened, at any point during the incident.





**Written Test**

**Self Check #1**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Identifying weaknesses and strengths is help full remove time lost in debate.
2. Understanding the strengths and weaknesses helps to identify weak points in processes.



<b>Information Sheet-3</b>	Corrective action
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### 2.3. CORRECTIVE ACTION:

A set of planned activities (actions) implemented for the sole purpose of *permanently* resolving the problem. Three Types of Corrective action Specific, Preventive, Systemic

These types of corrective action are quite different in how they are applied and what they do. Not understanding this leads to serious mistakes in fixing problems.

#### **SPECIFIC CORRECTIVE ACTION**

Action(s) taken to correct the direct cause, Corrects or improves the condition noted in the event, by changing the direct cause, or the direct cause and the effect.

- Also encompasses Containment
- Used to correct the Direct Cause
- Does not prevent recurrence!

#### **Preventive corrective action**

Action(s) taken that prevent recurrence of the condition noted in the event , Preventive actions must directly address the root and contributing causes to insure effectiveness.

Preventive corrective actions focus on changing the root cause and any contributing causes.

You probably won't get a 100% effective fix at just one point the root cause.

You often have to consider two or more contributing causes to ensure the chain is broken

#### **Systemic Corrective Action**

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to occur. Usually is on a larger scale ,Probably can have an effect on other part numbers  
 May have an effect on *other customers*.

<b>Self Check #1</b>	<b>Written Test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Systemic Corrective Action address the failure in the supplier's quality system that allowed the event to occur.

2. Specific corrective action used to correct the Direct Cause

3.

Preventive corrective actions focus on changing the root cause and any contributing causes.

<b>Operation Sheet- 1</b>		<b>Considering safety and operating procedures</b>	
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**Techniques for Considering safety and operating procedures**

Step1. Consider safety issues

Step 2. Identify OHS rule and regulations

Step 3 . Consider OHS rule and regulations

Step 4. List deferent operating procedures

Step 5 . consider appropriate operating procedures

<b>Operation Sheet- 2</b>	<b>Corrective action</b>
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**Techniques for Corrective action**

Step 1. Analysis the problem

Step 2. Identify the problem

Step3. list the corrective actions

Step 4. Select appropriate corrective actions

Step 5. corrective actions

<b>LAP Test</b>	<b>Practical Demonstration</b>
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Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks.

Task 1: Considering safety and operating procedures

Task 2: Considering Strengths and weaknesses

Task 3: apply Corrective action

**References;** Troubleshooting & Repairing Solid-States TVs By **Homer L Davidson**

# **BASIC HOME/OFFICE ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING Level-II**

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# Learning Guide-33

## Unit of Competence: Apply Routine Problem Solving Techniques

### Module Title: Applying Routine Problem Solving Techniques

**LG Code EEL HOS2 M09 -3 LG-33**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

### **LO3: Recommend solution to higher management**

<b>Instruction Sheet</b>	<b>Learning Guide #33</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Preparing report
- Presenting Recommendations
- Following recommendation
- Experimenting Propos solutions

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

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- Present Recommendations
- Follow recommendation
- Experiment Propos solutions

### Learning Instructions:

6. Read the specific objectives of this Learning Guide.
7. Follow the instructions described below 3 to 5.
8. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
9. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
10. Do the “LAP test” (if you are ready).

<b>Information Sheet-1</b>	Preparing report
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## 3.1. STRUCTURE OF REPORTS

### INTRODUCTION

The purpose of a technical report is to completely and clearly describe, these are: *technical work, why it was done, results obtained and implications of those results*. The technical report serves as a means of communicating the work to others and possibly providing useful information about that work at some later date.

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A wellwritten report allows the reader to quickly understand what has been accomplished. The report also provides sufficient detail to allow the reader to recreate the results although the level of detail provided depends heavily on the report's audience and any proprietary nature of the work.

## THE FORMAL TECHNICAL REPORT

The formal technical report contains a complete, concise, and wellorganized description of the work performed and the results obtained. Any given report may contain all of the sections described herein or a subset, depending upon the report requirements. These requirements are decided by the author and are based on the audience and expected use of the report.

All reports have certain aspects in common regardless of expected usage. Common report sections are presented first, and all possible sections potentially included in a report are discussed afterwards.

## UNIVERSAL ASPECTS OF ALL REPORTS

- The report should be written in an active voice using the third person in most instances. Avoid using personal pronouns. Personal pronouns tend to personalize the technical information that is generally objective rather than subjective in nature. Use correct grammar, punctuation, and spelling.

*Attention to these details results in a professional tone to the report.*

- All diagrams must be neatly presented and should be computer generated. Use a computer software package, such as Paint, Multisim or AutoCAD, to draw diagrams. Leave at least a oneinch margin on all sides of a full page diagram and always number and title all figures.
- *Always insert a full page diagram or graph so it can be read from the bottom or from the right side of the page.*
- All pages of the report after the Table of Contents must include the page number.
- Any information in the report that is directly quoted or copied from a source must be cited using the proper notation.

Any information in the report that is directly derived or paraphrased from a source must be cited using the proper notation.

Any reference material derived from the web must come from credible and documentable sources

~~Students need to evaluate websites critically. The first step is to verify a credible author.~~

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Wikipedia is not a credible reference because the information changes over time and authors are not necessarily people with verifiable expertise or credentials.

## **REPORT FORMAT**

The pages of the report are to be assembled in the following order.

This is the recommended order; however, certain reports may lend themselves to either reordering sections and/or excluding sections.

## **TITLE PAGE**

The format for this page may vary, however, the following information is always include: report title, who the report was prepared for, who the report was prepared by, and the date of submission. This is not a numbered page of the report.

## **ABSTRACT**

An abstract is a concise description of the report including its purpose and most important results. An abstract must not be longer than half a page and must not contain figures or make reference to them.

The results may be summarized in the abstract but qualitatively, not quantitatively. No specific technical jargon, abbreviations, or acronyms should be used.

This is not a numbered page of the report.

## **TABLE OF CONTENTS**

Include all the report sections, subsections, and appendices. This is not a numbered page of the report .

## **INTRODUCTION**

Give the objective of the work, a brief description of the problem, and how it is to be attacked. This section should provide the reader with an overview of why the work was performed, how the work was performed, and the most interesting results. This can usually be accomplished with ease if the work has clearly stated objectives. After introducing the problem, indicate how those objectives are met.

The length of this section depends on the purpose but the author should strive for brevity, clarity, and interest.

Be careful not to use specific technical jargon or abbreviations such as using the term “oscope” instead of “oscilloscope”. Also, make sure to define any acronyms or abbreviations prior to using them. For example, in a surveying lab report a student might want to refer to the electronic distance measuring (EDM) device.

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The first time the device is referred to, the student must Spell out what the acronym stands for before using the acronym as demonstrated in the previous sentence.

This practice should be applied throughout the report then the author wants to use an acronym that has not yet been defined within the report. Do not assume that the reader is familiar with all the acronyms that are familiar to the author.

## **BACKGROUND THEORY**

Include, if necessary, a discussion of relevant background theory. For example, if the phase shift of an RC circuit is to be measured, give the derivation of the theoretical phase shift. Include any preparation specified in the lab manual. In deciding what should or not should be included as background theory, consider presenting any material specific to the lab that you had to learn prior to performing the lab.

## **DESIGN / THEORETICAL ANALYSIS**

Give the details of your design procedure. Be sure to introduce and describe your design work using sentences, equations alone are not sufficient. Use citations if you wish to refer the reader to reference material. Divide this section into subsections where appropriate.

For example, a lab design may consist of designing several circuits that are subsequently interconnected; you may choose to treat each circuit design in its own subsection. Keep this section as general as possible, only applying

Specific numbers after the design is explained.

If there is no design but strictly analysis, then provide the important details of all the analysis performed. Be brief. It is not necessary to show every step; sentences can be used to describe the intermediate steps. Furthermore, if there are many steps to the analysis, the reader should be directed to the appendix for complete details.

## **PROCEDURE**

This section varies depending on requirements of the one who assigned the work and the audience. At a minimum, the author *discusses* the procedure by describing the Methods to test a theory, verify a design or conduct a process.

Presentation of the procedure may vary significantly for different fields and different audiences, however, for all fields; the author should be brief and get to the point. Like with any written work, if it is unnecessarily wordy, the reader becomes bored and the author no longer has an audience. Also, the procedure section should never include specific measurements/results,

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discussion of results, or explanation of possible error sources. Make sure all diagrams provided are numbered, titled, and clearly labeled.

<b>Self Check #1</b>	<b>Written Test</b>
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**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

1. All pages of the report after the Table of Contents must include the page number.
2. Be sure to introduce and describe your design work using sentences, equations alone are not sufficient.
3. An abstract must not be longer than half a page and must not contain figures.
4. Figures always must not have number and title.

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<b>information Sheet-2</b>	<b>Presenting Recommendations</b>
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### 3.2. Clear presentation of results

Is at least as important as the results themselves; therefore, writing a report is an exercise in effective communication of technical information. Results, such as numerical values, designed systems or graphs by themselves are not very useful. To be meaningful

to others, results must be supported by a written explanation describing how results were obtained and what significance they hold, or how a designed system actually functions.

Although the person reading the report may have a technical background, the author should assume unfamiliarity with related theory and procedures. The author must therefore supply details that may appear obvious or unnecessary.

With practice, the technical report writer learns which details to include.

The key to a well-written report is organization. A report that is divided into several sections, occurring in a logical sequence, makes it easy for the reader to quickly obtain an overview of the contents as well as locate specific information. This document provides guidelines for producing well-written technical report.

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Clear presentation of results is at least as important as the results themselves.
2. Writing a report is not an exercise in effective communication of technical information.
3. With practice, the technical report writer learns which details to include.

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<b>Information Sheet-3</b>	Following recommendation
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### 3.3. Follow up

Although this is not an official step of the troubleshooting process it nevertheless. Should be done once the equipment has been repaired and put back in service. You should try to determine the reason for the malfunction.

- Did the component fail due to age?
- Did the environment the equipment operates in cause excessive corrosion?
- Are there wear points that caused the wiring to short out?
- Did it fail due to improper use?
- Is there a design flaw that causes the same component to fail repeatedly?

Through this process further failures can be minimized. Many organizations have their own follow-up documentation and processes. Make sure you check your organization's procedures. Adopting a logical and systematic approach such as the Troubleshooting Approach can help you to troubleshoot like an expert!

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. For good maintenance have their own follow-up documentation and processes.
2. Follow up recommendations Should be done once the equipment has been repaired and put back in service

<b>Information Sheet-4</b>	Experimenting Propos solutions
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**a. Propose solutions are experimented**

**Set goals:** - once you have thought about the program from d/t angles. You can identify your goals. What is that you want to achieve? Sometimes you may become frustrated by a problem and for get to think about what you want to achieve.

For e.g you might become ill, struggle to complete number of assignments on time & feel so unmotivated that you let due dates pass

- Improve your health
- Increase your management skills
- Complete the assignments to the best of your ability
- Finish the assignments as soon as possible.

If you decide your goal is to improve your health that will lead to d/t solutions to that linked with the goal of completing your assignments as soon as possible. One goal may lead you to a doctor and another may lead you to apply for extensions for your assignments. so working out your goals is a vital part of the problem solving process .

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: for the following questions fill in the blank spacejil**

1. struggle to complete number of assignments on time & feel so unmotivated that you let due dates pass should be

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

D. \_\_\_\_\_



<b>Operation Sheet- 1</b>	Preparing report
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Techniques for Preparing report

- Step 1. prepare important materials
- Steps 2. Analysis the result
- Step 3. Develop report

<b>Operation Sheet- 2</b>	<b>Presenting Recommendation</b>
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**Techniques for Presenting Recommendation**

- Step1.analysis the work
- Step 2. Identify the wekenes and strangths
- Step 3. Put recomandations

<b>Operation Sheet- 3</b>	<b>Following recommendation</b>
---------------------------	---------------------------------

**Techniques for Following recommendation**

- Step1. see the recommendations.
- Step 2. see the corrective options.
- Step 3. Following the recommendations.

<b>Operation Sheet- 4</b>	<b>Experimenting Propos solutions</b>
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**Techniques for Experimenting Propos solutions**

Step1. List referent propose solutions	Federal TVET Agency Author/Copyright	TVET program title	Version -1 October 2019
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**Step 2. Experiment each propose solutions.**

**Step 3. Select the best propose solution**

<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within 8-12 hours.

Task 1: Preparing report

Task2: Presenting Recommendation

Task 3: Following recommendation

Task 4: Experimenting Propos solutions

# **BASICHOME/OFFICE ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING**

## **Level-II**

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# Learning Guide-34

**Unit of Competence: Apply Routine Problem Solving Techniques**

**Module Title: Applying Routine Problem Solving Techniques**

**LG Code EEL HOS2 M09 -4 LG-34**

**TTLM Code: EEL HOS2 M09 TTLM 1019v1**

**LO4: Implement solution**

<b>Instruction Sheet</b>	<b>Learning Guide # 34</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying objectives

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- Identifying Timeline

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Identify objectives
- Identify Resource
- Identify Timeline

### **Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
4. Accomplish the “Self-check 1, Self-check 2 and Self-check-3
5. Do the “LAP test”

<b>Information Sheet-1</b>	Identifying objectives
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#### 4.1. Identifying objectives

##### INTRODUCTION

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The term learning means changes in our behavior, attitude, knowledge and skills. In other words we can say that through learning we can feel permanent changes in our self. If we are not feeling any changes in our above skills then it will not be called as learning. The learning is a type of reinforcement, which may learn a change in behavior enduring by strengthening and intensifying certain aspect of an individual behavior. Learning may be described as the process of acquiring the ability to respond adequately to a situation, which may or may not have been previously encountered.

**Components of learning objectives:-** The learning objectives has the following components:-

1. Audience- Audience is the target of learning objective and the audience character.
2. Behavior - Behavior is expected from the learner to show the audience has learned something from the instructor.
3. Condition-Under what condition will the learner be expected to demonstrate his/her knowledge. It is the responsibility of instructor to create an atmosphere of learning for grasping the memory from the learning environment.

**Main characteristics of good learning objective**

1. The learning objective should identify learning outcomes: – The main objective of learning is reflection. The objective needs to state what the learner is to perform, not how the learn lesson.
2. The learning objective should be consistent with course goal – it is necessary that the learning objective should be consistent with the course goal. When objective and goals are not consistent two avenues of approached will be available. - Change the objective or - Change the course goal
3. The learning objective should be precious:- Its some have difficulties to strike a balance between too much and too little precious in an objective. There should be a free line between choosing objective that reflects an important and meaningful outcome of instructions and objective. To make the objective of learning the affective steps are as under:-  
 - Starts class on schedule. - Present material listed in lesson plans and follows the general outline. - Use following traits and techniques while conducting instruction: flexibility, spontaneity, provides empathy, and compassion uses good questioning techniques, is an active listener, gets feedback, uses positive reinforcement, and provide counseling. - Facilitator directs and guides the learner towards finding the correct answer to their questions, rather than being an answering service.

Provide coaching. - Demonstrates new or difficult material in manner that may be seen and understood by the learners. - Evaluates learner in the prescribed manner. - Grades tests and distributes scores as required. - Completes class roster and other form at end of training session and deliver them to the training department. - Completes all learning activities and required function, during allotted time period.

**Learning Objective and Techniques of Motivation** Knowledge, Understanding, application and creativity can be used as criteria for selecting the appropriate techniques of motivation.

- 1) Knowing Objectives: This objective is achieved to develop the recall and recognition abilities .it is the lowest learning objective and concerns with the environment of objects. The reward, praise, punishment and reproof techniques of motivation may be employed to achieve knowledge objective. The concrete form of motivation is effective for this purpose.
- 2) Understanding objectives: The understanding objective is realized by developing the abilities of seeing relationship, discrimination, cite example and generalization, the environment and content both are equally important for providing appropriate learning experiences to the students. The praise, success, punishment and failure techniques of motivation can assist in achieving this objective.

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**3) Application of objectives:** An application objective is achieved by developing the abilities of reasoning, hypothesizing, inferring, and prediction. The perception and expectancies of the students play the significant role. The success and failure, cooperation and competition knowledge of results and attitude, techniques of motivation can help in realizing the objective of application.

**Creativity objectives:** The creativity is the highest objective of the cognitive domain. This can be achieved by satisfying the highest needs of a person and employing internal motivation. The analysis, synthesis and evaluation or Judgment abilities are developed for achieving this objective. The context is most important and environment is least important. The ego environment and self-motivation is essential for creativity. The level of aspiration, novelty and attitude, techniques of motivation can be used for achieving creativity objective.

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: for each of the following questions fill in the blank space**

1. What are the Components of learning objectives

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

2. List down Main characteristics of good learning objective

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_



<b>Information Sheet-2</b>	Identifying Resource
----------------------------	----------------------

#### ***4.2. Identify needed resources***

Resources that are relevant to troubleshoot identify and analyzing problems like information, people.

What resources do I need?

e.g. Books, internet, lab manuals, circuit diagrams etc.

Where will I get them?

e.g. we will gate books from library, friends, families etc

How long will it take? The time will determine according to the given task difficulty.

What can others offer?

Are there any special requirements?

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TABLE 1

Identifying resources and needs

	Resources	needs	example
People/organizations to form part of the network, Potential data sources to form the basis of the system.			Gain cooperation . ' of different individuals involved. Develop way of collecting information on a specific core area, e.g. usage of electronics equipment
Human resources :skills and expertise on data selection, electrical issues; faulty areas			Training in specific aspects of data collection. Advocacy to increase awareness of the purpose of data collection



Infrastructure to collect data and communicate b/n members			Need internet connection to facilitate communication, or mailing list of member contact. Data entry software assist with data analysis
Capacity for financing data collection or providing time to undertake activities			Staff time to assist with data analysis and net work coordination. Finances to cover provision of data entry software. Finance to cover venue and travel

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: For each of the following questions choose the best answer**

1. Which of the following is a resource
 

A. Books	C. Internet
B. People	D. All
  
2. Where will we get resources
 

A. Libraries	C. Families
B. usage of electronics	D. all



<b>Information Sheet-3</b>	Identifying Timeline
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### 3.1. Identify timelines in accordance with plan

We like to begin at the end

On a calendar, mark down when your first contest is, then work your way backwards keep all the items you must complete in mind.

Adjust the dates depending upon how much time you will have.

What you must complete by your first qualifier:

- . Pick a topic
- . Research that topic
- . Come up with an innovative solution
- . Share that solution
- . Write a presentation for judges
- . Create props and poster boards
- . Practice your presentation

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<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: I. WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. One of the time management is mark starting date.
2. Adjust the dates depending upon how much time you will have is time planning.

<b>Operation Sheet- 1</b>	<b>Identifying Resource</b>
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### **Techniques for Identifying Resource**

Step 1 . analysis issues

Step 2. List different resource

Step 3. Identifying resource.

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<b>Operation Sheet- 2</b>	Identifying Timeline
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**Techniques fore identifying timeline.**

**Step 1. Analysis the work.**

**Step 2. Justify the resources.**

**Step 3 . Locate the time line.**

<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_  
\_\_\_\_\_

\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks .

**Task 1:** Identifying objectives

**Task 2:** Identifying Resource

**Task 3:** Identifying Timeline

References: **Buy Electronic Equipment Schematic Diagrams**

- 1) [www.Radiolocman.com](http://www.Radiolocman.com)
- 2) [www.justmanuals.com](http://www.justmanuals.com)
- 3) [www.servicemanuals.net](http://www.servicemanuals.net)

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**BASIC HOME/OFFICE  
ELECTRICAL/ELECTRONICS  
EQUIPMENT SERVICING  
Level-II**

# **Learning Guide-35**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving Techniques**

**LG Code EEL HOS2 M09 -5 LG-35**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

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## LO5: Evaluate/ monitor results and outcome

Instruction Sheet	Learning Guide#35
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Identifying processes and improvements
- Preparing recommendations and submitted to superiors.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Identify processes and improvements
- Prepare recommendations and submitted to superiors

### Learning Instructions:

11. Read the specific objectives of this Learning Guide.
12. Follow the instructions described below 3 to 5.
13. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
14. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
15. Do the “LAP test” (if you are ready)

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<b>Information Sheet-1</b>	Identifying Processes and improvements
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**a. Identify Processes and improvements**

- Identify process is used to things to accomplished on program, used to time management
- Continuous improvements for different problems solving processes.

**Different between monitoring and evaluation**

**Monitoring**

- Continuous, regular
- Focus on input, process and output of activities
- Need information during activities activities

**Evaluation**

- periodic
- focus on only output
- need information after finished

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Monitoring Focus on input, process and output of activities
2. Monitoring needs information after finished
3. Evaluation is Continuous, regular

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<b>Information Sheet-2</b>	Preparing and submitting Recommendation
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### 5.2. Prepare and submit Recommendation

Prepare recommendations and submitted to supervisors:

- To ask any equations the problem can be occurred by what mechanism.
- To recommend so many important idea for the problem occurring equipment.
- To supervise or appreciate the recommended idea generated person for best solution for that problem.

Timely and quality reporting problems to technical expertise

Quality reporting requires effective follow-up and implementation of recommendations by many technicians

A standing supervisor structure with a mandate to Coordinate and prepare reports to and engage with the qualitative maintenance procedures ( the periodic review and special procedures)

Coordinate and follow-up and implementation of recommendations/ decisions emanating from these mechanisms

<b>Self Check #1</b>	<b>Written test</b>
----------------------	---------------------

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: FOR THE FOLLOWING QUESTION FILL IN THE BLANK SPACE**

1. Prepare recommendations and submitted to supervisors to

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

<b>Operation Sheet- 1</b>	<b>Identify processes and improvements</b>		
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## Techniques for Identify processes and improvements

Step1 . Analysis the work

Step 2 . Identify the weakness

Step 3 . Identify the processes and improvements.

Operation Sheet- 2	Prepare recommendations and submitted to superiors
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## Techniques for Prepare recommendations and submitted to superiors

Step1. Analysis work.

Step2 . prepare recommendations.

Step3 . submitted to superior.

LAP Test	Practical Demonstration
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks.

**Task 1:** Identify processes and improvements

**Task 2:** Prepare recommendations and submitted to superiors

**References:** Samuel M. Goldwasser “Notes On The Troubleshooting And Repair Of Small Switch Mode Power Supplies”. Here is the website link <http://www.repairfaq.org/sam/smpsfaq.htm>

# BASIC HOME/OFFICE

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# **ELECTRICAL/ ELECTRONICS EQUIPMENT SERVICING**

**Level-II**

## **Learning Guide-32**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code :EEL HOS2 M09 -2 LG-32**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

**LO 2: Identify possible solutions**

<b>Instruction Sheet 1</b>		<b>Learning Guide # 32</b>	
	Author/Copyright	TVET program title	Version -1 October 2019



This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Considering safety and operating procedures
- Considering Strengths and weaknesses
- Corrective action

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Consider safety and operating procedures
- Consider Strengths and weaknesses
- Corrective action

**Learning Instructions:**

16. Read the specific objectives of this Learning Guide.
17. Follow the instructions described below 3 to 5.
18. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
19. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
20. Do the “LAP test” (if you are ready).

<b>Information Sheet-1</b>		Considering safety and operating procedures	
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## 2.1. Electrical safety

All systems which use electrical energy have the potential to cause serious harm.

### Injuries caused by electric current

Electric current can pass through the body when the body becomes part of the electric circuit.

Electric current flowing through the body can cause:

- Electric shock
- Electrocution
- Burns caused by electric current and arc flash

The severity of the injury depends on:

- Amount of current flowing through the body.
- Path of the current through the body.
- Length of time the body is in the circuit.
- The voltage of the current.

A person receiving a shock caused by grabbing a bare conductor can generally release himself when the current passing through his body is less than 15 mA.

The high resistance of a dry skin is rapidly broken down by a high voltage. High voltages can cause violent muscular contraction, often so severe that the victim is thrown clear.

### An electric shock may injure the human body in several ways:

Contraction of chest muscles causing interference with breathing, leading to asphyxiation.

Temporary paralysis of the nerve center leading to breathing failure.

Ventricular fibrillation which is an irregular movement of heart muscles leading to failure of blood circulation. The heart cannot spontaneously recover, causing death.

Hemorrhage and destruction of nerves, tissues and muscles, caused mainly by heat.

When electricity passes through the body, it can interfere with the normal electrical signals between the brain and other body systems.

Arc flashes result in intense heat causing burns or ignition of other materials.

Contact with high voltage can cause burns in internal tissues.

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## **Precautions to be taken while working with electricity**

Check for damage on power plugs, wire and other electrical fittings. If found damaged, repair or replace damaged equipment immediately.

Keep electrical wires of equipment away from hot surfaces to prevent damage of the insulation.

Do not lay electric wires along passage. It can be a trip hazard. Further contact with sharp

edges can cause damage to insulation leading to short circuit.

Know the location of switches/circuit breaker boxes for use in case of an emergency.

All circuit breakers in the switch board must be clearly labeled for easy identification.

Access to circuit breakers must not be blocked.

Extension cords must be used only to supply power temporarily.

Do not handle electrical equipment when hands, feet or body are wet or perspiring, or

when standing on a wet floor.

Consider all floors as conductive unless covered with insulating matting of suitable type for electrical work.

Whenever possible, use only one hand when working on circuits or control devices.

Do not wear rings, metallic watchbands, chains etc. when working with electrical equipment.

## **Precautions to be taken while using power tools**

before connecting the tool to the power supply, switch the tool OFF.

Disconnect power supply before making adjustments.

the tool must be properly grounded with a 3-wire cord with a 3-prong plug. Use double insulated tools wherever possible.

Do not use electrical tools in wet conditions or damp locations unless the tool is Connected to an Earth Leakage Circuit Breaker

## **Personal Protective Equipment**

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Personal Protective Equipment is an integral part of any employer's safety program. OSHA has determined that PPE although a good way to protect employees, should be used as a last line of defense and its important to understand the limitations of PPE in the workplace.

### **PPE for the Head**

Employees must wear nonconductive head protection helmet wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts .

### **PPE for the Eyes & Face**

Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

When working on energized parts, the possibility of arc flash exists and the employee must be protected. Dangers could include heat, flying hazards and molten metal, therefore the PPE must be durable, non-conductive, heat resistant and provide deflection qualities

### **PPE for the Body (FR Clothing)**

As we learned earlier, employees working in areas where there are potential electrical hazards must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed [see 1910.335(a)(1)(i)]. This would include flame resistant (FR) clothing.

During an arc flash event the temperatures can reach an excess of 35,000 degrees. Even at temperatures much lower, typical daily wear clothing would do little to protect the worker from being seriously injured. In fact, at such high temperatures, the clothing will ignite and continue to burn on the body well after the arc flash has dissipated. This is where serious injury and death often occur

### **PPE for the Hands (Gloves)**

Since employees working on energized electrical parts are using their hands, obviously that part of the body (hands and arms) are most susceptible to electric shock and must be protected. Insulating gloves provide an excellent means of protecting the workers from accidental electrical contact. To be effective the insulating gloves must have high insulation qualities, while also being comfortable, durable and flexible.

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Written Test

Self Check #1

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: For each of the following questions choose the best answer**

3. Electric current flowing through the body can cause:
- A. electric shock
  - B. paralyzes
  - C. Burns caused
  - D. All
4. Which of the following is not PPE?
- C. Glove
  - D. T shirt
  - C. helmet
  - D. goggle



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<b>Information Sheet-2</b>	Considering Strengths and weaknesses
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**a. Strengths and weaknesses**

Requires to study the process to detail

Dedicate sufficient time for the breakdown

Study the steps of the process, interact with people, get data, documents, and understand tools:

All problems can be divided into smaller defined problems: by region, location, department, product,

channel, customers, etc.

Specify the point of cause: the problem is present in a specific part of the process

The Problem solving process is based upon; plan, do, check, act.

**Problem sol** Remove time lost in debate

Identify weak points in processes

Discover systemic causes

Explain with reasons why problem occurred

Gives a factual representation of the problem

Compare what actually happened against what happened, at any point during the incident.

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**Written Test**

**Self Check #1**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

3. Identifying weaknesses and strengths is help full remove time lost in debate.
4. Understanding the strengths and weaknesses helps to identify weak points in processes.



<b>Information Sheet-3</b>	Corrective action
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### 2.3. CORRECTIVE ACTION:

A set of planned activities (actions) implemented for the sole purpose of *permanently* resolving the problem. Three Types of Corrective action  
Specific, Preventive, Systemic

These types of corrective action are quite different in how they are applied and what they do. Not understanding this leads to serious mistakes in fixing problems.

#### **SPECIFIC CORRECTIVE ACTION**

Action(s) taken to correct the direct cause, Corrects or improves the condition noted in the event, by changing the direct cause, or the direct cause and the effect.

- Also encompasses Containment
- Used to correct the Direct Cause
- Does not prevent recurrence!

#### **Preventive corrective action**

Action(s) taken that prevent recurrence of the condition noted in the event, Preventive actions must directly address the root and contributing causes to insure effectiveness.

Preventive corrective actions focus on changing the root cause and any contributing causes.

You probably won't get a 100% effective fix at just one point the root cause.



You often have to consider two or more contributing causes to ensure the chain is broken

### **Systemic Corrective Action**

Actions taken that address the failure in the supplier's quality system that allowed the event to occur. Usually is on a larger scale ,Probably can have an effect on other part numbers May have an effect on *other customers*.

<b>Self Check #1</b>	<b>Written Test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

1. Systemic Corrective Action address the failure in the supplier's quality system that allowed the event to occur.
2. Specific corrective action used to correct the Direct Cause
3. Preventive corrective actions focus on changing the root cause and any contributing causes.



<b>Operation Sheet- 1</b>	<b>Considering safety and operating procedures</b>
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### **Techniques for Considering safety and operating procedures**

- Step1. Consider safety issues
- Step 2. Identify OHS rule and regulations
- Step 3 . Consider OHS rule and regulations
- Step 4. List deferent operating procedures
- Step 5 . consider appropriate operating procedures

<b>Operation Sheet- 2</b>	<b>Corrective action</b>
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### **Techniques for Corrective action**

- Step 1. Analysis the problem
- Step 2. Identify the problem
- Step3. list the corrective actions
- Step 4. Select appropriate corrective actions
- Step 5. corrective actions



<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks.

Task 1: Considering safety and operating procedures

Task 2: Considering Strengths and weaknesses

Task 3: apply Corrective action

**References;** Troubleshooting & Repairing Solid-States TVs By **Homer L Davidson**



**BASIC HOME/OFFICE  
ELECTRICAL/ELECTRONICS  
EQUIPMENT SERVICING  
Level-II**

# **Learning Guide-33**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code EEL HOS2 M09 -3 LG-33**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

**LO3: Recommend solution to higher management**

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<b>Instruction Sheet</b>	<b>Learning Guide #33</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Preparing report
- Presenting Recommendations
- Following recommendation
- Experimenting Propos solutions

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Prepare report
- Present Recommendations
- Follow recommendation
- Experiment Propos solutions

**Learning Instructions:**

21. Read the specific objectives of this Learning Guide.
22. Follow the instructions described below 3 to 5.
23. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
24. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
25. Do the “LAP test” (if you are ready).



<b>Information Sheet-1</b>	Preparing report
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### 3.1. STRUCTURE OF REPORTS

#### INTRODUCTION

The purpose of a technical report is to completely and clearly describe, these are:

*technical work,*

*why it was done, results obtained and implications of those results.* The technical report serves as a means of communicating the work to others and possibly providing useful information about that work at some later date.

A wellwritten report allows the reader to quickly understand what has been accomplished. The report also provides sufficient detail to allow the reader to recreate the results although the level of detail provided depends heavily on the report's audience and any proprietary nature of the work.

#### THE FORMAL TECHNICAL REPORT

The formal technical report contains a complete, concise, and wellorganized description of the work performed and the results obtained. Any given report may contain all of the sections described herein or a subset, depending upon the report requirements. These requirements are decided by the author and are based on the audience and expected use of the report.

All reports have certain aspects in common regardless of expected usage. Common report sections are presented first, and all possible sections potentially included in a report are discussed afterwards.

#### UNIVERSAL ASPECTS OF ALL REPORTS

- The report should be written in an active voice using the third person in most instances. Avoid using personal pronouns. Personal pronouns tend to personalize the techn

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ical information that is generally objective rather than subjective in nature. Use correct grammar, punctuation, and spelling.

*Attention to these details results in a professional tone to the report.*

- All diagrams must be neatly presented and should be computer generated. Use a computer software package, such as Paint, Multisim or AutoCAD, to draw diagrams. Leave at least a oneinch margin on all sides of a full page diagram and always number and title all figures.
- *Always insert a full page diagram or graph so it can be read from the bottom or from the right side of the page.*
- All pages of the report after the Table of Contents must include the page number.
- Any information in the report that is directly quoted or copied from a source must be cited using the proper notation.

Any information in the report that is directly derived or paraphrased from a source must be cited using the proper notation.

Any reference material derived from the web must come from credible and documentable sources Students need to evaluate websites critically. The first step is to verify a credible author.

Wikipedia is not a credible reference because the information changes over time and authors are not necessarily people with verifiable expertise or credentials.

## **REPORT FORMAT**

The pages of the report are to be assembled in the following order.

This is the recommended order; however, certain reports may lend themselves to either reordering sections and/or excluding sections.

### **TITLE PAGE**

The format for this page may vary, however, the following information is always include: report title, who the report was prepared for, who the report was prepared by, and the date of submission. This is not a numbered page of the report.

### **ABSTRACT**

An abstract is a concise description of the report including its purpose and most important results. An abstract must not be longer than half a page and must not contain

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figures or make reference to them.

The results may be summarized in the abstract but qualitatively, not quantitatively. No specific technical jargon, abbreviations, or acronyms should be used.

This is not a numbered page of the report.

## **TABLE OF CONTENTS**

Include all the report sections, subsections, and appendices. This is not a numbered page of the report.

## **INTRODUCTION**

Give the objective of the work, a brief description of the problem, and how it is to be attacked. This section should provide the reader with an overview of why the work was performed, how the work was performed, and the most interesting results. This can usually be accomplished with ease if the work has clearly stated objectives. After introducing the problem, indicate how those objectives are met.

The length of this section depends on the purpose but the author should strive for brevity, clarity, and interest.

Be careful not to use specific technical jargon or abbreviations such as using the term “oscope” instead of “oscilloscope”. Also, make sure to define any acronyms or abbreviations prior to using them. For example, in a surveying lab report a student might want to refer to the electronic distance measuring (EDM) device.

The first time the device is referred to, the student must spell out what the acronym stands for before using the acronym as demonstrated in the previous sentence.

This practice should be applied throughout the report then the author wants to use an acronym that has not yet been defined within the report. Do not assume that the reader is familiar with all the acronyms that are familiar to the author.

## **BACKGROUND THEORY**

Include, if necessary, a discussion of relevant background theory. For example, if the phase shift of an RC circuit is to be measured, give the derivation of the theoretical phase shift. Include any preparation specified in the lab manual. In deciding what should or not

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should be included as background theory, consider presenting any material specific to the lab that you had to learn prior to performing the lab.

### **DESIGN / THEORETICAL ANALYSIS**

Give the details of your design procedure. Be sure to introduce and describe your design work using sentences, equations alone are not sufficient. Use citations if you wish to refer the reader to reference material. Divide this section into subsections where appropriate. For example, a lab design may consist of designing several circuits that are subsequently interconnected; you may choose to treat each circuit design in its own subsection. Keep this section as general as possible, only applying specific numbers after the design is explained.

If there is no design but strictly analysis, then provide the important details of all the analysis

performed. Be brief. It is not necessary to show every step; sentences can be used to describe the intermediate steps. Furthermore, if there are many steps to the analysis, the reader should be directed to the appendix for complete details.

### **PROCEDURE**

This section varies depending on requirements of the one who assigned the work and the audience. At a minimum, the author *discusses* the procedure by describing the methods to test a theory, verify a design, or conduct a process.

Presentation of the procedure may vary significantly for different fields and different audiences, however, for all fields; the author should be brief and get to the point. Like with any written work, if it is unnecessarily wordy, the reader becomes bored and the author no longer has an audience.

Also, the procedure section should never include specific measurements/results, discussion of results, or explanation of possible error sources. Make sure all diagrams provided are numbered, titled, and clearly labeled.

<b>Self Check #1</b>	<b>Written Test</b>
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**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE**

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## STATEMENT IS FALSE

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

5. All pages of the report after the Table of Contents must include the page number.
6. Be sure to introduce and describe your design work using sentences, equations alone are not sufficient.
7. An abstract must not be longer than half a page and must not contain figures.
8. Figures always must not have number and title.

<b>information Sheet-2</b>	Presenting Recommendations
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### 3.2. Clear presentation of results

Is at least as important as the results themselves; therefore, writing a report is an exercise in effective communication of technical information. Results, such as numerical values, designed systems or graphs by themselves are not very useful. To be meaningful to others, results must be supported by a written explanation describing how results were obtained and what significance they hold, or how a designed system actually functions.

Although the person reading the report may have a technical background, the author should assume unfamiliarity with related theory and procedures. The author must therefore supply details that may appear obvious or unnecessary.

With practice, the technical report writer learns which details to include.

The key to a well-written report is organization. A report that is divided into several sections, occurring in a logical sequence, makes it easy for the reader to quickly obtain an overview of the contents as well as locate specific information. This document provides guidelines for producing well-written technical report.

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

4. Clear presentation of results is at least as important as the results themselves.
5. Writing a report is not an exercise in effective communication of technical information.
6. With practice, the technical report writer learns which details to include.

<b>Information Sheet-3</b>	Following recommendation
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### 3.3. Follow up

Although this is not an official step of the troubleshooting process it nevertheless. Should be done once the equipment has been repaired and put back in service. You should try to determine the reason for the malfunction.

- Did the component fail due to age?
- Did the environment the equipment operates in cause excessive corrosion?
- Are there wear points that caused the wiring to short out?
- Did it fail due to improper use?
- Is there a design flaw that causes the same component to fail repeatedly?

Through this process further failures can be minimized. Many organizations have their own follow-up documentation and processes. Make sure you check your organization's procedures.

Adopting a logical and systematic approach such as the Troubleshooting Approach can help you to troubleshoot like an expert!

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

3. For good maintenance have their own follow-up documentation and processes.
4. Follow up recommendations Should be done once the equipment has been repaired and put back in service

<b>Information Sheet-4</b>	Experimenting Propos solutions
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**a. Propose solutions are experimented**

**Set goals:** - once you have thought about the program from d/t angles. You can identify your goals. What is that you want to achieve? Sometimes you may become frustrated by a problem and for get to think about what you want to achieve.

For e.g you might become ill, struggle to complete number of assignments on time & feel so unmotivated that you let due dates pass

- Improve your health
- Increase your management skills
- Complete the assignments to the best of your ability
- Finish the assignments as soon as possible.

If you decide your goal is to improve your health that will lead to d/t solutions to that linked with the goal of completing your assignments as soon as possible. One goal may lead you to a doctor and another may lead you to apply for extensions for your assignments. so working out your goals is a vital part of the problem solving process .

<b>Self Check #1</b>	<b>Written test</b>
----------------------	---------------------

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: for the following questions fill in the blank spacejil**

2. struggle to complete number of assignments on time & feel so unmotivated that you let due dates pass should be

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

D. \_\_\_\_\_



<b>Operation Sheet- 1</b>	<b>Preparing report</b>
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Techniques for Preparing report

Step 1. prepare important materials

Steps 2. Analysis the result

Step 3. Develop report

<b>Operation Sheet- 2</b>	<b>Presenting Recommendation</b>
---------------------------	----------------------------------

**Techniques for Presenting Recommendation**

Step1.analysis the work

Step 2. Identify the wekenes and strangths

Step 3. Put recomandations

<b>Operation Sheet- 3</b>	<b>Following recommendation</b>
---------------------------	---------------------------------

**Techniques for Following recommendation**

Step1. see the recommendations.

Step 2. see the corrective options.

Step 3. Following the recommendations.

<b>Operation Sheet- 4</b>	<b>Experimenting Propos solutions</b>
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**Techniques for Experimenting Propos solutions**

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**Step1. List deferent propose solutions**

**Step 2. Experiment each propose solutions.**

**Step 3. Select the best propose solution**

LAP Test	Practical Demonstration
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within 8-12 hours.

Task 1: Preparing report

Task2: Presenting Recommendation

Task 3: Following recommendation

Task 4: Experimenting Propos solutions



**BASICHOME/OFFICE  
ELECTRICAL/ELECTRONICS  
EQUIPMENT SERVICING  
Level-II**

# **Learning Guide-34**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code EEL HOS2 M09 -4 LG-34**

**TTLM Code: EEL HOS2 M09 TTLM 1019v1**

**LO4: Implement solution**

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<b>Instruction Sheet</b>	<b>Learning Guide # 34</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying objectives
- Identifying Resource
- Identifying Timeline

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to:

- Identify objectives
- Identify Resource
- Identify Timeline

**Learning Instructions:**

6. Read the specific objectives of this Learning Guide.
7. Follow the instructions described below 3 to 6.
8. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.
9. Accomplish the “Self-check 1, Self-check 2 and Self-check-3
10. Do the “LAP test”

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<b>Information Sheet-1</b>	Identifying objectives
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#### 4.1. Identifying objectives

##### INTRODUCTION

The term learning means changes in our behavior, attitude, knowledge and skills. In other words we can say that through learning we can feel permanent changes in our self. If we are not feeling any changes in our above skills then it will not be called as learning. The learning is a type of reinforcement, which may learn a change in behavior enduring by strengthening and intensifying certain aspect of an individual behavior. Learning may be described as the process of acquiring the ability to respond adequately to a situation, which may or may not have been previously encountered.

**Components of learning objectives:-** The learning objectives has the following components:-

1. Audience- Audience is the target of learning objective and the audience character.
2. Behavior - Behavior is expected from the learner to show the audience has learned something from the instructor.
3. Condition-Under what condition will the learner be expected to demonstrate his/her knowledge. It is the responsibility of instructor to create an atmosphere of learning for grasping the memory from the learning environment.

**Main characteristics of good learning objective**

1. The learning objective should identify learning outcomes: – The main objective of learning is reflection. The objective needs to state what the learner is to perform, not how the learn lesson.
2. The learning objective should be consistent with course goal – it is necessary that the learning objective should be consistent with the course goal. When objective and goals are not consistent two avenues of approach will be available. - Change the objective or - Change the course goal
3. The learning objective should be precious:- Its some have difficulties to strike a balance between too much and too little precious in an objective. There should be a free line between choosing objective that reflects an important and meaningful outcome of instructions and objective. To make the objective of learning the affective steps are as under:- - Starts class on schedule. - Present material listed in lesson plans and follows the general outline. - Use following traits and techniques



while conducting instruction: flexibility, spontaneity, provides empathy, and compassion uses good questioning techniques, is an active listener, gets feedback, uses positive reinforcement, and provide counseling. - Facilitator directs and guides the learner towards finding the correct answer to their questions, rather than being an answering service.

Provide coaching. - Demonstrates new or difficult material in manner that may be seen and understood by the learners. - Evaluates learner in the prescribed manner. - Grades tests and distributes scores as required. - Completes class roster and other form at end of training session and deliver them to the training department. - Completes all learning activities and required function, during allotted time period.

**Learning Objective and Techniques of Motivation** Knowledge, Understanding, application and creativity can be used as criteria for selecting the appropriate techniques of motivation.

**1) Knowing Objectives:** This objective is achieved to develop the recall and recognition abilities .it is the lowest learning objective and concerns with the environment of objects. The reward, praise, punishment and reproof techniques of motivation may be employed to achieve knowledge objective. The concrete form of motivation is effective for this purpose.

**2) Understanding objectives:** The understanding objective is realized by developing the abilities of seeing relationship, discrimination, cite example and generalization, the environment and content both are equally important for providing appropriate learning experiences to the students. The praise, success, punishment and failure techniques of motivation can assist in achieving this objective.

**3) Application of objectives:** An application objective is achieved by developing the abilities of reasoning, hypothesizing, inferring, and prediction. The perception and expectancies of the students play the significant role. The success and failure, cooperation and competition knowledge of results and attitude, techniques of motivation can help in realizing the objective of application.

**Creativity objectives:** The creativity is the highest objective of the cognitive domain. This can be achieved by satisfying the highest needs of a person and employing internal motivation. The analysis, synthesis and evaluation or Judgment abilities are developed for achieving this objective. The context is most important and environment is least important. The ego environment and self-motivation is essential for creativity. The level of aspiration, novelty and attitude, techniques of motivation can be used for achieving creativity objective.

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: for each of the following questions fill in the blank space**

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1. What are the Components of learning objectives

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

2. List down Main characteristics of good learning objective

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_



<b>Information Sheet-2</b>	Identifying Resource
----------------------------	----------------------

#### ***4.2. Identify needed resources***

Resources that are relevant to troubleshoot identify and analyzing problems like information, people.

What resources do I need?

e.g. Books, internet, lab manuals, circuit diagrams etc.

Where will I get them?

e.g. we will gate books from library, friends, families etc

How long will it take? The time will determine according to the given task difficulty.

What can others offer?

Are there any special requirements?



TABLE 1

Identifying resources and needs

	Resources	needs	example
<p>People/organizations to form part of the network, Potential data sources to form the basis of the system.</p>			<p>Gain cooperation . ' of different individuals involved. Develop way of collecting information on a specific core area, e.g. usage of electronics equipment</p>
<p>Human resources :skills and expertise on data selection, electrical issues; faulty areas</p>			<p>Training in specific aspects of data collection. Advocacy to increase awareness of the purpose of data collection</p>
<p>Infrastructure to collect data and communicate b/n members</p>			<p>Need internet connection to facilitate communication, or mailing list of member contact. Data entry software assist with data analysis</p>
<p>Capacity for financing data collection or providing time to undertake activities</p>			<p>Staff time to assist with data analysis and net work coordination. Finances to cover provision of data entry software. Finance to cover venue and travel</p>





Self Check #1	Written test
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Direction: For each of the following questions choose the best answer**

3. Which of the following is a resource
- |           |             |
|-----------|-------------|
| C. Books  | C. Internet |
| D. People | D. All      |
4. Where will we get resources
- |                         |             |
|-------------------------|-------------|
| C. Libraries            | C. Families |
| D. usage of electronics | D. all      |



<b>Information Sheet-3</b>	Identifying Timeline
----------------------------	----------------------

### 3.2. Identify timelines in accordance with plan

We like to begin at the end

On a calendar, mark down when your first contest is, then work your way backwards keep all the items you must complete in mind.

Adjust the dates depending upon how much time you will have.

What you must complete by your first qualifier:

- . Pick a topic
- . Research that topic
- . Come up with an innovative solution
- . Share that solution
- . Write a presentation for judges
- . Create props and poster boards
- . Practice your presentation

<b>Self Check #1</b>	<b>Written test</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: I. WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

3. One of the time management is mark starting date.
4. Adjust the dates depending upon how much time you will have is time planning.

<b>Operation Sheet- 1</b>	<b>Identifying Resource</b>
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#### **Techniques for Identifying Resource**

Step 1 . analysis issues

Step 2. List different resource

Step 3. Identifying resource.

<b>Operation Sheet- 2</b>	<b>Identifying Timeline</b>
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#### **Techniques fore identifying timeline.**

**Step 1. Analysis the work.**

**Step 2. Justify the resources.**

**Step 3 . Locate the time line.**



<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks .

**Task 1:** Identifying objectives

**Task 2:** Identifying Resource

**Task 3:** Identifying Timeline

References: **Buy Electronic Equipment Schematic Diagrams**

- 1) [www.Radiolocman.com](http://www.Radiolocman.com)
- 2) [www.justmanuals.com](http://www.justmanuals.com)
- 3) [www.servicemanuals.net](http://www.servicemanuals.net)



# **BASIC HOME/OFFICE ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING**

**Level-II**

## **Learning Guide-35**

**Unit of Competence: Apply Routine Problem Solving  
Techniques**

**Module Title: Applying Routine Problem Solving  
Techniques**

**LG Code EEL HOS2 M09 -5 LG-35**

**TTLM Code: EEL HOS2 M09 TTLM 0919v1**

**LO5: Evaluate/ monitor results and outcome**

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<b>Instruction Sheet</b>	<b>Learning Guide#35</b>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Identifying processes and improvements
- Preparing recommendations and submitted to superiors.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Identify processes and improvements
- Prepare recommendations and submitted to superiors

**Learning Instructions:**

26. Read the specific objectives of this Learning Guide.

27. Follow the instructions described below 3 to 5.

28. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3.

29. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.

**30.** Do the “LAP test” (if you are ready

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<b>Information Sheet-1</b>	Identifying Processes and improvements
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**a. Identify Processes and improvements**

- Identify process is used to things to accomplished on program, used to time management
- Continuous improvements for different problems solving processes.

**Different between monitoring and evaluation**

**Monitoring**

- Continuous, regular
- Focus on input, process and output of activities
- Need information during activities finished activities

**Evaluation**

- periodic
- focus on only output
- need information after

<b>Self Check #1</b>	<b>Written test</b>
----------------------	---------------------

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: WRITE TRUE IF THE STATEMENT IS TRUE OR FALSE IF THE STATEMENT IS FALSE**

4. Monitoring Focus on input, process and output of activities
5. Monitoring needs information after finished
6. Evaluation is Continuous, regular



<b>Information Sheet-2</b>	Preparing and submitting Recommendation
----------------------------	-----------------------------------------

### 5.2. Prepare and submit Recommendation

Prepare recommendations and submitted to supervisors:

- To ask any equations the problem can be occurred by what mechanism.
- To recommend so many important idea for the problem occurring equipment.
- To supervise or appreciate the recommended idea generated person for best solution for that problem.

Timely and quality reporting problems to technical expertise

Quality reporting requires effective follow-up and implementation of recommendations by many technicians

A standing supervisor structure with a mandate to Coordinate and prepare reports to and engage with the qualitative maintenance procedures ( the periodic review and special procedures)

Coordinate and follow-up and

implementation of recommendations/ decisions emanating from these mechanisms

<b>Self Check #1</b>	<b>Written test</b>
----------------------	---------------------

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

**Directions: FOR THE FOLLOWING QUESTION FILL IN THE BLANK SPACE**

**2.** Prepare recommendations and submitted to supervisors to

**D.** \_\_\_\_\_

**E.** \_\_\_\_\_

**F.** \_\_\_\_\_





<b>Operation Sheet- 1</b>	<b>Identify processes and improvements</b>
---------------------------	--------------------------------------------

**Techniques for Identify processes and improvements**

- Step1 . Analysis the work**
- Step 2 . Identify the weakness**
- Step 3 . Identify the processes and improvements.**

<b>Operation Sheet- 2</b>	<b>Prepare recommendations and submitted to superiors</b>
---------------------------	-----------------------------------------------------------

**Techniques for Prepare recommendations and submitted to superiors**

- Step1. Analysis work.**
- Step2 . prepare recommendations.**
- Step3 . submitted to superior.**



<b>LAP Test</b>	<b>Practical Demonstration</b>
-----------------	--------------------------------

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks.

**Task 1:** Identify processes and improvements

**Task 2:** Prepare recommendations and submitted to superiors

**References:** Samuel M. Goldwasser “Notes On The Troubleshooting And Repair Of Small Switch Mode Power Supplies”. Here is the website link <http://www.repairfaq.org/sam/smpsfaq.htm>

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No	Name of trainer	Qualification	Region	E-mail



## Unit of Competence: Apply Routine Problem Solving Techniques

### LO 1: Analyze the problem

Information Sheet-1	Evaluating Issues/concerns
---------------------	----------------------------

#### Self Check #1

Answer key

I

1. True
2. False

II

1. D
2. B

Information Sheet- 2	Identifying Possible cause
----------------------	----------------------------

#### Self Check #1

- 1.False
2. True
3. TRUE
4. TRUE
5. TRUE

Information Sheet-3	Developing causes of problem
---------------------	------------------------------

#### Self Check #1

1. FALSE



2. TRUE

## LO 2: Identify possible solutions

<b>Information Sheet-1</b>	Considering safety and operating procedures
----------------------------	---------------------------------------------

**Self Check #1**

1. D

2. B

<b>Information Sheet-2</b>	Considering Strengths and weaknesses
----------------------------	--------------------------------------

**Self Check #1**

1. TRUE

2. TRUE

<b>Information Sheet-3</b>	Corrective action
----------------------------	-------------------

**Self Check #1**

1. TRUE

2. TRUE

## LO3: Recommend solution to higher management

<b>Information Sheet-1</b>	Preparing report
----------------------------	------------------

**Self Check #1**

1. TRUE

2. TRUE

3. TRUE

4. FALSE



<b>information Sheet-2</b>	Presenting Recommendations
----------------------------	----------------------------

**Self Check #1**

1. TRUE
2. FALSE
3. TRUE

<b>Information Sheet-3</b>	Following recommendation
----------------------------	--------------------------

**Self Check #1**

1. TRUE
2. TRUE

<b>Information Sheet-4</b>	Experimenting Propos solutions
----------------------------	--------------------------------

**Self Check #1**

1.
  - Improve your health
  - Increase your management skills
  - Complete the assignments to the best of your ability
  - Finish the assignments as soon as possible

## LO4: Implement solution

<b>Information Sheet-1</b>	Identifying objectives
----------------------------	------------------------

**Self Check #1**

1. Audience
2. Behavior
3. Condition



<b>Information Sheet-2</b>	Identifying Resource
----------------------------	----------------------

**Self Check #1**

1. D
2. D

<b>Information Sheet-3</b>	Identifying Timeline
----------------------------	----------------------

**Self Check #1**

1. TRUE
2. TRUE



## Module Title: - Working In Team Environment

### Answer key

LO1			
NO	Self-Check -1	Self-Check -2	Self-Check -3
1	C	C	True
2	D	B	True
3	B	A	False

LO2			
NO	Self-Check -1	Self-Check -2	Self-Check -3
1	True	False	False
2	False	False	True
3	False	True	False

LO3						
NO	Self-Check -1	Self-Check -2	Self-Check -3	Self-Check -4	Self-Check -5	Self-Check -6
1	D	True	True	True	True	D
2	D	False	True	True	True	B
3	B	True	....	False	....	....