Confectionary processing

Level-II

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Module Title: - Operating a Process Control Interface

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LG #31	LO #1 Navigate the process control interface

Instruction sheet

This Learning guide covers the skills and knowledge required to operate a computer-based interface to modify and/or interrogate (investigate) a control system:

- conforming readiness of the control interface and related operation
- Using hard ware to operate the interface.
- Using page link to move between screens
- Acknowledging message and alarms
- Accessing required information from screen displays.
- Recording and reporting interface system malfunction

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

- conform readiness of the control interface and related operation
- Use hard ware to operate the interface.
- Use page link to move between screens
- Acknowledge message and alarms
- Access required information from screen displays.
- Record and reporting interface system malfunction

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Learning Instructions:

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- conforming readiness of the control interface and related operation

1.1 Conform readiness of the control interface and related operation

An interface describes a system's boundary with respect to external entities that can impact or influence each other in unidirectional or bidirectional manner.

1.1.1 Elements of a Software Interface Control Document.

An ICD is a document that describes the interface(s) to a system or subsystem. It may describe the inputs and outputs of a single system or the interface between two systems or subsystems. An ICD should only describe the interface itself, and not characteristics of the systems which realize or use it. In general, an ICD does not have to be a textual document, and can come in many forms. For instance, an application programming interface (API) is a form of ICD. Interface descriptions can be created for software, optical, mechanical, thermal, and other interactions. In engineering design and modeling literature, the terms 'interface' and 'interaction' are often used.

The term interface is generally used to denote the shared boundary between two systems facing each other. Today, the development of mobile devices, the remote communication of objects with the internet, the provision of control of devices and the preference of modern visual interfaces have also improved the interface designs. New generation interface designs have more modern visuals menus. It is developed in accordance with internet transfer and control of data. In order to perform these operations, the operating systems are required.

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1.2 Objective of Process Control Interface

Process control interface is used in order to maximize production while maintaining a desired level of Product quality and safety and making the process more economical. Because these goals apply to a variety of industries, process control interface systems

are used in facilities for the production of candy biscuits chemicals, and other confectionary products to control moisture content of the product and other parameters.

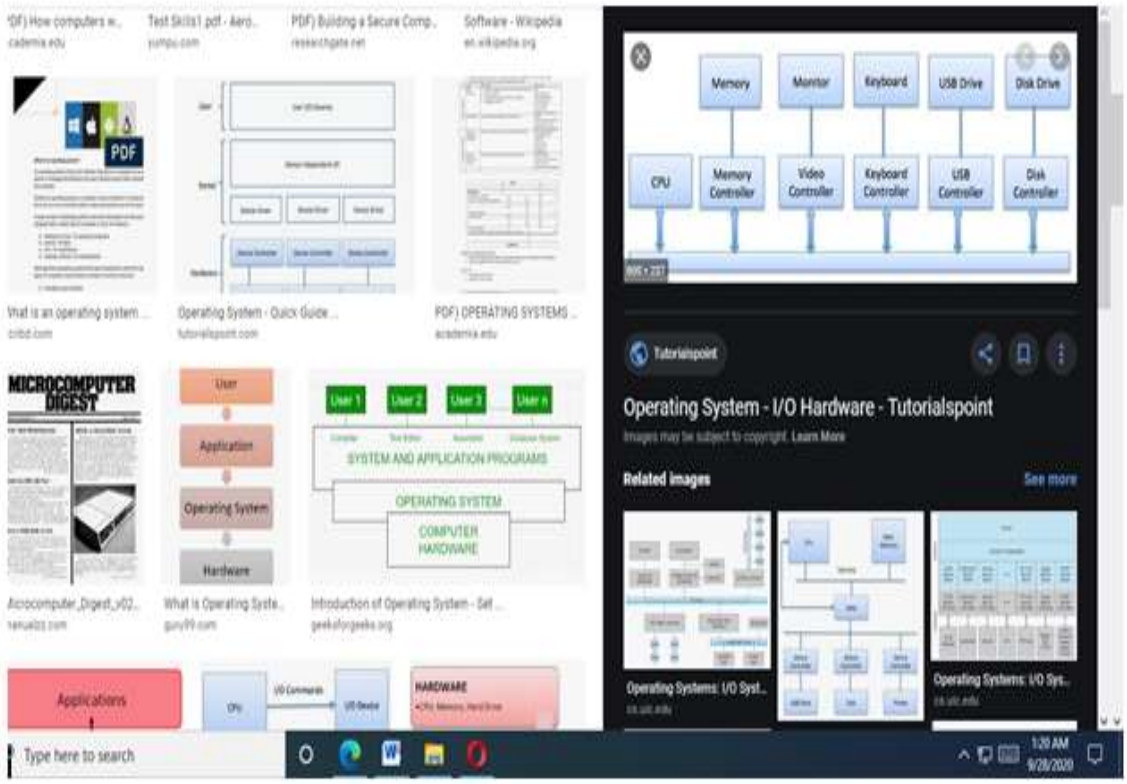

Fig 1.1 Control interface system line

Process control Instrumentation, which provides the direct interface between the process and the control hierarchy, serves as the fundamental source of information about the process state and the ultimate means by which corrective actions are transmitted to the process.

- The function of the process control interface measurement device is to sense the value, or changes in value, of process variables like Temperature, pressure flow rate etc.

Self-check 1	Written test

I Say true or false the following question. (1 point each)

1. Process control interface is used in order to maximize production.

2. The term interface is generally used to denote the shared boundary between two systems facing each other.

I choose the best answer for the following questions 1.5 (point each)

1 Which of the following terms are related with each other?

A. Interface and interaction B. interface and reference point C. Reference and link

2 ---------- describes a system's boundary with respect to external entities that can impact or influence each other in unidirectional or bidirectional manner

A .interaction B interface C. link D reference point

II Explain the following questions briefly?

1. Process control interface**?** 2 points

2. List and define process variables that will be controlled by interface? 3 points

Name ---------- ID, NO----------

Satisfactory rating ≥5 point unsatisfactory rating ≤5 point

Information Sheet 2	Using hard ware to operate the interface

2.1 Using hard ware to operate the interface

Computer hardware includes the physical parts of a computer, such as central processing unit (CPU), monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard..

By contrast, software is the set of instructions that can be stored and run by hardware. Hardware is so-termed because it is "hard" or rigid with respect to changes, whereas software is "soft" because it is easy to change.

Hardware is typically directed by the software to execute any command or instruction. A combination of hardware and software forms a usable computing system, although other systems exist with only hardware. Quite simply, computer hardware is the physical components that a computer system requires to function. It encompasses everything with a circuit board that operates within a PC or laptop; including the motherboard, graphics card, CPU (Central Processing Unit).

Although the physical hardware is the visible part of a computer system, the software is the intelligence of the system that enables the hardware components to work. An operating system (OS) is software that controls a computer. It manages hardware, runs applications, provides an interface for users, and stores, retrieves, and manipulates files. In general, an operating system acts as the middle man between applications and

Hardware an Operating System (OS) is an interface between computer user and computer hardware. An operating system is software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

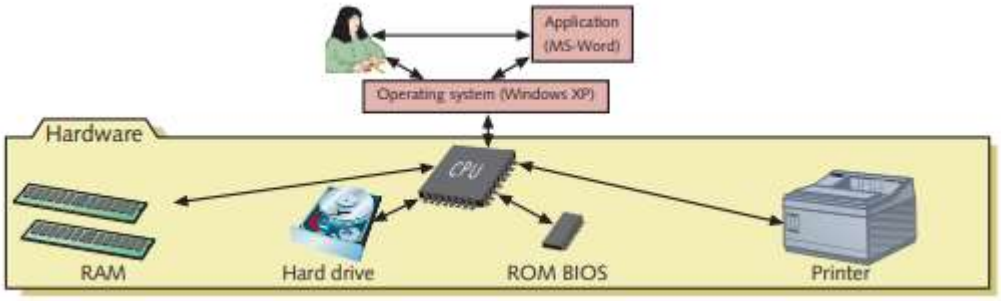

FIG 1.2 users and application depend on the OS to relate to the all hard ware components

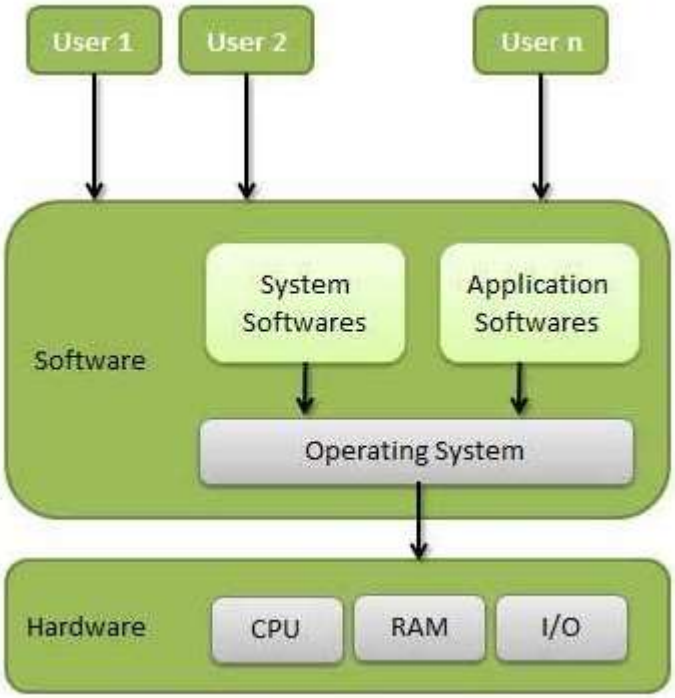

Fig1.3 computer hard ware and software parts

The following are some of important functions of an operating System.

- Memory Management
- Processor Management
- Device Management
- File Management
- Security
- Control over system performance
- Job accounting
- Error detecting aids
- Coordination between other software and users

Self-check 2	Written test

I. Say true or false the following questions (1point each)

1 Software is the set of instructions that can be stored and run by hardware

2. Management is the function of operating system.

II choose the best answer from the given alternative (1point)

1. The function of operating system is:

A .Memory management B. control over the system performance C. job accounting D. all

III Explain the following questions (2 point each)

1 Define computer hard ware?
2 What are the parts under Computer hardware?
3 What does operating system mean?
4 What is the function of operating system?
5 What is the difference between hard ware and software?

Name ---------- ID, NO----------

Satisfactory rating ≥ 6.5 point unsatisfactory rating ≤6.5 point

Information Sheet 3	**Using page link to move between screen**

3.1 Use page link to move between screens

A link (short for hyperlink) is an HTML (hypertext markup language) object that allows you to jump to a new location when you click or tap it. Links are found on almost every webpage and provide a simple means of navigating between pages on the web

A link page is a type of web page that contains a list of links the website owner finds notable to mention, such as partner organizations, clients, friends, or related projects.

- How do you put a link on your desktop

- Resize your Web browser so you can see the browser and your desktop in the same screen.
- Left click the icon located to the left side of the address bar. This is where you see the full URL to the website.
- Continue to hold down the mouse button and drag the icon to your desktop.

Fig 1.4 Adding a Website Link to the Home Screen of any mobile Device

Tap the menu button and tap "**Add to home screen**" (pictured right).

You will be asked to enter a name for the shortcut which Chrome will then add to your home screen.

The webpage icon will appear on your home screen like any other app, shortcut or widget. You can drag it around and put it wherever you like.

Chrome for Android loads the website as a web app when you tap the icon, so you can launch it with a single click, without the need to launch the browser first and then type in the website URL every time.

Other popular browsers such as Firefox for Android can also do this if you tap the menu button, tap the "**Page**" option, and tap "**Add to Home Screen**".

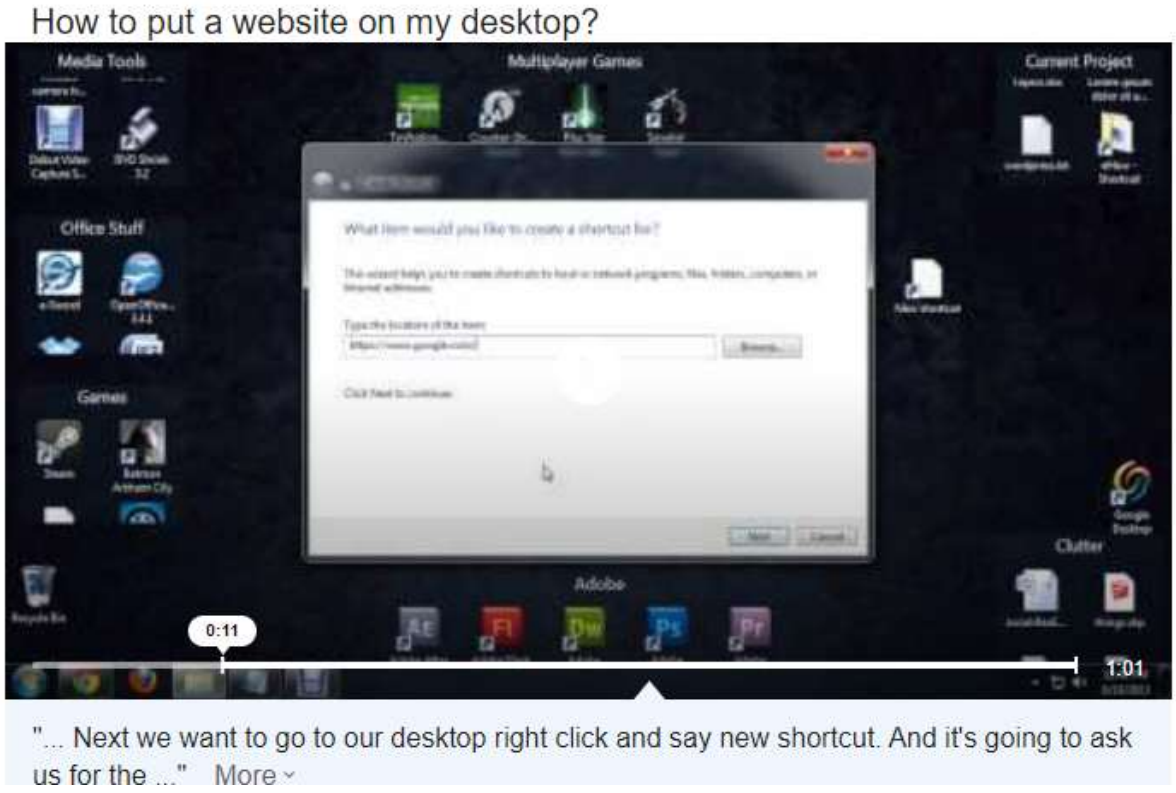

Fig 1.5 Adding a Website Link to the Home Screen of any computer Device

Self-check 3	Written test

I. Say true or false the following questions (1point each)

1. A link is an HTML (hypertext markup language) object that allows you to jump to a new location when you click or tap it.

II Answer the following questions

1. What does link mean? 2 point

2. What is the function of link? 2 point

3 write the steps to put link on the desktop? 2 point

Name ---------- ID, NO----------

Satisfactory rating ≥3.5 point unsatisfactory rating ≤ 3.5 point

Information Sheet 4	Acknowledging message and alarms

3.1 Acknowledging message and alarms

A critical alarm (which is defined in Security Server's Global Settings) will require the person acknowledging to provide login information. These are just a few factors that affect the overall process of acknowledgement.

You can acknowledge an alarm even if it doesn't require acknowledgement. A good reason for doing this would be to add a comment about an alarm. For example, you might acknowledge an alarm only to add a comment if the power source were hit by lightning or when a machine is taken offline for maintenance.

When a system alarm for a space is triggered for any reason, you can stop its alarm actions by acknowledging it through your software. The process of alarm acknowledgment alerts other system administrators that you are taking responsibility for the problem, showing them that you have seen the issue and are investigating or working on resolving the root problem. While this ceases the functions of the alarm, acknowledgment neither removes nor resets the alarm.

4.1.1 Alarm Acknowledge

Procedure

- Right-click the alarm in the Alarms sidebar panel and select
- Select an inventory object in the object navigator. Acknowledge.
- Acknowledge the alarm in the Monitor tab.
- Click the Monitor tab.
- Click Issues, and click Triggered Alarms.
- Right-click an alarm and select Acknowledge.

Table 1 Alarm rates in different display types

Categorical display	Chronological display
	15 per 10 minutes
20 per 10 minutes	20 per 10 minutes
25 per 10 minutes	25 per 10 minutes
30 per 10 minutes	

4.1.2 The dependent variables of alarm acknowledgement

- **Response Time** – Time elapsed after an alarm is raised until the action procedure completed by the operator. Some alarms require multiple actions to complete.
- **Acknowledges Time** – Time operator takes to acknowledge the alarm after it gets displayed in the alarm window. The alarm message can be acknowledged by double clicking the message displayed in the alarm window.

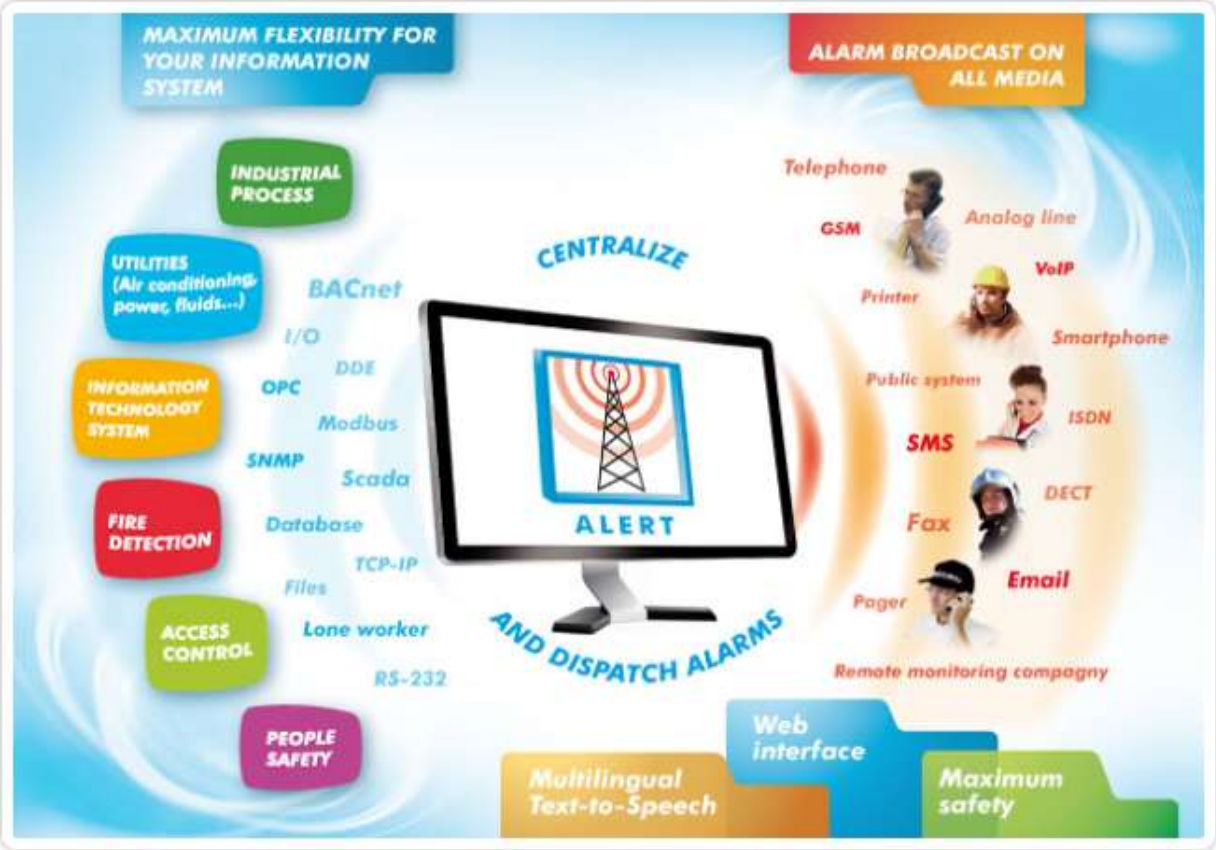

Fig. 1.6 Alarm panel

Fig1.7 managing the Alarm process by using Delta V operating system

Powerful operator interface software (Delta V Operate software) provides a powerful environment for process operation, with built-in features for easy information access. Whether you are viewing the highest-priority alarm, the next display, or detailed module information, common operator navigation is consistent and intuitive.

Self-check 4	Written test

I. Say true or false the following questions (2 point each)

1. Response Time is Time elapsed after an alarm is raised until the action procedure completed by the operator.

2. Delta V Operate provides a powerful environment for process operation, with built-in features for easy information access.

II Answer the following questions

1. Where you see message and alarm in the factory? 2 point
2. What you read from the Alarm panel board? 2 point
3. What is response Time mean during Alarm acknowledgement? 2 point

Name ---------- ID, NO----------

Satisfactory rating ≥5 point unsatisfactory rating ≤5 point

Information Sheet 5	Accessing required information from screen displays

5.1 Accessing required information from screen displays

Access controls are security features that control how users and systems communicate and interact with other systems and resources. Access is the flow of information between a subject and a resource. All display interfaces continuously fetch the frame buffer data (the buffer in the system memory that contains the image to be displayed) and transmit the same to the display.

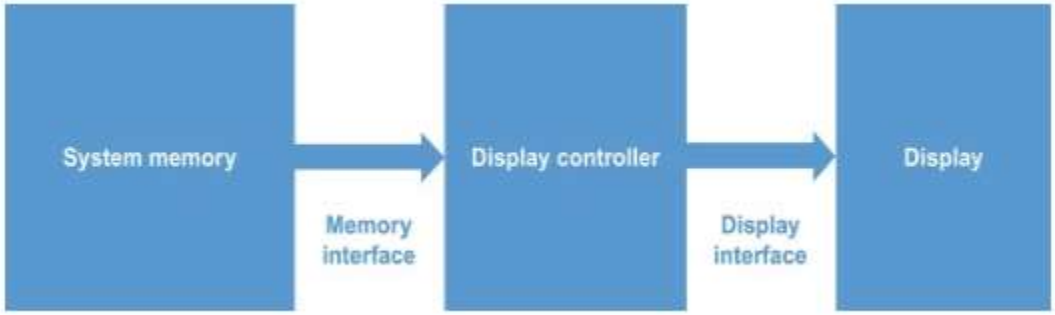

Fig 1.8 Display memory

- **Create a form by using the Form tool**

You can use the Form tool to create a form with a single mouse-click. When you use this tool, all the fields from the underlying data source are placed on the form. You can start using the new form immediately, or you can modify it in Layout view or Design view to better suit your needs.

- **Use the Form tool to create a new form**

In the Navigation Pane, click the table or query that contains the data you want to see on your form.

- **On the Create tab, in the Forms group, click Form.**

Access creates the form and displays it in Layout view. In Layout view, you can make design changes to the form while it is displaying data. For example, you can adjust the size of the text boxes to fit the data, if necessary

Self-check 5	Written test

I. Say true or false the following questions (2 point each)

1. The Navigation Pane, click the table or query that contains the data you want to see

2. Access controls are security features that control how users and systems communicate and interact with other systems and resources

II Explain the following questions?

1. From where you read information of the control interface? 3 point
2. What is the information displayed on the circuit board? 3 point

Name ---------- ID, NO----------

Satisfactory rating ≥5 point unsatisfactory rating ≤ 5 point

Information Sheet 6	Recording and reporting interface system malfunction

6.1 Recording and reporting interface system malfunction

System Malfunction certain system events can result in the pop-up message “system malfunction call technician”. A system malfunction is an event that could be related to a failed component, or events that may not necessarily indicate an equipment problem. If this message clears on its own and the equipment operates normally, it should be ignored. If it does not clear, or comes back repeatedly after being dismissed, the system should be checked at the owner’s earliest convenience. The user can press the right side button to dismiss the notice.

The regular run mode screen will then appear except “SYSTEM MALFUNCTION” will appear in place of the day/time. If the error has not disappeared within 24 hours, the above display will return. If the error code disappears, “SYSTEM MALFUNCTION” will disappear and the day/time will reappear

Fault reporting is maintenance concept that increases operational availability and that reduces operating cost through three mechanisms.

- Reduce labor
- Eliminate diagnostic testing down-time

- Provide notification to management for degraded operation

Condition-based maintenance

6.1.1 Recording problems

No serious attempt to use measurement for software QA would be complete without rigorous means of recording the various problems that arise during development, testing, and operation. No software developer consistently produces perfect software the first time. Thus, it is important for developers to measure those aspects of software quality that can be useful for determining

- how many problems have been found with a product
- how effective are the prevention, detection and removal processes
- when the product is ready for release to the next development stage or to the customer
- how the current version of a product compares in quality with previous or competing versions

The terminology used to support this investigation and analysis must be precise, allowing us to understand the causes as well as the effects of quality assessment and improvement efforts. In this section we describe a rigorous framework for measuring problems

In general, we talk about problems, but Figure below depicts some of the components of a problem's cause and symptoms.

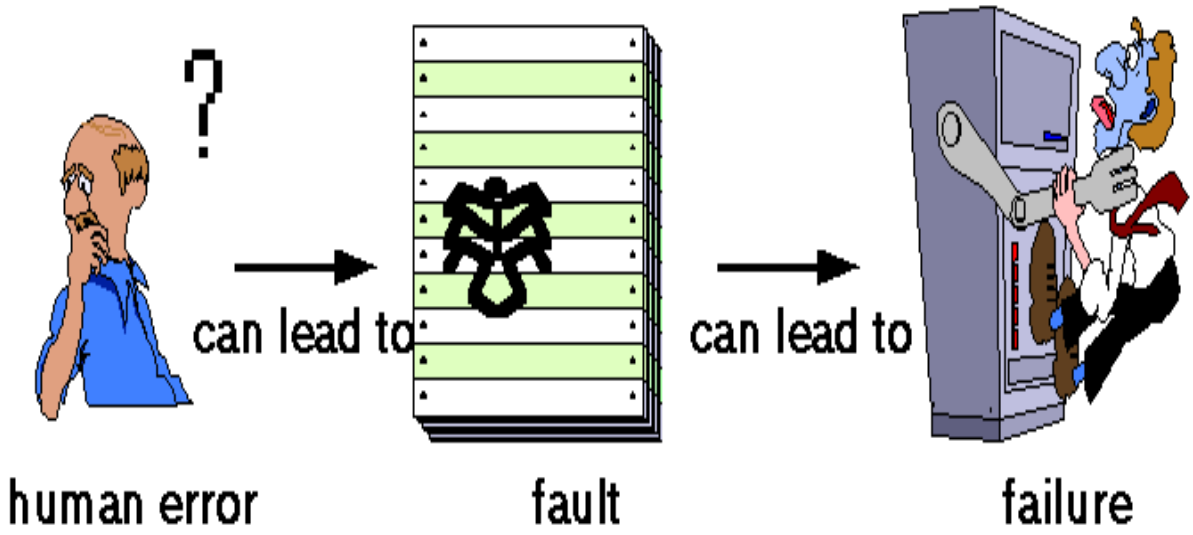

Fig 1.9 software Terminology

A fault occurs when a human error results in a mistake in some software product. That is, the fault is the encoding of the human error. For example, a developer might misunderstand a user interface requirement, and therefore create a design that includes the misunderstanding. The design fault can also result in incorrect code, as well as incorrect instructions in the user manual. Thus, a single error can result in one or more faults, and a fault can reside in any of the products of development

6.2 What Is Corrective Action?

Corrective action is an aspect of quality management that aims to rectify a task, process, product, or even a person's behavior when any of these factors produce errors or have deviated from an intended plan. Corrective actions can be thought of as improvements to an organization to eliminate undesirable effects. Corrective actions

can apply to an entire project when the deliverables, whether tangible or service, deviate from the required output.

6.2.1 What Is a Corrective Action Plan?

A *corrective action plan (CAP)* describes, step by step, how you plan to resolve a problem or nonconformity. A CAP details the resources needed to correct the causes of a problem in the most cost-effective and cost-efficient way. The plan's objectives and benefits include the following:

- It provides a standard way to address deficiencies.
- It offers premade templates that describe what types of information you need in your plan.
- It provides a process to start, research, implement, and close out a corrective action program.
- It clarifies team member or contractor responsibilities.
- It specifies what types of issues require a corrective action plan

Self-check 6	**Written test**

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

I Say true or false the following questions (1 point each)

1 A *corrective action plan (CAP)* describes, step by step, how you plan to resolve a problem or nonconformity.

3. A system malfunction is an event that could be related to a failed component.

II Choose the best answer from the given alternative

1. ---------- Describes, step by step, how you plan to resolve a problem or nonconformity.

A. *corrective action plan B.* Recording problems C. Fault D .all

II Explain the following questions

1. Record malfunction/fault/ displayed? 1point
2. Report the malfunction/fault/ displayed to supervisor or manager? 2 point
3. .What does control interface malfunction mean? 2 point
4. What is the cause of control interface malfunction and corrective action that we take? 2 point

Satisfactory rating ≥5 point unsatisfactory rating ≤ 5 point

Operation sheet 1	**Using hard ware to operate the interface**

Procedure:

Steps 1 Hold computer mouse

Steps 2 Right click on computer screen

Steps 3 required page link (API)

Operation sheet 2	Using page link to move between screens

Procedure:

Step 1 Resize your Web browser so you can see the browser and your desktop in the same screen.

Step 2 Left click the icon located to the left side of the address bar

Step3 Continue to hold down the mouse button and drag the icon to your Desktop

Step3 link is moved on screen

Operation sheet 3	**Acknowledging message and alarm**

Procedure:

Step 1 Right-click the alarm in the Alarms sidebar panel and select Acknowledge.

Step 2 Acknowledge the alarm in the Monitor tab.

Step 3 Select an inventory object in the object navigator.

Step 4 Click the Monitor tab.

Step 5 Click Issues, and click Triggered Alarms.

Step 6 Right-click an alarm and select Acknowledge.

Operation sheet 4	Accessing required information from screen displays

Procedure**:**

Step 1 In the Navigation Pane, click the table or query that contains the data you want to see on your form.

Step 2 On the Create tab, in the Forms group, click Form.

Step 3 Access creates the form and displays it in Layout view

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks with in 2 hour for each task. The project is expected from each student to do it.

Task 1 acknowledging message and alarm

Task 2 Use page link to move between screens

Task 3 use hard ware to operate interface

Task 4 access required information from screen displays

LG 31#	LO #2 Use interface system to operate and maintain a process within required parameters

Instruction sheet

This Learning guide covers the skills and knowledge required to operate a computer-based interface to modify and/or interrogate (investigate) a control system:

- Starting, monitoring and shut down individual items of equipment and/or processes.
- Selecting equipment status and altering.
- Activating sequences to initiate process operation
- Recognizing equipment bad signal or bad measurement

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

- Start monitoring and shut down individual items of equipment and/or processes.
- Select equipment status and altering.
- Activate sequences to initiate process operation
- Recognize equipment bad signal or bad measurement.

.

Learning Instructions:

Learning Instructions:

7. Read the specific objectives of this Learning Guide.
8. Follow the instructions described below.
9. Read the information written in the information Sheets
10. Accomplish the Self-checks
11. Perform Operation Sheets
12. Do the “LAP test”

Information Sheet 1	Starting, monitoring and shut down individual items of equipment and/or processes

1.1 Plant Shut-down sequence

The plant shut-down sequence is reverse order of start-up sequence. After shut-down of power block, the shut-down of auxiliary systems depends on. When next start-up is expected soon, the auxiliary systems shall remain in operation, whereas the auxiliary systems shall be shut down and placed on preservation status when long time shut-down is expected.

Every designated “seasonal water system” must have a state-approved start-up procedure. And, every operating season, before serving drinking water to the public, you must certify that you completed the approved start-up procedure to ensure the system is ready to supply safe drinking water to customers. When you are ready to close your seasonal water system for the year, you should inspect it, clean it, and protect it so it will be ready to re-open the next season. If you perform a few shutdown procedures, your water system will be in good shape and need fewer repairs and maintenance work before you re-open it

- Seasonal water system monitoring:
  1. Evaluate the line system
  2. Inspect the line system using the inspection
  3. Self-Inspection Checklist
  4. Look for problems with the system that need attention or repair during the off-season.
  5. you will turn off the power supply

1.1.1 Shut down the sources

For most sources, you will want to turn off the power supply in the off-season. Be sure to take steps necessary to protect your source, equipment, and structures. Consider freezing, vandalism, vermin, flooding, severe rain, and so on. Depending on your

situation relative to these factors, you may need to leave the power supply to the source turned on. If you are closing the system through the winter, take steps to protect the

- ❖ Prepare For Process System Shutdown
    - ➢ **Performance Statements**

In achieving this unit you must have the knowledge of the following terms

- Effectively obtained operational instructions
- Accurately determined shutdown time and made appropriate preparations for shutdown
- Effectively briefed relevant personnel on shutdown procedures
- Accurately identified real and potential hazards and protected against them
- Ensured that all information supplied and recorded is accurate, complete and legible
- Worked safely in accordance with operational instructions and associated Safe Systems of Work.

- ❖ Knowledge and Understanding

You must know and understand:

- How to access and interpret (oral and written) shutdown instructions
- How to access and interpret operational instructions (to include sequence of shutdown, recommended rate of shutdown)
- The real and potential shutdown hazards (to include standby equipment operational, vents, noise, and heat)

Self-Check – 1	Written test

Name…… ID…… Date…….

II say true or false the following questions. 1.5 point

1 The plant shut-down sequence is reverse order of start-up sequence

III Choose the best answer from the following. 1.5 point

1 ---------- Is the reverse step of shut down sequence

A. Startup sequence B. closed line C. A and B D. none

Answer the following questions

1 What are the steps that you follow to shut down plant machineries? 3 point

And explain each step?

2 What does plant mean? Explain with its components**.** 2 point

3 What is the use of shutting down plant? 2 point

Note: Satisfactory rating ≥ 5 points unsatisfactory ≤5points

Information Sheet 2	Selecting equipment status and altering

2.1 Selecting equipment status and altering

Selecting equipment is the best instrument for the production and is a very important part of equipment management. Some criteria to consider when selecting machinery equipment are listed below.-

- Why and how will the equipment be used?
- What are the performance characteristics of the instrument? Is it sufficiently accurate and reproducible to suit the needs of the testing to be done?
- What are the facility requirements, including the requirements for physical space? Will the cost of the equipment be within the laboratory's budget?
- Will reagents be readily available?
- Will reagents be provided free of charge for a limited period of time? If so, for how long?
- How easy will it be for staff to operate?
- Will instructions be available in a language that is understood?
- Is there a retailer for the equipment in the country, with available services? • Does the equipment have a warranty?

There are also safety issues to consider:-

If the decisions about purchasing are made outside the factory, for example by a central purchasing body, the factory manager should provide information that will support selecting equipment that will best serve the needs of the factory.

In areas where there are national programs for purchasing standard equipment purchase, rent or lease equipment? When making this decision, it is a good idea to factor in repair costs. The initial cost of an instrument may seem reasonable, but it may be expensive to repair. Also consider savings that could be negotiated if the laboratory needs more than one piece of equipment. The manufacturer should provide all of the necessary information electing and purchasing food processing equipment can be time consuming and difficult

The first step in selecting and purchasing food-processing equipment is a clear identification of the need. The expense of purchasing and installing capital equipment can be a tremendous burden for any business.

Once the need has been clearly identified, the second step in selecting and purchasing food-processing equipment is to define the requirement. What will satisfy the need? This step requires the most work, but achieves the highest reward. A complete definition of your requirement will enable you to effectively communication with potential suppliers. One type of document that is commonly used by government and industry to define requirements is called a specification

- **Specification**

A specification is a statement that includes a detailed description or lists features of equipment. A specification will include all the technical details and requirements that the purchaser has in mind for the equipment. The specification will:

- Define what is needed for the equipment. It should identify the minimum requirements.
- For custom equipment describe to the manufacturer features, capabilities.
- Construction materials are needed for that equipment.
- Provide a receiving document to verify correct delivery.

A specification could be**:**

- A brief statement that includes a specific manufacturer's model number.
- A generic description for equipment that many manufacturers could provide.

Weight.

When writing a specification, keep it:

- Simple, but exact.
- Easily identifiable using common terms.
- Reasonable, as unnecessary specific detail may be expensive and restrictive.
- Capable of being met by several bidders for the sake of competition.
- Clear and understandable

Self-Check – 2	**Written test**

Name…… ID…… Date…….

II say true or false the following question 2 point

1. Selecting equipment is the best instrument for the production and is a very important part of equipment management.

II Explain the following questions briefly?

1 what is the requirement to select equipment? 3 point

2 what is specification? 2 point

3 what is the step that you follow to select and buy equipment? 3 point

Note: Satisfactory rating ≥5 points unsatisfactory rating ≤ 5 points

Information Sheet 3	Activating sequences to initiate process operation

3.1 **Activating sequences to initiate process operation**

3.1.1 Plant Start-up Preparation Sequence

Energizing of Electrical and I&C System Energizing of plant electrical, instrumentation and control system shall be performed by receiving start-up electricity from the grid. Electricity export system to the grid shall be made as ready, too. Details of energizing sequence and making electricity export system ready shall be described in separate documents.

3.1.2 Start-up of Cycle Make-up System

Permissive: Demi. Water storage tank level > Low - Low If filling is required; cycle make-up system shall be started first. If filling is not required, the start-up of cycle make-up system shall be performed after the operation of compressed air system. Operation of cycle make-up system shall be confirmed by the following conditions.

Table 2 start-up preparation sequence of water line

Equipment/System	Condition	Tag No.	Remarks
Demi. water storage tank	Water inlet valve "Open"		
One cycle make-up pump	- Running - Discharge pressure > Low		If instrument air is not available, manual operation is required.

.

Table 3 filing start up level

Equipment/System	Condition	Tag No.	Remarks
Fuel Gas Supply Line	Gas pressure in normal pressure		Substitute nitrogen filled fuel gas line with natural gas
HRSG HP drums	Level ≥ Start-up level		Start-up level shall be defined by HRSG supplier.
HRSG IPdrums	Level ≥ Start-up level		Start-up level shall be defined by HRSG supplier.
HRSG LPdrums	Level ≥ Start-up level		Start-up level shall be defined by HRSG supplier.
Condenser hotwell	Level > Low		
Circulating water pump pit	Level > Low		
Closed cooling water head tank	Level > Low		
Raw water storage tank	Level > Low		
Demi. water storage	Level > Low		

.

3.1.3 Start-up of Aux. Circulating Water System An aux. circulating water system shall be started in order to supply cooling water to closed cooling water system, especially for supplying cooling water to air compressors and seal water coolers of vacuum pumps. In order to prevent the aux. circulating water pump from operation under its minimum flow, the water flow circuit to closed cooling water heat exchangers shall be secure

Self-Check – 3	Written test

Name…… ID…… Date…….

I Say True or False the following Questions. 2 point

1 .Energizing of plant electrical instrumentation and control system shall be performed by receiving start-up electricity from the grid.

2 .An aux. circulating water systems shall be started in order to supply cooling water to closed cooling water system

II Explain the following questions briefly?

1 Explain activating sequences to initiate equipment mean? 2 point

2 Explain what does start up mean. 2 point

Note: Satisfactory rating ≥ 4 points unsatisfactory rating ≤ 4 points

Information Sheet 4	Recognizing equipment bad signal or bad measurement

4 1.Recognizing equipment bad signal or bad measurement

Function checks In order to verify that equipment is working according to the manufacturer's specifications, it is necessary to monitor instrument parameters by performing periodic function checks. This should be done before using the instrument initially, then with the frequency recommended by the manufacturer. These function checks should also be done following any instrument repairs. Some examples of function checks are daily monitoring of temperatures and checking the accuracy of wavelength calibration.

Electronic test equipment is used to create signals and capture responses from electronic devices under test (DUTs). In this way, the proper operation of the DUT can be proven or faults in the device can be traced. Use of electronic test equipment is essential to any serious work on electronics systems.

Practical electronics engineering and assembly requires the use of many different kinds of electronic test equipment ranging from the very simple and inexpensive (such as a test light consisting of just a light bulb and a test lead) to extremely complex and sophisticated such as automatic test equipment (ATE). ATE often includes many of these instruments in real and simulated forms.

Types of test equipment

Fig 1.10 Basic equipment Test

The following items are used for basic measurement of voltages, currents, and components in the circuit under test.

- Voltmeter (Measures voltage)
- Ohmmeter (Measures resistance)
- Ammeter, e.g. Galvanometer or Millimeter (Measures current)
- Multimeter e.g., VOM (Volt-Ohm-Millimeter) or DMM

The following are used for stimulus of the circuit under test:

- Power supplies
- Signal generator
- Digital pattern generator

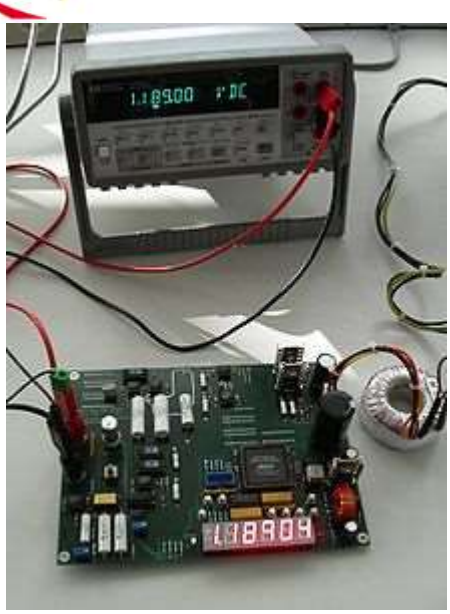

Fig 2. Voltcraft *M-3850* portable multimeter

The following analyze the response of the circuit under test:

- Oscilloscope (Displays voltage as it changes over time)
- Frequency counter (Measures frequency) and connecting it all together:

Self-Check – 4	Written test

Name…… ID…… Date…….

I Say True or False the following Questions. 2 point

1 Voltmeter is an instrument that measure current.

2 Oscilloscope Displays voltage as it changes over time

II Explain the following questions briefly?

1. What are the items used for the measurement of the following items **6 points**.

- Voltage
- Current
- VOM (Volt-Ohm-Millimeter

Note: Satisfactory rating ≥5 points Unsatisfactory ≤ 5 points

Operation sheet 1	Starting, monitoring and shut down equipment or processes.

Procedure to shut down equipment or process

Step 1 Evaluate the line system

Step2 Inspect the line system using the inspection

Step3 Fill Self-Inspection Checklist

Step4 Look for problems with the system that need attention or repair during the off-season.

Step 5 Turn off the power supply

Operation sheet 2	Activating sequences to initiate process operation

Procedure:

Step 1Plant Start-up Preparation

Step 2 Start-up of Cycle Make-up System

Step 3 Start-up of Aux. Circulating

Step 4 Turn on the power supply

Operation sheet 3	Recognizing equipment bad signal or bad measurement

Procedure :

Step 1 Wear appropriate PPE

Step 2 Identify the equipment

Step 3 Identify bad signal equipment

Step 4 Apply testing

Step 5 Take corrective action

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 hour for each. The project is expected from each student to do it.

Task 1 shut down equipment or processes

Task 2 Activating sequences to initiate process operation

Task 3 Recognizing equipment bad signal or bad measurement

LG #31	LO #3 Lo3 Analyze data to predict and control performance

Instruction sheet
This Learning guide covers the skills and knowledge required to operate a computer-based interface to modify and/or interrogate (investigate) a control system: • Selecting and analyzing trends to identify performance • Identifying causes of abnormal or unacceptable performance. • Recording information as required This Learning guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to: • Select and analyze trends to identify performance • Identify causes of abnormal or unacceptable performance. • Record information as required
Learning Instructions:

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

”.

Information Sheet 1	Selecting and analysing trends to identify performance

3.1 Selecting and analyzing trends to identify performance

A time series neural network based approach is introduced to achieve more accurate and reliable performance prediction of machine using condition monitoring data source. The proposed time series model utilizes the various measured condition monitoring data at the current and previous inspection marks as the inputs, and the machine output performance as the targets for the model. The collected condition monitoring data are used to train and validate the proposed model. Results showed that the proposed time series method could predict the performance of the gas turbine power output with more accuracy and better results. The main roles of failure prediction of machines are to increase machine reliability, prevent failure, and decrease maintenance cost

However, several approaches of machine health condition and performance prediction are defined and can be divided into model based or physics based approaches and data driven approaches

- **Development of analyzing tool for OEEP**

OEE (overall efficiency of equipment performance can be monitored and presented with least efforts. For example

- Fool –proof: - visual indication of possible mistakes/error/
- Performance and quality factor chart, daily, monthly OEE chart
- Monthly Report which analyze cause for Reduced OEE

❖ **How do you analyze the performance of manufacturing equipment to reduce over time?**

OEEP can be reflected to combine the operation maintenance and management of manufacturing equipment basic quality control Tools these application can be essential supplement.

Self-Check – 1	Written test

Name…… ID…… Date…….

I Say True or False the following Questions. 2 point

1 .Accurate machine performance prediction is crucial to an effective maintenance.

2. The main roles of failure prediction of machines are to increase machine reliability, prevent failure, and decrease maintenance cost

III Explain the following questions

1. What is the effort that OEEP is monitored and presented? 3 point

2. What is the use of machine performance prediction? 3 point

Note: Satisfactory rating ≥ 5 points unsatisfactory rating ≤ 5 points

Information sheet 2	Identifying causes of abnormal or unacceptable performance.

3.1 Identifying causes of abnormal or unacceptable performance.

Troubleshooting is a method of finding the cause of a problem and correcting it. The ultimate goal of troubleshooting is to get the equipment back into service as quickly and as fully as possible. Time is of the essence because the entire operation depends on the troubleshooter's ability to solve the problem efficiently and economically. Troubleshooters on most job sites are the mechanics.

Although the actual steps in troubleshooting may vary from case to case, there are a few general guidelines to follow. Sometimes it's a familiar piece of equipment that breaks down, and the problem can be solved and rectified quickly. All too often, though, the root cause is buried deep in the equipment's systems, and it turns into a lengthy and frustrating exercise before the machinery is dependably functional again.

The troubleshooting process doesn't need to be complicated if a logical, step-by-step process is followed that is specific to the problem at hand. Here are the basic steps to troubleshooting equipment breakdowns:

3.1.1 Verify a problem actually exists

The troubleshooting process begins with symptom recognition. That involves the equipment operator, equipment indicators, controls and the technical documentation about the equipment and its systems. Contacting the equipment operator should be the first action taken as they're usually the most familiar with the equipment and can supply the primary details about the breakdown circumstances.

To get the most information, the troubleshooter should ask:

- What are the operator's indications of the trouble?
- How did the operator discover the trouble?
- What were the conditions at the time the trouble occurred?
- Is the trouble constant or intermittent?

Next, the troubleshooter should observe the equipment or system to get a first-hand impression of what's wrong. During this, the troubleshooter should note all abnormal symptoms, evaluate what's observed and examine the equipment's log or other documentation.

3.1.2 Narrow down the problem's root cause

The second step of the troubleshooting process heavily relies on the troubleshooter's technical skills, experience and intuition. The troubleshooter is responsible for narrowing down the root cause of the problem. This is done by using testing equipment and reading the equipment's instruments. Disassembly may be required if nothing results from making any adjustments

to the equipment's components. It also involves mental activity such as logic, reasoning and evaluation

Abnormal or Unacceptable Performance means performance that is consistently below expectations in relation to the behavior indicators for the competency. A rating at this level requires the development of a Performance Improvement Plan.

Common causes of equipment failure are:

1. Cause #1: Improper operation
2. Cause #2: Failure to perform preventive maintenance
3. Cause #3: Too much preventive maintenance
4. Cause #4: Failure to continuously monitor equipment

Self-Check – 2	Written test

Name…… ID…… Date…….

I Say True or False the following Questions. 2 point each

1 An equipment maintenance document should include: step-by-step instructions for routine maintenance, including frequency of performance, and how to keep records of performance

2. Acceptable performance is consistently below expectations in relation to the behavior indicators for the competency

II Explain the following questions briefly?

1 what is the cause of unacceptable performance. 3 point

2. Define calibration 3 point

Note: Satisfactory rating ≥ 5 points Unsatisfactory≤ 5 points

Information Sheet 3	Recording information as required

1.1 Recording information as required

Some the tools that are helpful for keeping records on equipment management are: charts, logs, checklists, graphs, service, and reports. of The log book should be available for review during the entire life of the equipment. Equipment Maintenance Documentation Developing documents and policies for record keeping Equipment documents and records are an essential part of the quality system.; For major equipment, include identification of the specific instrument, and perhaps information on its performance.

Recording maintenance information each piece of equipment should have a dedicated logbook documenting all characteristics and maintenance elements:

- Preventive maintenance activities and schedule;
- recording of function checks and calibration;

Any maintenance performed by the manufacturer; full information on any problem that the instrument develops, the subsequent activity, and follow-up information regarding resolution of the problem. In recording problems, date problem occurred, and when equipment was removed from service; o reason for breakdown or failure; corrective action taken; including a note about any service provided by the manufacturer; o date returned to use; o any changes to procedure for maintenance or function checks as a result of the problem.

Fig 2.1 record book

All laboratories should have a well-organized equipment management program. The program should address equipment selection, preventive maintenance, and procedures for troubleshooting and repair. It is essential that good documents and records be maintained. These will include a complete and accurate inventory of all laboratory equipment, documents provided by the manufacturer on operation, maintenance, and troubleshooting, and records of all preventive maintenance and repair activities. Key messages A good equipment maintenance program results in a high level of

performance and greater confidence in the reliability of results. A significant benefit to the laboratory will be fewer interruptions in test performance, lower repair costs, and elimination of premature replacement of equipment. Increased safety for laboratory workers will result from well-maintained equipment.

Self-Check – 3	**Written test**

I Say True or False the following questions. 2 point

1. Recording maintenance information each piece of equipment should have a dedicated logbook documenting all characteristics and maintenance elements:

2. Some the tools that are helpful for keeping records on equipment management are: charts, logs, checklists, graphs, service, and reports

II Explain the following questions briefly?

1 What is the use of record book? 2 point

2 List the tools that are helpful for keeping records on equipment management? 4point

Note: Satisfactory rating ≥ 4 points Unsatisfactory≤ 4 points

Operation sheet 1	**Identify performance of the equipment**

Procedure

Step 1 wear PPE

Step 2 Fool –proof: - visual indication of possible mistakes/error/

Step 3 Performance and quality factor chart, daily, monthly OEE chart

Step 4 Record Monthly Report which analyze cause for Reduced OEE

Operation sheet 2	**Record information as required**

Procedure:

Step 1 Wear PPE

Step 2 Identify record books

Step 3 Apply recording from panel board

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 for each hour. The project is expected from each student to do it

Task1 Identifying performance of the equipment

Task 2 Recording information

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Available at http://www.github.com/Open-MBEE/TMT-SysML-Model

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