

**Web Development and Database Administration**

**Level-II**

**Based on March 2022, Curriculum Version 1**



**MODULE TITLE:** Maintaining IT equipment and consumables

**MODULE CODE:** EIS WDDBA2 M04 0322

**NOMINAL DURATION:** 50 Hours

**Prepared by:** Ministry of Labor and Skill

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**Addis Ababa, Ethiopia**

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## Acknowledgment

Ministry of Labor and Skills wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

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## Acronym

BIOS-	basic input/output system
CM-	Corrective Maintenance
CPU-	Central Processing Unit
GPU -	Graphics Processing Unit
IM-	Improvement Maintenance
ITE-	Information Technology Equipment
MTA-	Made to Assemble
PDM-	Predictive Maintenance
PM-	Preventive Maintenance
POST-	Power on self-test
PPE -	Personal Protective Equipment
RAM-	Random Access Memory
RTF-	Run to Failure Maintenance
TTLM-	Teaching, Training, Learning Material

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## Introduction to the Module

In Web Development and Database Administration, the Maintaining IT equipment and consumables helps to know the maintenance of Information Technology equipment and materials.

This module is designed to meet the industry requirement under the Web Development and Database Administration standard, particularly for the unit of competency: Maintaining IT equipment and consumables.

### This module covers the units:

- Maintaining IT system Components
- Applying maintenance procedures
- Cleaning equipment
- Replacing and maintaining consumables and supplies

### Learning Objective of the Module

- Maintain IT system Components
- Apply maintenance procedures
- Clean equipment
- Replace and maintain consumables and supplies

### Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

- Read the information written in each unit
- Accomplish the Self-checks at the end of each unit
- Perform Operation Sheets which were provided at the end of units
- Do the “LAP test” giver at the end of each unit and
- Read the identified reference book for Examples and exercise

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## Unit One: Identify And Analyze It System Components To Be Maintained

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

- Determining and documenting warranty status of components and/or software
- Reviewing system architecture and configuration documentation for currency status.
- Identifying critical hardware components and/or software and documenting recommendation in service arrangements

This 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:

- Determine and document warranty status of components and/or software
- Review system architecture and configure documentation
- Identify critical hardware components and/or software

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## 1.1 Determine and document warranty status of components

In contract law, a warranty is a promise which is not a condition of the contract or an innominate term. It is a term "not going to the root of the contract" and which only entitles the innocent party to damages if it is breached: i.e. The warranty is not true or the defaulting party does not perform the contract in accordance with the terms of the warranty. A warranty is not a guarantee. It is a mere promise. It may be enforced if it is breached by an award for the legal remedy of damages.

A warranty is a term of a contract. Depending on the terms of the contract, a product warranty may cover a product such that a manufacturer provides a warranty to a consumer with which the manufacturer has no direct contractual relationship.

- **Hardware Warranty**

By law, goods when sold must be of satisfactory quality, fit for the purpose and correspond to the published description at the date of delivery to the buyer and remain that way for a reasonable period afterwards, but that period may be no more than an hour or a day. Since the general law is uncertain and imprecise, we offer this Hardware Warranty to the customer, so as to avoid any uncertainty and offer peace of mind.

- **Software Warranty**

A software warranty is a document, often a digital document provided as a file with a piece of software, which indicates any rights a user may have to replace a piece of software if it is damaged or faulty. This type of warranty may involve the hardware on which the software was sold, such as a physical disc.

### 1.1.1 Manufacturer and vendor

A manufacturer is a person or company that produces finished goods from raw materials by using various tools, equipment, and processes, and then sells the goods to consumers, wholesalers, distributors, retailers, or to other manufacturers for the production of more complex goods.

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## Types of Manufacturers

- **Made to Stock (MTS)**

Made to Stock manufacturers produce substantial quantities of goods and store the manufactured goods before their final sale. MTS businesses aim to forecast the demand for their products in the market and then produce the quantity of goods corresponding with the predicted demand.

The success of made to stock manufacturers mostly depends on their ability to forecast the market demand correctly. If the forecast significantly deviates from the actual demand, they will face the under- or over-production.

- **Made to Order (MTO)**

Unlike their MTS counterparts, made to order manufacturers produce goods only if they receive orders from customers. The nature of MTO production eliminates the necessity to forecast future demand for the products. Thus, MTO businesses will not face overproduction.

However, MTO manufacturers generally face a higher lead time between the initiation and completion of an order. In addition, a sudden increase in the current demand for the products tends to put additional pressure on the operations, which, in turn, will lead to even higher lead times.

- **Made to Assemble (MTA)**

Instead of immediately producing a final good, made to assemble manufacturers initially create the basic parts of a final good that can be quickly assembled together when an order from a customer is received. MTA production significantly reduces lead times for customer orders. Nevertheless, the business could face lower demand for certain types of basic parts.

## Vendor

A vendor is a party in the supply chain that makes goods and services available to companies or consumers. The term "vendor" is typically used to describe the entity that is paid for goods provided rather than the manufacturer of the goods itself.

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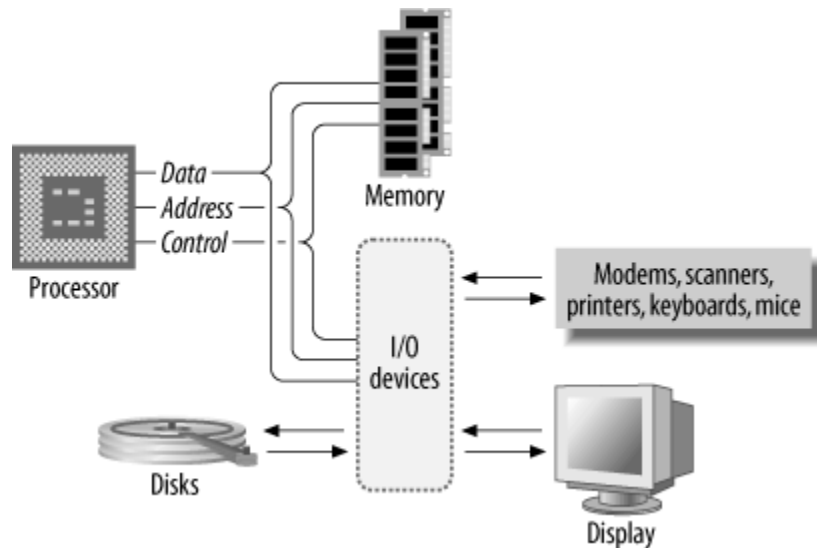
### 1.1.2 Project or organizational requirements

A project is defined as an effort to create or modify a specific product or service. Projects are temporary work efforts with a clear beginning and end. Projects can be completely contained within a specific unit or department, or include other organizations and vendors.

### 1.2 Review system architecture and configuration documentation

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.

A system architecture can consist of system components and the sub-systems developed, that will work together to implement the overall system. In computer engineering, computer architecture is a set of rules and methods that describe the functionality, organization, and implementation of computer systems.



**Figure 1.1 Computer Architecture**

System configuration is a term in systems engineering that defines the computer hardware, the processes as well as the various devices that comprise the entire system and its boundaries. This term also refers to the settings or the hardware-software arrangement and how each device and

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software or process interact with each other based on a system settings file created automatically by the system or defined by the user.

## 1.3 Critical hardware and software components

### 1.3.1 Motherboard

A motherboard is a circuit board through which all the different components of a computer communications and it keep everything together. The input and output devices are plugged into the motherboard for function.

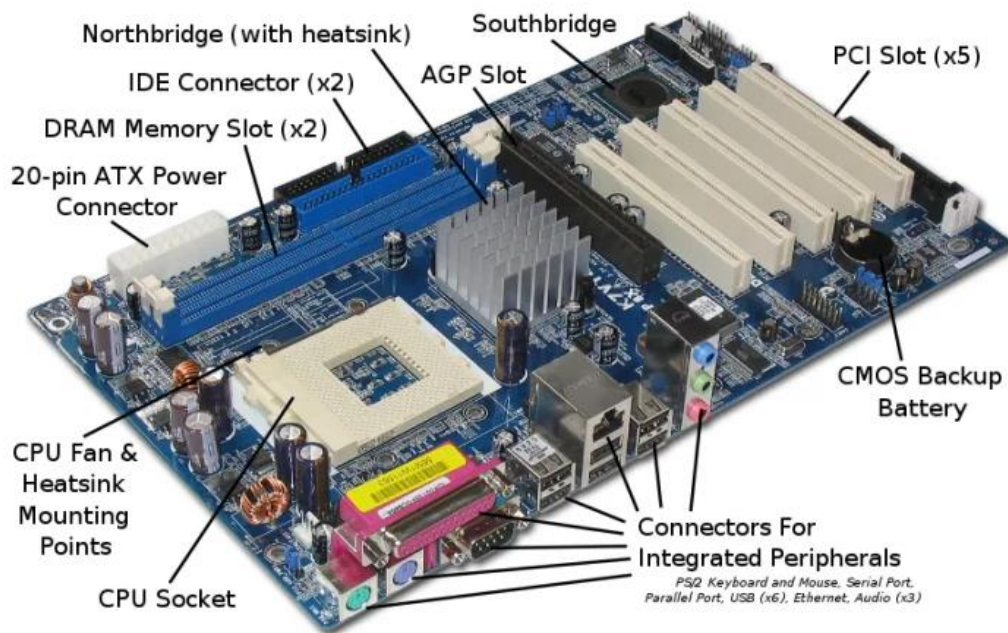


Figure 1.1 Motherboard

### 1.3.2 Input devices

Computers respond to commands given to them in the form of numbers, alphabets, images etc. These inputs are then processed and converted to computer language and then the response is the output in the language that we understand or the one we have programmed the computer with. Example: keyboard, mouse, microphone,...

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### 1.3.3 Output Unit

The result of the command we provide the computer with through the input device is called the output. The most used is the monitor since we give commands using the keyboard and after the processing, the result or outcome is displayed on the monitor.



Figure 1. 2 Computer Components

### 1.3.4 Central Processing Unit (CPU)

The CPU is called the brain of the computer since no action can take place without its permission and execution as the main processing unit. It communicates with all the other components of the computer and has Components that help in the smooth functioning of the CPU. Components of the CPU are:

#### A. Memory Unit

The information entered through the input devices is saved in the memory of the CPU and then passed on to the other parts. Similarly, when the output is ready it is saved in the memory before the result is given to the user.

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## B. Control Unit

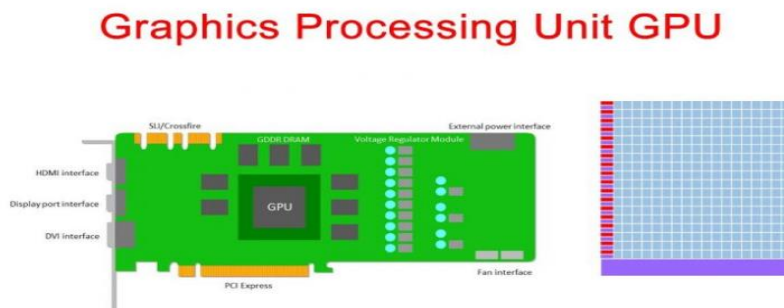
This unit controls the functioning component of the computer. It collects the data entered, leads it on for processing after the processing is done, receives the output and provides it to the user. So getting instructions, decoding it, signaling the execution and receiving the output is done by the control center and hence it is called the center of all processing actions that happen in the computer.

## C. Arithmetic and Logical Unit

This unit does mathematical calculations, arithmetic operations, comparison of data and decision making. It has circuits that are built for addition, subtraction, multiplication, division and other calculations.

### 1.3.5 Graphics Processing Unit (GPU)

Another vital component of the computer is GPU. The Graphics Processing Unit or the video card helps generate high-end visuals like the ones in video games. Good graphics like these are also helpful for people who have to execute their work. It generally communicates directly with the monitor.



**Figure 1. 3 GPU**

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### 1.3.6 Random Access Memory (RAM)

RAM is the most commonly referred component in a computer. The RAM is also known as the volatile memory since it gets erased every time the computer restarts. It stores the data regarding the programs which are frequently accessed programs and processes. It helps programs to start up and close quickly. It being slower has made it more obsolete these days.



Figure 1. 4 RAM

- **SRAM (Static RAM)**

Static RAM (SRAM) uses several transistors to hold each bit of data in memory. This technology has both advantages and disadvantages. Once you had data in SRAM, the system didn't need to do anything special to keep it there. Its access time was low and never interrupted by wait states. Because it used so many transistors to keep each bit of data in place, SRAM cost much more than other RAM.

- **DRAM (Dynamic RAM)**

DRAM) used only a single capacitor per bit of data and, thus, cost substantially less than SRAM, but had many disadvantages. The DRAM memory required periodic refreshing during which the processor couldn't access the RAM (called a wait state).

Refreshing caused DRAM to be slower than SRAM.

Additionally, DRAM used more power than SRAM. DRAM became the primary system RAM in all computers for many years.

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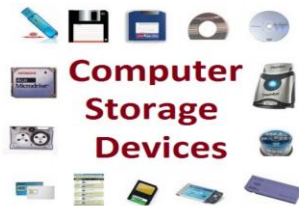
- **SDRAM (Synchronous Dynamic RAM)**

SDRAM the current RAM of choice in most systems offers a great improvement over DRAM, delivering data in high speed bursts. Plus, SDRAM runs at the speed of the system bus.

### 1.3.7 Storage Unit

A storage unit is a part of the computer system which is employed to store the information and instructions to be processed. A storage device is an integral part of the computer hardware which stores information/data to process the result of any computational work. Without a storage device, a computer would not be able to run or even boot up. Or in other words, we can say that a storage device is hardware that is used for storing, porting, or extracting data files. It can also store information/data both temporarily and permanently. Computer storage is of two types:

- **Primary Storage Devices:** It is also known as internal memory and main memory. This is a section of the CPU that holds program instructions, input data, and intermediate results. It is generally smaller in size. RAM (Random Access Memory) and ROM (Read Only Memory) are examples of primary storage.
- **Secondary Storage Devices:** Secondary storage is a memory that is stored external to the computer. It is mainly used for the permanent and long-term storage of programs and data. Hard Disk, CD, DVD, Pen/Flash drive, SSD, etc, are examples of secondary storage.



**Figure 1. 5 Computer Components**

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## 1.4 Disassemble and assemble Computer Components

### 1.4.1 Disassemble

- **Unplug your computer and peripheral items**

Turn off the computer, unplug the power cord and unplug any peripheral items attached to the computer, such as the keyboard, mouse, monitor, headphones, and any external drives.



**Figure 1. 6 Unplug Computer**

- **Remove side covers**

Remove at least one of the side covers, usually the right side as you face the front of the computer.



**Figure 1. 7 Remove Side Cover**

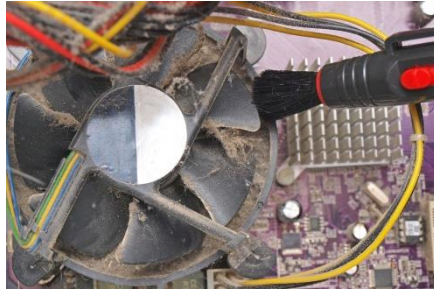
- **Disconnect connectors**

Disconnect all the connectors, and then remove any card readers and internal DVD players. These are usually screwed into place.

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- **Remove standalone fans**

Remove any standalone fans. This is a good time to remove any dust, lint, and pet hair from the fans if you're planning on reusing them.



**Figure 1. 8 Standalone fan**

- **Remove the storage drive**

Disconnect the cables and remove the storage drive.



**Figure 1. 9 Remove Storage Device(Hard Disk)**

- **Remove memory (RAM) modules**

Remove the memory (RAM) modules by pushing the clips on both ends of the module down.



**Figure 1. 10 Remove Memory**

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- **Remove power supply unit**

Remove the power supply unit by unplugging the remaining connectors, then unscrewing the unit from the frame.

- **Remove motherboard adapter or expansion cards**

Remove any adapter or expansion cards from the motherboard.

- **Remove the motherboard**

Disconnect all the cables from the motherboard, then unscrew it from the frame by loosening each screw a little bit before going around again to loosen each screw properly.

## 1.5 Symptoms of common devices failure

### 1.5.1 Symptoms of RAM Failure

- **Low Performance**

A Faulty RAM can be identified from sudden decrease in performance. You PC may run fine when you start up the computer, but as soon as you start using it you may notice the performance gradually decreases.

- **Frequent Crashes**

Since there can be numerous reasons behind computer crashes, it is difficult to pinpoint the exact cause. However, if the crash happens to occur randomly and without any warnings it could be sign of a faulty RAM.

- **Graphics Card Failure**

Under normal circumstances when you turn on the PC, you may hear beep tones given by the computer. This indicates that all the hardware components are recognized and functioning properly. Literally if there are no any beep tones given, it could be sign of a RAM failure. Along with these the Graphics card may also fail to load during the boot process.

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- **Corrupted Files**

Corruption of file present on your system can be an indication of a failing RAM. Specifically the files you access and save frequently may get corrupted.

- **System Freeze**

RAM issues can also manifest in the form of system freezing. Your PC could freeze without any prior warnings. And even keyboard and mouse can become completely unresponsive.

- **Blue Screen of Death**

Blue Screen of Death errors are common when you have installed a new hardware or software. But if the error seems to appear without any hardware installation that could mean that the memory is facing some problems.

- **Random Restart**

Random restarts have found to be another symptom of a faulty RAM. This can happen all of a sudden when you are performing a task or just when you are not literally doing anything.

- **Beep Noises**

Listen for the beep tones when you turn on the PC. Unlike usual one single beep, if there are sequences of beeps heard that can be a sign of a failing RAM. However these beep codes vary depending on the manufacturer. Therefore, you have to search the codes to find out whether they are related to the RAM.

- **Installation Failure**

When the RAM faces issues, no longer you will be able to install new programs.

### 1.5.2 Symptom of CPU Failure

- **Computer Freezes**

One of the most common signs of CPU failure is the random freezing of your computer, usually after just logging into the operating system. The system won't respond to any of your instructions. The mouse freezes on the screen and any attempt to use the keyboard will result in a

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series of short beeps. Restarting the system may not solve the issue. This may also indicate that the motherboards are in critical condition.

- **Booting Issues**

Normally you will hear a beep sound when your computer is powered on. However, in case of a CPU failure, there can be booting issues such as – blank screens, no beep after the boot and no response on pressing keyboard keys or clicking the mouse.

- **Computer Automatically Turns Off**



**Figure 1. 11 Computer Automatically Turn Off**

If your computer has been working for a long time, the processor can get heated up. In such a condition, the motherboard shuts down the PC to cool down the processor. By shutting down, the processor is saved from getting permanently damaged. If you are experiencing a frequent shutdown issue, it can be due to CPU issues.

- **A Blue Screen with Error Code**

If your screen displays the error code 0x00000, then it is an indication of processor failure.

- **Beep alerts**

Each time the computer is booted, it checks whether all the components of the PC are functioning properly. This is called the POST test. If you hear irregular beep sounds, a failing CPU can be one of the reasons. A CPU issue will usually cause a series of 5-7 beeps.

- **External Appearances of Damage**

A computer can show signs of CPU damage even without booting it up. Overheating can cause damages that may be visible externally. Any burnt marks on and around the CPU socket

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indicates that the CPU has undergone extreme overheating. In such situations, a replacement may be the only option.

Understanding what the symptoms of CPU failure are can help to prevent extensive damage. However, computers can sometimes throw symptoms at you that need trained eyes and ears to be decoded.

### 1.5.3 Hard disk Failure

- **Frequent Computer Freezes and Crashes**

If you find your computer freezes and crashes like the Blue Screen of Death issue frequently, it is possibly caused by your hard drive. And if it occurs after a fresh installation, it is very likely due to bad hardware, and possibly a failing hard drive.

There are many causes of computer freezes and crashes, but it also indicates hard drive failure coming soon.

- **Missing Files or Files Failed to Open**

One of the typical signs of hard drive failure is files suddenly disappeared or failed to open.

- **Consuming Excessive Time to Access Folders and Files**

Really long wait time to access folders and files is also a sign of hard drive failure, which is due to the failing areas of the hard drive requiring repeated read attempts before successful access. However, this can be also caused by many other computer issues, but it is also a typical sign of hard drive failure.

- **A Rising Number of Bad Sectors**

A rising number of bad sectors can be a sign of a failing hard drive. A bad sector is a disk sector on a disk storage unit that is permanently damaged. Once damaged, all information stored on the sector will be lost. Accumulated bad sectors are a sign of hard drive failure and they are hard to identify. When large amounts of your disk are currently in use, the data stored on the disk could be in danger.

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### 1.5.4 Signs of Power Supply Failure

- Computer turns on for some time then it suddenly turns off.
- **Random black & blue screen crashes**

The infamous BSOD or the Blue Screen of Death is a frequent sign citing power supply failure. But usually, it's the lack of power that may cause the malfunctioning of different hardware components of the system. Of course, bsod can be caused due to driver failures, memory, and storage disk issues.

- **Random Computer Crashes and Restarts**

The CPU is off without notice, and then it restarts, leaving all of your unsaved progress gone forever.

- **Display Issues**

It is usually a problem due to insufficient power that causes the CPU and the Graphics driver to malfunction, resulting in this glitch.

If the same problem persists while connected with the main power supply, then there is something wrong with the monitor. If not, it's the Power Supply.

- **Smoke/Burning Smell**

In case your Power Supply unit is out of service, you may find it being smoked(literally). A power surge on a dead PSU may lead to fatal accidents, including a fire.

- **Strange noises from the PC case**

It may also be a grinding sound with the fan. It could be that it has reached the end of its useful life, that the fan is not being supplied with power, problems with the fan itself, dirt (try cleaning it), or that it is rubbing against something.

- Presence of Frequent Electric Shocks When You Touch The Metallic Parts Of The Computer.

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- **PC won't start, but the case fans spin.**

So the case fans are spinning, but the PC isn't starting.

- **Overheating of PSU**

If you don't hear the PSU fan at all – and don't feel air coming from the air vent on the back of the unit – this could be a sign of fan ventilation failure.

Below are the AMI BIOS beep codes. However, because of the wide variety of different computer manufacturers with this BIOS, the beep codes for your computer may differ slightly from those listed below.

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## Self-check 1

### Test-I Matching

Instruction: select the correct answer for the give choice. You have given 1 Minute for each question. Each question carries 2 Point.

A

B

-----1. Motherboard

A. Supper Computer

-----2. RAM

B. Read Only Memory

-----3. Hard Disk

C. Random Accessed Memory

-----4. Power Supply

D. Provides power source to computer

-----5. ROM

E. Magnetic storage device

F. It connects all computer parts

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## Operation sheet 1.1: Disassemble computer motherboard

**Operation title:** disassemble motherboard

**Purpose:** To practice and demonstrate the knowledge and skill required in disassembling computer motherboard.

**Instruction:** use antistatic wrist-strap device to protect damages and of the computer from any power sources.

**Tools and requirement:** This operation sheet, Screw driver, Wrist strap, Air blower, motherboard

**Precautions:** Apply OHS standards

### Procedures

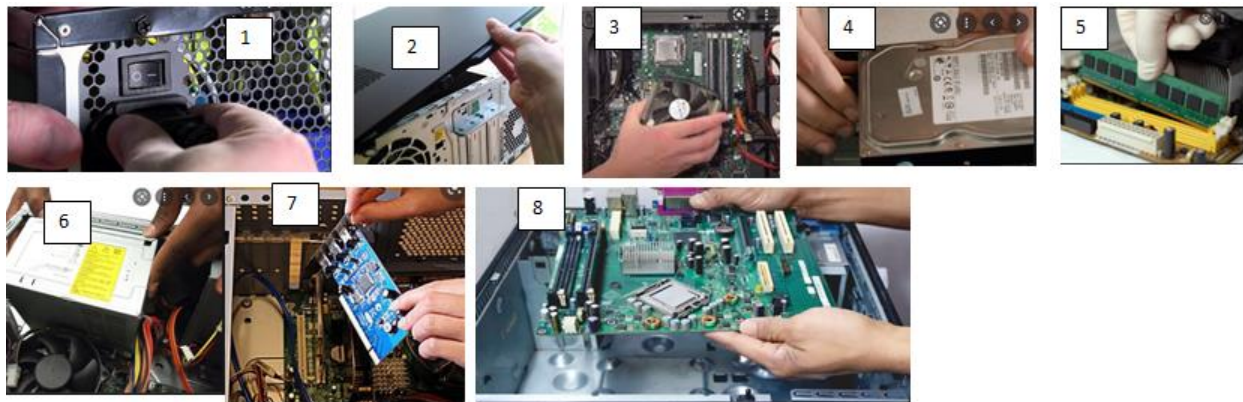


Figure 1.12 Disassemble computer hardware components

Step 1 – Unplug your computer and peripheral items

Step 2 – Remove side covers

Step 3 – Remove standalone fans

Step 4 – Remove the storage drive

Step 5 – Remove memory (RAM) modules

Step 6 – Remove power supply unit

Step 7 – Remove motherboard adapter or expansion cards

Step 8– Remove the motherboard

**Quality Criteria:** The computer is motherboard is removed

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## Operation sheet 1.2: assemble computer motherboard

**Operation title:** Procedures of assemble and disassemble computer components

**Purpose:** To assemble computer motherboard

**Instruction:** use antistatic wrist-strap device to protect damages and of the computer from

**Tools and requirement:** This operation sheet, Screw driver, Wrist strap, Air blower, motherboard



Figure 1.13 assemble computer hardware components

**Precautions:** Apply OHS standards

### Procedures

- Step 1: Procuring Parts
- Step 2: Gather Tools and Supplies
- Step 3: Open the Case
- Step 4: Prepare the Case for Assembly
- Step 5: Ground Yourself
- Step 6: Install Motherboard
- Step 7: Install Hard Drive
- Step 8: Install Optical Drive
- Step 9: Install the CPU
- Step 10: Install RAM
- Step 11: Install the CPU Fan
- Step 12: Install Case Fan
- Step 13: Install Power Supply
- Step 14: Connect Cables

- **Quality Criteria:** The computer is assembled

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## Lap Test-1: Disassemble & assemble Computer Components

Task-1: Disassemble Computer Components

Task-2: Assemble Computer Components

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## Unit Two: Apply Maintenance Procedures

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

- Creating Preventative maintenance schedule
- Maintenance cost
- Business requirement
- Service-level agreement
- Identifying and applying specific and appropriate maintenance procedure
- Documenting and submitting recommended procedure for approval accordingly
- Giving orientation to implementing staffs and ensuring to follow maintenance schedule
- Observing OHS throughout the process

This 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:

- Create preventive maintenance schedule
- Specify maintenance cost
- Specify business requirement
- Apply maintenance procedure
- Document procedure
- Apply OHS process

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## 2.1 Creating Preventative Maintenance Schedule

This module provides basic information about maintaining your computer hardware and software. It is important that computer hardware devices are regularly maintained.

Maintenance is a set of organized activities that are carried out in order to keep an item in its best operational condition with minimum cost acquired.

### Types of Maintenance

- Preventive Maintenance (PM)

The advantage of applying preventive maintenance activities is to satisfy most of maintenance objectives. Its aim is to maintain machines and facilities in such a condition that breakdowns and emergency repairs are minimized. Its activities include replacements, adjustments, major overhauls, inspections and lubrications.

- Corrective Maintenance (CM)

In this type, actions such as repair, replacement, or restore will be carried out after the occurrence of failure in order to eliminate the source of this failure or reduce the frequency of its occurrence.

### Maintenance safety rules

Maintenance safety rules are safe guard of people and Pc components. It prevents people from injury, equipment from damage.

#### A. Laboratory procedures

The work place or laboratory should have safety guidelines

#### B. Safe working conditions

The work place should be cleaned and organized

### General Safety Rules

The following general safety rules have been developed to provide a safe and healthy working environment for all employees and students. These apply to all work activities.

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- Persons with physical or mental impairment shall not be assigned to tasks where their impairment has a potential to endanger themselves or others.
- No person shall be permitted to remain on the premises while their ability to work is so affected by alcohol, drugs (prescription or non-prescription) or other substance, so as to endanger their health or safety or that of any other person.
- Persons working alone shall be required to check-in regularly with Security or a supervisor to ensure that their wellbeing is maintained.
- Inappropriate behavior, such as horseplay, fighting and practical jokes are extremely dangerous and will not be tolerated.
- Any unsafe conditions which are encountered shall be corrected or reported to your Supervisor and/or the Occupational Health and Safety Department.
- Do not operate any machinery or equipment if it is known to be in an unsafe condition.
- Machinery and equipment, including vehicles, are only to be operated by qualified persons and then only when adequately trained in the use of the equipment and authorized to operate it.
- Unsafe Acts shall be reported to your Supervisor and/or the Occupational Health and Safety Department.

### 2.1.1 Maintenance cost

Maintenance costs are the one-time or recurring costs a company incurs related to maintaining company facilities, property, vehicles or equipment. Some companies incur these costs for general or preventative maintenance that help keep their assets in proper working order.

### 2.1.2 Business requirement

The purpose of business requirements is to define a project's business need, as well as the criteria of its success. Business requirements describe why a project is needed, whom it will benefit, when and where it will take place, and what standards will be used to evaluate it.

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Business requirement generally do not define *how* a project is to be implemented; the requirements of the business need do not encompass a project's implementation details.

### 2.1.3 Service-level agreement

A service-level agreement (SLA) defines the level of service you expect from a vendor, laying out the metrics by which service is measured, as well as remedies or penalties should agreed-on service levels not be achieved. It is a critical component of any technology vendor contract.

## 2.2 Identifying and applying specific and appropriate maintenance procedure

Computer maintenance is the art of ensuring that computers are in a good state of repair. This art encompasses computer cleaning, backup, disk maintenance and software update maintenance.

### Preventative Maintenance Procedures

Cleaning for the most part, computer equipment is very reliable and lasts a long time. Dirt and other airborne contaminants will greatly accelerate the deterioration caused by normal use. Therefore, the best preventive maintenance is to keep the equipment clean.

- **Compressed Air**

Compressed air works well for getting the dust out of power supply fans, expansion slots, and keyboards, but you need to exercise care in using it for blowing the dust off components and the inside of the case.

You also need to exercise extreme care when using compressed air, because the liquid that compresses the air sits in the bottom of the can and is usually not released unless you turn the can upside down or sideways. This liquid can damage or destroy your components.

- **Lint-Free Cloths**

Lint-free cloths are excellent for removing dust from your computer. The cloths used for cleaning eyeglasses work the best, because they will not scratch surfaces or leave lint behind.

Make sure you never use "dry dusting" lint-free cloths and the like for cleaning anything in or on your computer.

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The proper placement or location of a computer relative to its environment is important for ease of maintenance and long life. Let's sum up good practices for placement of computer equipment.

### **Component Protection and Storage**

You need to protect your computing environment from any kind of power surge, or power sags, as either of these events can cause severe damage to your system.

- **Uninterruptible Power Supplies(UPS)**

A UPS helps in blackout situations, during which the electricity cuts off completely for a period of time, and brownouts, during which the electrical supply sags well below the level needed to run your PC. Every UPS has batteries that provide backup power, thus enabling you to save your work and shut down your PC properly.

- **Surge Suppressors**

Surge suppressors help to absorb power surges so that your computer does not feel their effects. They come as either separate modules or incorporated with a UPS. The best suppressors to purchase are the ones with the lifetime or 10-year guarantee.

- **Common ESD Protection Devices**

Many devices are available that can help to protect your system from the effects of ESD to ensure a longer life for your components. These devices include anti-static wrist and ankle straps, anti-static mats, anti-static floor mats, anti-static bags, and anti-static sprays.

Make sure you know what ESD is and what devices can protect your system from its effects.

You can help prevent the effects of ESD by grounding yourself by touching the exterior of the PC power supply before touching any of your system's components. Remember, though, that you are only at the potential of the system as long as you hold on to the chassis. When you let go, you can build up potential and cause an ESD event.

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- **Anti-Static Wrist and Ankle Straps**

Anti-static wrist and ankle straps are composed of a wire with a 1 mega ohm resistor. They keep you at the same relative electrical ground level as the computer components on which you're working, as long as you set them up properly.

### **2.3 Documenting and submitting recommended procedure for approval accordingly**

Documented procedures (simply put) are documents that everyone in your company has access to and lay out all the steps for particular tasks that need to be undertaken and repeated consistently.

The goal of process documentation is similar to that of business process management. It improves business performance and operational agility by optimizing core processes. Documenting processes during execution enables employees to learn by doing, gleaning insight from both mistakes and successes to refine processes.

#### **What are key elements of procedure documentation?**

- Scope the initial process. ...
- Define process boundaries. ...
- Determine process inputs and outputs. ...
- Identify process steps. ...
- Connect with project stakeholders. ...
- Construct a process flowchart.

### **2.4 Giving orientation to implementing staffs and ensuring to follow maintenance schedule**

Maintenance scheduling is the process of making sure planned work is carried out. It involves bringing all the necessary resources together to make sure tasks are completed correctly and on time.

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## Create a preventive maintenance schedule

Step 1: prioritize assets by maintenance needs. ...

Step 2: collect historical data about each asset. ...

Step 3: make projections about assets maintenance needs. ...

Step 4: put together the initial preventive maintenance plan. ...

Step 5: verify progress and adjust as needed.

## 2.5 Observing OHS throughout the process

An OHS policy is a statement of a company's commitment to the health and safety of its employees.

Occupational safety and health (OSH) is a planned system of working to prevent illness and injury where you work by recognizing and identifying hazards and risks. Health and safety procedure is the responsibility of all persons in the computer and technology industries.

### Promote Occupational Health and Safety in Your Workplace

- Make sure that your OHS policies comply with all federal and/or state laws and regulations
- Ensure that your staff is properly trained on all machinery and equipment they may use in the workplace and are certified to operate them if required
- Keep Safety Data Sheets (SDS or MSDS) for all chemical products in use at your workplace, and make sure that they are easily accessible by your employees
- Have all necessary Personal Protective Equipment (PPE) such as hard hats, eye protection, and respirators readily available to all employees
- Use tools and other equipment correctly and only for their intended purpose
- Use mechanical assistance such as carts, dollies, or pallet jacks when lifting or moving heavy objects
- Maintain good posture when sitting, standing, or lifting, especially when doing so for extended periods of time.

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## SELF-CHECK 2

Perform the following. Use a separate sheet of paper in answering.(10%)

### I. Short Answer

1. Define what is Maintenance?
2. List Types of Maintenance
3. Maintenance work order procedure and techniques are
4. Maintenance safety rules are \_\_\_\_\_
5. What is Improvement Maintenance?

### II. Fill Blank spaces

6. \_\_\_\_\_ can lead to diseases, infections, and other serious health conditions
7. \_\_\_\_\_ policy is a statement of a company's commitment to the health and safety of its employees.
8. \_\_\_\_\_ is a planned system of working to prevent illness and injury where you work by recognizing and identifying hazards and risks.

### III. Choose the best answer

9. Which of the following is physical hazard? A. Chemical hazard B. Emotional hazard C. Biological Hazard D. All
10. Each BIOS manufacturer has a unique beep sequence for hardware failures.  
A. True B. False

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## Operation Sheet 2.1: Replace Power Supply

**Operation Title:** Replacing Power Supply

**Purpose:** To Practice And Demonstrate The Knowledge And Skill Required In Repairing A Computer From Failure

**Instruction:** Use Antistatic Wrist-Strap Device To Protect Damages And Of The Computer From Any Power Sources As Well As Disassemble All Components

**Tools And Requirement:** This Operation Sheet, Screw Driver, Wrist Strap, Air Blower, Old Power Supply, New Power Supply

**Precautions:** Apply OHS Standards

### Procedures In Doing The Task



Figure 2. 1 Replace Power Supply

Step1: Remove the power supply

Step2: **Remove the motherboard connections carefully.**

Step3: **Pull out the power supply**

**Quality Criteria:** the hard disk is maintained

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## Operation Sheet 2.2: Replace Computer Equipment

**Operation Title:** Replacing Hard Disk

**Purpose:** To Practice And Demonstrate The Knowledge And Skill Required In Replacing Computer Component

**Instruction:** Disconnect Un Functional Computer Component

**Tools And Requirement:** This Operation Sheet, Screw Driver, Wrist Strap, Air Blower, Computer And Main Components,...Soft Clothes, Cleaner Liquid,...

**Precautions:** Apply OHS Standards

### Procedures In Doing The Task



Figure 2. 2 Replacing Hard Disk

Step 1: Back up data

**Step 2: Create a recovery disc**

Step 3: Remove the old drive

Step 4. Place the new drive

Step 5. Reinstall the operating system

**Quality Criteria:** Just the hard disk installed properly

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## Operation Sheet 2.3: Upgrade Computer Equipment

### Operation Title: Upgrade RAM

**Purpose:** To Practice And Demonstrate The Knowledge And Skill Required In Upgrading Computer Component

**Instruction:** Disconnect Un Functional Computer Component

**Tools And Requirement:** This Operation Sheet, Screw Driver, Wrist Strap, Air Blower, New RAM, Old RAM

**Precautions:** Apply OHS Standards

### Procedures In Doing The Task



Figure 2. 3 Upgrade RAM

1. Consult your motherboard's manual
2. Open your RAM slots
3. Line up your RAM
4. Insert the new RAM

**Quality Criteria:** Check that your upgrade worked

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## Operation Sheet 2.4: Remove The Motherboard

**Operation Title:** Replacing Equipment

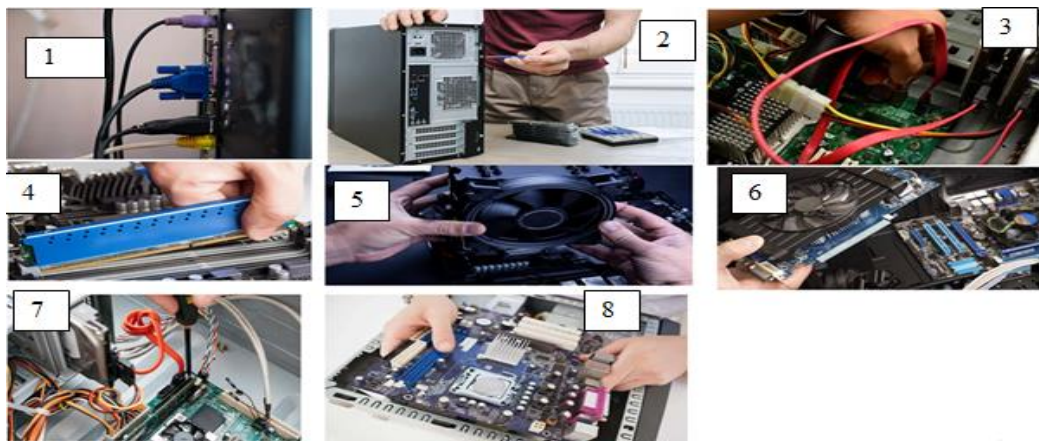
**Purpose:** To Replacing Motherboard

**Instruction:** Disconnect All Peripherals, Including The Mouse, Keyboard, Ethernet Cable, External Hard Drives, Printers, And More.

**Tools And Requirement:** This Operation Sheet, Screw Driver, Wrist Strap, Air Blower, Computer And Main Components, Old Motherboard, New Motherboard,..

**Precautions:** Apply OHS Standards

Procedures



**Figure 2. 4 Remove the Motherboard**

Step-1: Detach External Cables From Your PC

Step-2: Open the Side Panels

Step-3: Detach All Cables From the Motherboard

Step-4: Remove Your RAM

Step-5: Remove Your CPU Cooler and CPU

Step-6: Remove Your Video Card From the Motherboard

Step-7: Remove All Screws Holding the Motherboard to Your PC Case

Step-8: Remove the motherboard

**Quality Criteria: Motherboard is replaced**

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## Operation Sheet 2.5: Install The Motherboard

- **Operation Title:** Replacing Equipment
- **Purpose:** To Install A New Motherboard
- **Instruction:** Disconnect All Peripherals, Including The Mouse, Keyboard, Ethernet Cable, External Hard Drives, Printers, And More.
- **Tools And Requirement:** This Operation Sheet, Screw Driver,, Wrist Strap, Air Blower, Computer And Main Components
- **Precautions:** Apply OHS Standards
- Procedures



Figure 2. 5 Install the Motherboard

Step1: Install the RAM Back to Your New Motherboard

Step2: Install the CPU to Your New Motherboard

Step3: Install Your CPU Cooler on Top of the Motherboard

Step 4: Start Connecting All Your Old Components Back

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## Lap Test 2

Task-1: Perform preventive maintenance

Task-2: perform corrective maintenance

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## Unit Three: Clean Equipment

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

- Identifying IT related tools and equipment
- Accessing and verifying cleaning supplies selected for usability
- Recording and documenting maintenance actions
- Cleaning equipment as per manufacturer specifications and organization manual.

This 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:

- Identify IT tools and equipment
- Access cleaning supplies
- Record and document maintenance actions
- Clean equipment

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### 3.1 Identifying IT related tools and equipment

#### Information Technology Equipment (ITE)

Information Technology Equipment is a group or “family” of product, which include devices that have a primary function related to the collection, transfer, storage, or processing of data.

Examples of ITE may be any of or similar to examples such as;

- Computers
- Monitors
- Servers
- Telecommunication  
s Equipment
- Keyboards
- Drives
- Printers
- Network hubs

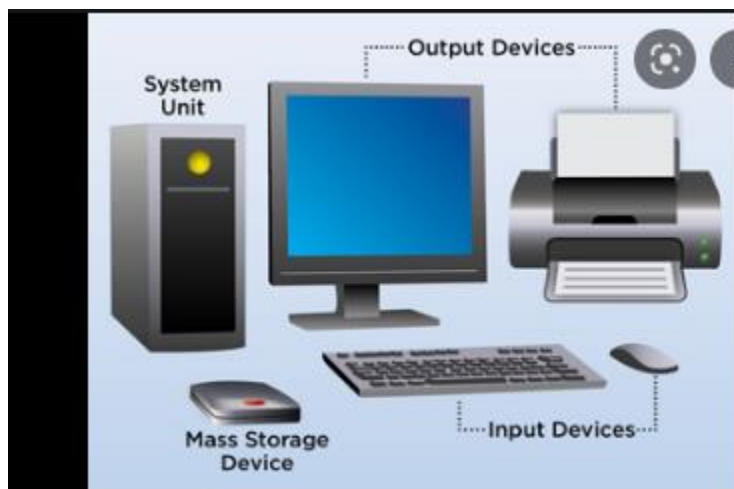


Figure 3. 1 Computer System

### 3.2 Accessing and verifying cleaning supplies selected for usability

#### Cleaning supplies

Cleaning agents or hard-surface cleaners are substances (usually liquids, powders, sprays, or granules) used to remove dirt, including dust, stains, bad smells, and clutter on surfaces.

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## Clean a computer

Use compressed air and a lint free cloth to blow and wipe any dust build up you can see. Pay particular attention to any services, plastic shrouds, and heat sinks. Thoroughly clean any dust filters too. To clean fan blades, hold them steady and wipe or blow each blade individually.

### 3.3 Recording and documenting maintenance actions

Maintenance documentation is any record containing information that you might need to complete maintenance tasks and inspections. It tells you what you have, shows you how to maintain it, and has records of all your past work.

Maintenance records of work equipment are a key part of health and safety management, requiring efficient storage and management. Paperwork is often kept for extended periods of time for health and safety or compliance purposes.

A records management process is comprised of identifying records, classifying records, and storing records, as well as coordinating internal and external access. The process may also incorporate policies and practices on how to create and approve records, as well as the enforcement of those policies and practices.

### 3.4 Cleaning equipment as per manufacturer specifications

#### Clean computer equipment

Use an anti-static cloth to lightly dust your computer casing. Do not use furniture cleaners or strong solvents. Use a can of compressed air to blow out debris from the air intake slots. Ammonia diluted with water—or glass cleaner comprised mostly of ammonia and water—is a safe cleaning solution for computer surfaces.

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### What materials are used to clean ICT tools?

- Water.
- Compressed air.
- Isopropyl alcohol or glass cleaner.
- Computer screen cleaning wipes.
- Screwdriver.

### Clean your computer

- **Clean or Soapy Water and a Damp Cloth**

In some cases, you need only a bit of water and a damp cloth for cleaning chores, such as when cleaning the mouse ball, the outside of the mouse, or the exterior of the monitor or computer case. If water alone cannot do the job thoroughly, you can use mild soapy water on your damp cloth. Make sure that the cloth is damp and not wet and that you do not splash or drip water into your components.

If the keys on your keyboard start to stick or you have spilled a cup of coffee into your keyboard, or, for that matter, you just know that there is a lot of dirt under the keys, you can clean the keyboard with distilled water.

- **Denatured Alcohol**

The best thing to use for cleaning floppy drive heads is denatured alcohol (mentholated spirits). But how do you get it in there? You can't just pour it in! You need to use a lint free swab dipped in the alcohol to clean the floppy drive heads, or you can purchase a floppy drive cleaning kit, which almost always comes complete with denatured alcohol. Don't clean the mechanical mechanism with alcohol because the parts are lubricated and the alcohol will dissolve the lubricant.

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When cleaning your mouse, you can use a damp cloth to clean the cover and ball, as mentioned earlier, but what about the rollers?.

- **Glass Cleaner**

You need to turn your monitor off before cleaning to avoid damage to the screen. Many technicians clean the monitor screen with regular glass cleaner. Under most circumstances, however, water and a damp cloth will do the job just fine. Water is the safest cleaning liquid you can use on a monitor. When cleaning the LCD display screen of a laptop, do not use glass cleaner at all. You will melt the screen!

**Fabric Softener**

Some technicians like to use a mixture of 1 part fabric softener to 10 parts water to clean the plastic casing of their computer components. As a cleaning solution it's not as good as mild soap and water, but as an anti-static solution it's excellent! Use it after the cleaning process to help protect your computer from the harmful effects of static electricity.

- **Lint-Free Cloths**

Lint-free cloths are excellent for removing dust from your computer. The cloths used for cleaning eyeglasses work the best, because they will not scratch surfaces or leave lint behind.

Make sure you never use "dry dusting" lint-free cloths and the like for cleaning anything in or on your computer. Cloths such as the Swiffer Sweeper do wonders for dusting those hard-to-reach places in your house, but they use static electricity to collect the dust. As you probably know by now, static electricity is computer enemy number one!

**Cleaning in an IT environment**

Dust needs to be removed because it acts as an insulator that prevents air from circulating over or through the components and this can cause overheating. If dust contains conductive particles it can also cause a short circuit, which can damage components or even cause a fire.

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- ***Removing Dust***

Dust can be removed using a household vacuum cleaner with an appropriate attachment, although it is much easier to use a purpose-built computer vacuum cleaner or keyboard cleaner.

- ***Residue from hands***

The human skin produces residues that cling to surface of the computer hardware we touch, which can be removed with liquid cleaners. However, use only specifically designed cleaners for cleaning computer equipment. Unsuitable cleaners may:

- Cause dangerous fumes
- Damage the plastics used in computer hardware
- Release ozone-damaging gases
- Not clean effectively

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### SELF-CHECK 3

Perform the following. Use a separate sheet of paper in answering.(15%)

1. What are IT tools and equipment.
2. Define the organizational manual.
3. Write all appropriate procedure for cleaning equipment
4. Give six factors to cleaning tools and equipment?
5. What is cleaning mine

---



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6. List at list 6 Peripherals devise Cleaned

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## Operation sheet 3.1: Clean equipment (Motherboard)

**Operation title:** Cleaning Motherboard

**Purpose:** To Practice And Demonstrate The Knowledge And Skill Required In Cleaning Equipment

**Instruction:** Power Off The Computer And Disconnect All Computer Components

**Tools And Requirement:** This Operation Sheet, Computer, Air Blower, Lint Free Clothes

**Precautions:** Apply OHS Standards

### Procedures In Doing The Task



Figure 3. 2 Cleaning Motherboard

Step-1: Turn off and unplug your computer.

Step-2: Use compressed air to remove dust

Step-3: A soft-tipped paint brush will work as well for dust that has caked up in areas such as the fans, power supply, intake vents and between RAM modules.

Step-4: Open your computer's case

Step-5: Blow all parts of the motherboard, including the fan and the heat sink.

Step6: Close the computer's case.

**Quality Criteria:** the motherboard must be cleaned

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## Lap Test 3

Task-1: clean a computer system components

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## Unit Four: Replace And Maintain Consumables And Supplies

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

- Identifying IT related consumables
- Accessing consumables from storage and recording usage information
- Replacing consumables and logging the action undertaken
- Disposing consumables by following environmental guidelines
- Testing equipment to ensure it is in working order at set time periods

This 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:

- Identify IT consumables
- Access consumables
- Replace consumables
- Dispose consumables
- Test equipment

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## 4.1 Identifying IT related consumables

### Consumables in computing

For example consumable office supplies are such products as paper, pens, file folders, Post-it notes, and toner or ink cartridges. This is in contrast to capital goods or durable goods in the office, such as computers, fax machines, and other business machines or office furniture.

### Consumable asset

A consumable asset is one that is purchased in quantity and distributed. It is assigned to the consumable model category, and the asset record tracks the quantity that is available and total cost. When consumable assets are received, they are merged into an existing consumable record, if available

## 4.2 Accessing consumables from storage and recording usage information

How to keep track of consumables

- Create a list of consumables your business uses. ...
- Develop a perpetual inventory system. ...
- Give your employees the tools they need to succeed. ...
- Align your tracking system with your reordering system. ...
- Conduct audits annually—if not more frequently.
- A clean and dry place.
- A place with a stable temperature.
- A place not exposed to direct sunlight.

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### 4.3 Replacing consumables and logging the action undertaken

- Consumables can be defined as any parts or supplies that need replacing periodically in order for the machine to perform all of its functions.
- IT consumables are items that you use relating to your computer set-up. Examples of IT consumables can include: -
  - Inkjet cartridges
  - Laser printer toner cartridges
  - Ribbon cartridges
  - Tape cartridges
  - Floppy disks
  - ZIP disks
  - CD roms blanks
  - Tape, CD, floppy labels
  - Cables, connectors, plugs
  - Cleaning tools and materials
  - Batteries
  - Power boards, extension leads, spike protectors
  - Cables, connectors, plugs
  - Cleaning tools and materials
  - Batteries
  - Power boards, extension leads, spike protectors
  - Fuses

### Disposing consumable equipment

#### Disposal of Computer Waste

“Disposal” refers to the reselling, reassignment, recycling, donating, or throwing out of IT equipment through responsible, ethical, and environmentally sound means. It is illegal in several states to simply throw computer parts, or old computers, in the trash.

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The average color CRT monitor has about 4 pounds of lead in it. The rest of the computer is a buffet of heavy metals that can cause liver damage, kidney failure, cancer, and a host of different diseases that affect not only human beings but wildlife as well.

It is the duty of us technicians responsibility to properly recycle or dispose of our old computer parts.

### **Dispose consumables**

- **Batteries**

Batteries for the computer often contain lithium, mercury, or nickel-cadmium, which means that if they were to be thrown in the garbage and carried off to a landfill site, they could contaminate the water and soil. You can take batteries to a recycling depot or, in some cases, send them back to the manufacturer.

- **CRTs**

Many CRTs contain lead. If you dump them in the trash (and ultimately in a landfill), you may contaminate the soil and water in your area and poison people. Don't do it! For this reason, CRTs must be recycled or turned over to a hazardous waste program.

- **Toner Kits and Cartridges**

The main concern about the disposal of toner kits and cartridges is that there are too many of them. Most people go through several a year, and if they were all thrown in the garbage, they would fill a landfill site. There are many ways of dealing with toner kits and cartridges.

You can now refill these cartridges which saves on environmental wear but wreaks havoc on your printer. The printing quality from refilled cartridges is often less than that of new cartridges and the refilled ink can cause the bubble jets on ink-jet printers to clog.

Many manufacturers of these cartridges will buy back the used cartridges, refill them, and then resell them, which is probably the best solution.

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- **Chemical Solvents and Cans**

Chemical solvents or cans for PC use (or for any other use, for that matter) contain many harmful chemicals that should not be placed in the ground. For this reason, you simply cannot throw these in the garbage or they may damage the soil and water supply. Instead, chemical solvents and cans must be picked up through a hazardous waste program.

#### **4.4 Disposing consumables by following environmental guidelines**

Recycling and the disposal of computer hardware is considered environmentally friendly because it prevents hazardous waste, including heavy metals and carcinogens, from entering the atmosphere, landfill or waterways. Almost every part of a computer is something that you can recycle. This includes the battery, hard drive, and cables. While some parts contain gold or other materials that are worth money, separating those materials at home is difficult and usually not worth the time that you spend in terms of how much you get.

#### **4.5 Testing equipment to ensure it is in working order at set time periods**

In computer hardware and software development, testing is used at key checkpoints in the overall process to determine whether objectives are being met. For example, in software development, product objectives are sometimes tested by product user representatives.

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## Hardware / Software Testing

- Functionality Testing. Can be performed on hardware or software products to verify that your product functions exactly as designed. ...
- Compatibility Testing. ...
- Performance Testing. ...
- Usability Testing. ...
- Automation Testing. ...
- Competitive Analysis Testing.

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## SELF-CHECK 4

**Direction: Perform the following. Use a separate sheet of paper in answering.(15%)**

1. Define what consumable materials are.
2. List the differences b/n consumable and non-consumable materials.
3. Write all steps to replace consumable materials
4. Write down all types of non-consumable materials.
5. Write down the uses of consumable materials.
6. What are Information Technology (IT) Consumables?(2)
7. List e.g. Of IT consumables (2)
8. What are Disposal of Computer Waste mines?

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## Operation sheet 4.1: Replacing consumables (Printer Cartridge)

**Operation title:** Procedures of replacing Printer Cartridge

**Purpose:** To practice and demonstrate the knowledge and skill required in replacing consumables

**Tools and requirement:**

This operation sheet, Computer, Maintenance toolkit

**Precautions:** Apply OHS standards

**Procedures in doing the task**



Figure 4. 1 Replace Printer Cartridge

**Step1:** Write down the printer brand and model number

**Step2:** Press the power button on your printer

**Step3:** Open the compartment that contains the ink cartridges

**Step4:** Take note of the cartridge manufacture, model number, and color

**Step5:** Purchase new cartridges

**Step6:** Remove the cartridges you want to replace

**Step7:** Shake the new cartridge and then remove it from the package

**Step8:** Remove protective strips and tabs from the ink cartridge

**Step9:** Insert the cartridge into the printer

**Step10:** Print a test page

**Step11:** Reconfigure printer heads for best quality

**Quality Criteria:** the cartilage is replaced properly

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## LAP Test-4: Replace IT Consumables

Task1: Replace Printer Cartridge

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## Unit Five: Maintain Equipment

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

- Identifying equipment which requires maintenance
- Maintaining equipment based on manufacturer specifications and organization manual.
- Documenting maintenance procedures based on organizational instruction
- Exercising care to prevent interruption of business activities
- Storing unused equipment devices based on manufacturer specifications and organization manual.

This 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:

- Identify maintainable equipment
- Document maintenance procedures
- Prevent interruption of business activities
- Store unused equipment

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## 5.1 Identifying equipment which requires maintenance

Equipment maintenance is any process used to keep a business's equipment in reliable working order. It may include routine upkeep as well as corrective repair work. Equipment may include mechanical assets, tools, heavy off-road vehicles, and computer systems. Maintenance is the process in which changes are implemented either by modifying the existing system's structure or by adding new components to the system. System requirements are changing fast and to meet this requirement some changes are incorporated and maintained in the system.

## 5.2 Maintaining equipment based on manufacturer specifications

### Components to consider in reviewing the computer specifications

Whether you're buying a laptop, desktop or tablet computer, it's essential that you take the time to consider the device's processor, hard drive, memory, graphics card and operating system before making your purchase.

### Guidelines for maintaining a computer system

- Protect with padding. ...
- Organize cords. ...
- Update your operating system. ...
- Unplug to avoid overcharging. ...
- Purge your system of junk files and programs. ...
- Run regular antivirus scans. ...
- Clean the keyboard and case. ...
- Update your passwords.

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## Essential Computer Maintenance

- Update your operating system: If you're looking for basic computer maintenance, keeping your operating system up to date is one of the easiest solutions.

Unplug to avoid overcharging: Unnecessary charging can lead to overcharging, which then leads to regenerative capability deterioration. This often looks like a laptop that can't hold a charge as well as it could in its earlier days.

- Run regular antivirus scans: Malware infections can compromise the performance of your computer and expose your confidential information to third-party cybercriminals.
- Update your passwords: Believe it or not, updating your passwords is a task as crucial as backing up your data.

### 5.3 Documenting maintenance procedures based on organizational instruction

Maintenance documentation is any record containing information that you might need to complete maintenance tasks and inspections. It tells you what you have, shows you how to maintain it, and has records of all your past work. A standard maintenance procedure is a detailed list of steps that describes how to perform a maintenance task and is also a documented standard to which the job or task should be performed.

Maintenance and Support Documentation means and includes the organized collection of records that describes the structure, purpose, operation, maintenance, and data requirements for a computer program, operating system, or hardware device.

A document is a piece of writing that contains information whereas a record is a document that can be used as evidence. Both documents and records provide information, but records also serve as evidence.

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## 5.4 Exercising care to prevent interruption of business activities

Business Interruption means any event that disrupts Contractor's ability to complete the Work for a period of time, and may include, but is not limited to a Disaster, power outage, strike, loss of necessary personnel or computer virus.

- Determine the Risk. ...
- Calculate the Cost of Interruptions. ...
- Understand Your Insurance Coverage. ...
- Implement Steps for Prevention and Mitigation. ...
- Create a Crisis Communication Plan. ...
- Prepare an Emergency Plan.

## 5.5 Storing unused equipment devices based on manufacturer specifications

Storage equipment is any equipment used for holding or buffering materials over a period of time (and may include transport) typically they help preserve valuable work floor space.

Keep Electronics Safe during Storage

- Take inventory and oorganize. ...
- Remove all batteries. ...
- Clean first before sstorage. ...
- Make sure your data is secure. ...

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## SELF-CHECK 5

Perform the following. Use a separate sheet of paper in answering.(15%)

1. Define the use of maintenance procedure.
2. What are the exercises to minimizes business interruptions
3. How to record maintenance procedures?
4. What are the steps of computer maintenance?
5. Write and explain about storing un used materials
6. Define what is Maintenance?
7. List Types of Maintenance
8. Maintenance work order procedure and techniques are
9. Maintenance safety rules are\_\_\_\_\_&\_\_\_\_\_
10. What is Improvement Maintenance?

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## Operation sheet 5.1: Maintaining A Computer Equipment

**Operation title:** Procedures Of Repairing Damaged Computer

**Purpose:** To Practice And Demonstrate The Knowledge And Skill Required In Maintaining Computer

**Instruction:** identify the computer that require maintenance

### Tools and requirement:

This operation sheet, Computer, Maintenance toolkit

**Precautions:** Apply OHS standards

### Procedures in doing the task



Figure 5. 1 repairing damaged computer

**Step-1:** prepare the computer

**Step-2:** discharge your self

**Step-3:** Diagnose/troubleshoot which part is maintainable

**Step-4:** identify maintainable or not

**Step-5:** if it is maintainable, repair it, otherwise replace it by new equipment

**Quality Criteria:** the computer is functional

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## Lap Test 5: Maintain a computer

- Task-1: Maintain Hard Disk
- Task-2: Maintain Power Supply
- Task-3: Maintain Mother Board

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## Reference

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2. [How to Disassemble & Rebuild A Desktop PC | Crucial.com](#)
3. [How to Troubleshoot Basic Computer Problems to Fix Your Computer \(techboomers.com\)](#)
4. Complete A+ Guide to IT Hardware and Software (pearsoncmg.com)

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