FRUIT AND VEGITABLE PROCESSING

Level III

Based on May 2019, Version 2 OS and March. 2021, V1 Curriculum

Module Title: - Operating and Monitoring Food Processes and Equipment

LG Code: IND FVP3 M07 LO (1-3) LG (19-21)

TTLM Code: IND FVP3 07 TTLM 0321v1

March 2021 E.C

Bishoftu,Ethiopia

United Nations Educational, Scientific and Cultural Organization

With the support of Republic of Korea Funds-in Trust

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LG #19	LO#1 Prepare the food equipment and process for operation

Instruction sheet

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

- Approving identifying work requirements
- Confirming materials available
- Preparing Pre-mixes
- Identifying and confirming cleaning and maintenance requirements and status
- Fitting and adjusting machine components
- Entering Processing or operating parameters
- Checking and adjusting food equipment performance
- Carrying out pre-start checks

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:

- Approve identifying work requirements
- Confirm materials available
- Prepare Pre-mixes
- Identify and confirm cleaning and maintenance requirements and status
- Fit and adjust machine components
- Enter Processing or operating parameters
- Check and adjust food equipment performance
- Carry out pre-start checks

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- Identifying work requirements

1.1 Work requirements are qualifications and skills necessary for a certain position. A scope of work (SOW) sets forth requirements for performance to achieve project objectives.It should be clear, concise, accurate and complete. Work requirements are not a new policy idea. Job requirements are usually written in form of a list that contains the most important qualifications that a candidate must possess in order to be able to perform certain job duties. Skills (soft skills and/or technical skills).

1.1.1 Personal work requirements for a fruit and vegetable picker

- Enjoy practical work
- Free from skin conditions and allergies to agricultural chemicals
- Able to cope with the physical demands of the job
- Able to work at heights
- Able to work quickly and consistently for long periods of time
- Willing to work outdoors in all weather conditions
- Able to travel from property to property to pick fruit and vegetables
- Able to undertake manual and sometimes heavy work
- Reliable and motivated.

Core work activities include:

- Paid Employment
- Work Experience
- On-the-job-training
- Vocational Education Training
- Job Preparation
- Community Service Programs

Self-Check 1	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1.Work requirements are qualifications and skills necessary for a certain position (3point)

Test II: Choose the best answer

1. Which one of the following is Personal work requirements for a fruit and vegetable picker? (3points)
   A. Enjoy practical work
   B. Free from skin conditions and allergies to agricultural chemicals
   C. Able to cope with the physical demands of the job
   D. All

Test III: Short answer

1. Write at least three Personal work requirements (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Confirming materials

2.1 materials includes:

- Fresh fruit
- Fresh vegetables
- Jam and jelly
- Food additives
- Cereals and starches
- Fats and oil
- Sugar and sweeteners

Fresh fruits and vegetables are an important part of a healthful diet. They provide vitamins, minerals and fiber to help keep your body healthy. Occasionally, fresh fruits and vegetables can become contaminated with harmful bacteria or viruses, which are also known as pathogens. Examples of pathogens include *Salmonella, E. coli* 0157:H7 and Hepatitis A. Fruits are nearly all acidic and are commonly called 'high acid' foods. This acidity naturally controls the type of micro-organisms that are able to grow in fruit products. The spoilage microorganisms that are likely to be found in such products.

Fig1. Fresh fruit and fresh vegetables

Food additives

There are lists of permitted food colours, emulsifies, stabilisers, preservatives and other additives that can be added to foods. Any chemical that is not on these lists cannot be used. There are also maximum levels set for each additive in specific foods and lists of foods that are able to contain specified preservatives.

Fig 2. Food additives

Jam and jelly

Fresh fruits contain more than 80 per cent water and 10 to 15 per cent sugars. Therefore,fruits are good food for microorganisms. The fruits spoil very fast, if not preserved in time. One of the traditional methods of preservation is conversion of fruit pulp to jam and jelly.

All fruits can be converted to jam by mashing or slicing it fine, adding an approximately equal amount of sugar, and simmering until it reaches proper concentration or gel at 218° to 222°F (103°–105°C).

- ✓ **Jam** is a solid gel made from fruit pulp or juice, sugar, and pectin. It can be made from a single fruit or from a combination, but in either ease the fruit content should be at least 40 per cent.
- ✓ **Jellies** are crystal-clear jams, produced using filtered juice instead of fruit pulp.

Fig 3. Jam and jelly

yeasts, which if consumed, rarely cause illness. Processing may be achieved by using preservatives such as sugar, salt and vinegar, and by drying, concentration or fermentation.

Vegetables are less acidic than fruits and for that reason are classified as 'low acid' products. A wide range of micro-organisms are able to grow in moist low-acid products, which may lead to spoilage and the possibility of food poisoning.

The process of jelly making is also similar except that only fruit extract is used for making ofjelly and pectin is added for gel formation after boiling.

Cereal

A cereal is any grass cultivated (grown) for the edible components of its grain (botanically, a type of fruit called a caryopsis), composed of the endosperm, germ, and bran.

Fig 3 Cereal

Starch

is a soft, white, tasteless powder that is insoluble in cold water, alcohol, or other solvents

Fig 5 Starch product

Fats and oil

Fats and oils are composed of molecules known as triglycerides, which are esters composed of three fatty acid units linked to glycerol. An increase in the percentage of shorter-chain fatty acids and/or unsaturated fatty acids lowers the melting point of a fat or oil.

Sugar and sweeteners

Artificial sweeteners (sometimes called sugar alternatives) can replace sugar in foods and drinks to give you a sweet taste but with few or no calories. They are often several hundred times sweeter than sugar. So compared to sugar, only a little is needed for the same sweet taste.

Self-Check 2	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Fruits are nearly all acidic and are commonly called 'high acid' foods. (3point)

Test II: Choose the best answer

1_____is a solid gel made from fruit pulp or juice, sugar, and pectin.? (3points)

A. Jam

B. Jellies

C. Marmalad

D. All

Test III: Short answer

1. Write the importance of fresh fruits and vegetables (4points)

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 3- Preparing Pre-mixes

3.1 Preparing Pre-mixes

Premix usually refers to a food products which is mixed in an early stage in the manufacturing and distribution process. a mixture of ingredients designed to be mixed with other ingredients before use. The use of premixes can provide manufacturers with multiple distinct advantages. knowledgeable preblend formulator can bring her or his experience and expertise to bear in solving problems. Strict, standardized methods are developed to ensure quality and consistency.

Jam Premixs:

- ✓ **Sugar:** Sugar acts as a preservative that helps maintain the beautiful colour of the fruit and inhibits mould growth. Always use the exact amount of sugar called for in the recipe.
- ✓ **Pectin:** is a natural fibre found in plant cell walls and most concentrated in the skin **of fruits.**
- ✓ **Citric acid:** is often added to jams, jellies, candy, canned foods, and even meat products as a form of preservation**.**

Fig1 Pre-mixes

Fig 1 Citric acid

“Premixs have been a routine part of the approach to formulating food products for multiple reasons,” acknowledges “Sometimes, the challenge is a matter of getting good dispersion of a low-concentration ingredient. The right dilution of the color or flavor reduces the occurrence of ingredient hot spots in the final product.”

Self-Check 3	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1**.** Premix usually refers to a substance or object which is mixed in an early stage in the manufacturing and distribution process**.** (3point)

2. Preblends have been a routine part of the approach to formulating food products for multiple reasons. (3point)

Test II: Short answer

1. Write the advantages of Premix (4points**)**

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 4- Identifying and confirming cleaning and maintenance requirements and status

4.1 Identifying cleaning requirements and status

Cleaning is designed to remove all visible dirt, soil, chemical residues and allergens from equipment, utensils and work surfaces. Cleaning is usually carried out in several Reasons for Cleaning, includes the following:

To reduce the risks from food hazards -food poisoning and foreign body Contamination

- To present a hygienic visual image
- To promote safe working conditions for staff, contractors and visitors
- To maintain product shelf-life
- To avoid pest infestation
- To meet specific customer requirements
- To meet the requirements of global food safety standards (GFSI)
- To maintain positive audit and inspection outcomes
- To allow maximum plant productivity

Fig 1. Cleaning vegetable product by using water spray

4.1.1 Frequency of production room/equipment cleaning

- Daily clean - These are tasks that need to be done at least once daily. Some
  - ✓ Areas and items will need to be cleaned several times per day e.g. Public
  - ✓ Toilets
- Weekly clean - These are areas or items that need to be cleaned weekly. This may be scheduled on certain days of the week e.g. Monday - Clean the West Wing windows internally, Tuesday - Clean the ast Wing windows internally, Wednesday - Clean lift grills on floors 8-14 on lifts 9 and 10
- Team Cleaning - This means that there will be a team of people each with their own task working in the same area at once e.g. In a public toilet area one person would clean all the toilet cubicles whilst another will clean all the wash hand basins followed lastly by somebody to clean all the floors. Team cleaning is rare .In hotels but in large entertainment venues or offices, this practice is common. This will save all cleaners having to carry all pieces of cleaning equipment, instead just carrying the equipment they will need for their specific tasks
- Periodic cleaning - Tasks that are done on a regular periodic basis such as deep cleaning of carpets and upholstery, cleaning of chandeliers or windows. This cleaning will be planned and may involve at times using external contractors.

4.2 Identifying and confirming maintenance requirements and status

Maintenance

The technical meaning of maintenance involves functional checks, servicing, repairing or replacing of necessary devices, equipment, machinery, building infrastructure, and supporting utilities in industrial, business, governmental, and residential installations. Maintenance is the upkeep of all fruit and vegitable fittings and equipment to an exacting standard within the property so that all areas look consistently new and pristine

Fig2 Maintenance of fruit blanching equipment

Table 1 Cleaning and maintenance scadule

Type of equipment	Spare parts	Maintenance required	Cleaning
Fillers	None	None	After use with detergent and clean water
Filters (wine, juice)	Filter cloths or pads	None	After use with detergent and clean water, followed by sterilisation using dilute bleach
Food grade drums	None	None	After use with detergent and clean water, followed by sterilisation using dilute bleach
Freezer	None	Periodic de-icing	Periodic cleaning with detergent and clean water after de-icing
Fruit crushers	Motor drive belt, bolts, fuse	Monthly check belt tension, bearings, condition of wiring and bolt threads	After use with detergent and clean water
Fruit presses	None	Periodic check for wear on screw and bearing	After use with detergent and clean water
Gas burners Gas cylinder	None	None	After use with detergent and clean water
General tools, work tables	None	None	After use with detergent and clean water
Heat sealers	Heating element	None	Weekly wipe with damp cloth. Remove any burned-on plastic immediately
Hosepipe and spray gun	Washer for spray gun	None	Weekly wipe with damp cloth.
Hydrometers – alcohol and brine	None	None	After use with detergent and clean water
Insect proof	None	None	Weekly wipe with damp cloth.

Type of equipment	Spare parts	Maintenance required	Cleaning
Packing table	None	None	After use with detergent and clean water
Pasteurising kettle	None	None	After use with detergent and clean water
Peelers	Replacement blade	None	After use with detergent and clean water
pH meters	Buffer solutions, probe	Monthly standardisation	Wipe carefully with damp cloth after use
Pot sealers	Heating element	None	Weekly wipe with damp cloth
Preparation table	None	None	After use with detergent and clean water
Pressure cooker	None	None	After use with detergent and clean water
Protective gloves, hats, hairnets, coats, boots	None	None	Weekly laundry for coats, daily washing of boots. Others laundry as required
Pulper finishers	Motor drive belt, bolts, fuse	Monthly check belt tension, bearings, condition of wiring and bolt threads	After use with detergent and clean water, with particular attention to the screen
Reamers	None	None	After use with detergent and clean water
Refracto-meters	None	None	Wipe carefully with tissue paper and rinse with distilled water
Scales	None	Monthly standardisation with known weights	Weekly wipe with damp cloth
Sulphuring	None	None	Clean trays after each batch with

Self-Check 4	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Cleaning is designed to remove all visible dirt, soil, chemical residues and allergens from equipment. (3point)

Test II: Choose the best answer

1. Which one of the following is Frequency of cleaning (3points)

A. Daily clean

B. Weakily clean

C. Monthly clean

D. All

Test III: Short answer

1. Write three reasons of Cleaning Reasons equipment (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

1.2 Fitting machine components

Fitting meaning: a small part, especially a standardized or detachable part of a device or machine. Fitting is the process of applying craft methods such as skilled filing to the making and assembling of machines components or other equipments. Fitting means ready, appropriate, or in keeping, whereas proper means suited or acceptable to the purpose or circumstances. Fitting the equipment's follows the following points:

- Check for partially collapsed lines
- Inspect gears, pivots, etc.,for excessive wear.
- Check legibility of dials, numerals, and pointers.

Fig 1 Transporting and washing machine components

Fig 2. Fruit juicer processing machine components

- Stirrers, mixers, agitators, paddles

Fig 3 Stirrers, mixers, agitators, paddles

- Vacuum cookers

Fig 4 Vacuum cookers

- Concentrators:

Fig 5 Concentrators:

- Materials transfer and handling equipment

Fig 6 Materials transfer and handling equipment

- Storage tank

Fig 3 Fruit Storage tank

Self-Check 5	Written Test

Name…… ID…… Date…….

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

Test I: Write true/false

1. Fitting meaning a small part, especially a standardized or detachable part of a device or machine.(3point)

Test II: Choose the best answer

1. Which one of the following fruit and vegetable machine components 3pts

A. Mixing kettles

B. Stirrers, mixers, agitators, paddles

C. Vacuum cookers

D. All

Test III: Short answer

1. Write at least two points of fitting followos(4points) .

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 6- Entering Processing or operating parameters

6.1 Introduction

The processes that use high temperatures as a way to preserve foods include canned and finished product, including the measurement of chemical parameters. Operate, monitor and adjust process equipment to achieve required outcomes, including monitoring control points and conducting inspections as required to confirm process remains within specification operating procedures that address parameters will include instructions about: pressure limits, temperature ranges, flow rates, what to do when an upset condition occurs, and what alarms and instruments are pertinent if an upset condition occurs.Is the force applied perpendicular to the surface of an object per unit area over which that force is distributed

Fig 1 operating processing/ Flow rates of products

Basic operating principles of equipment, such as main equipment components, status and purpose of guards, equipment operating capacities and applications, and the purpose and location of sensors and related feedback instrumentation

Technological procedures of processing of fruit and vegetables can be classified into few processing methods: Traditional processing methods - drying, concentrating, heating (cooking, baking, frying) cooling, use of additives - preservatives, acidification, fermentation.

Fig 3 Adjusting time and temperature ranges

Fig 3 Ingredient addition systems tomato ketchup processing

Self-Check 6	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1**.** Start, operate, monitor and adjust process equipment to achieve required outcomes (5point)

Test I: Short answer

1. What is the basic operating principles of equipment (5point)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet 7 - Checking and adjusting food equipment performance

1.1. Checking equipment performance.

Checking measuring machinery health by performance monitoring has the potential to give warning of a developing failure through the changing levels of a suitable parameter being measured, thereby indicating a change in condition of a component

Fig1 Checking equipment performance.

1.3 Food equipment may include any one of the following:-

- Heat exchanger
- pH Meter General
- Retort equipment
- Static and batch retorts
- Continuous retorts
- Water retort
- Steaming/cooking equipment
- Hot water blanchers
- Steam blanchers
- Water purification equipment
- Dosing equipment
- Storage tanks
- Pumps and valves
- Distillation systems
- Reverse osmosis systems
- UV-Visible Spectrophotometer
- Deionization plants
- Softeners, carbon tanks and filters
- Dehydration equipment
- Packaging equipment
- Hydrostatic cookers with or without over-pressure

1. UV-Visible Spectrophotometer

General Description: To measure the chemical constituents of the sample and to get spectrometric analysis of the given samples. ation, inactivation and even for industrial incubation procedures.

Fig 1 UV-Visible Spectrophotometer

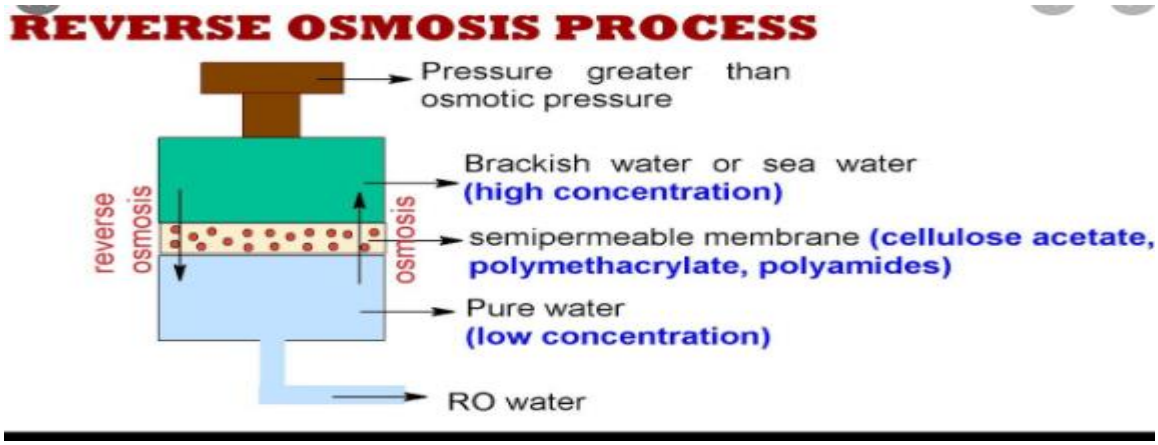
2. pH Meter General

Description: This equipment measures pH of the solutions and the tissue culture media. Appropriate buffers stabilize the pH of the electrode and the machine reads the pH of the solution in complement with the buffer.

Fig 2 pH Meter

3. Reverse osmosis

is a process that removes foreign contaminants, solid substances, large molecules and minerals from water by using pressure to push it through specialized membranes. The system improves water for drinking, cooking and other important uses.



4. Steam blanchers

Steam blanching is a critical step in dehydrating many types of vegetables and fruits. Blanching is the process whereby food is briefly cooked in boiling water, steam, or syrup, such that it destroys enzymes that catalyze the reactions of food spoilage.

Fig 4 Steam blanchers

1.4 Adjusting equipment performance.

Adjusting production equipment performance is used to increase fruit and vegitable equipment safety and ready for next production process.

Production equipment performance includes:-

- Lubricate each moving part once before turning it on. (Manipulator, robot guide, opening and closing guide).

- The cutting machine has a large chain and a small chain to add lubricating oil
- once a month. Check whether the moving parts are firm before the production,
- whether the screws are loose or not, especially in places with strong impact.
- Check if the high pressure gas source, low pressure gas source, power source and water source are normal.
- Check each emergency stop switch, safety door switch, and protection device to
- check if the switch is normal.
- Check the lamp for damage and breakage.
- Check if the pneumatic components are leaking and the action is sensitive.
- When the machine is being repaired, press the screen fault repair button to ensure safe maintenance.

Advantages of checking and adjusting machine

- Counting Stress and Overload Conditions to check the machine problem
- To identify the frequency and number of times that they are overloaded.

Fig1 Adjusting food equipment performance

Self-Check 7	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Adjusting production equipment performance is used to increase fruit and vegitable equipment safety and ready for next production process (5point)

Test II: Short answer

1. Write at least five food processing equipment (5point)

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 8- Carrying out pre-start checks

1.1 Introduction

1.2 Carrying out pre-start checks.

Pre-start checks involves a routine examination of a piece of opirating equipment by its operator that is standardized via a checklist. The purpose of an pre-start checks is to identify whether work equipment can be operated, adjusted and maintained safely – with any deterioration detected and remedied before it results in a health and safety risk. pre-start inspections are an important task with financial, and more importantly, safety implications.

Pre-start checks include:

- Inspecting equipment condition to identify any signs of wear
- Selecting appropriate settings and/or related parameters
- Canceling isolation or lockouts as required
- Confirming that equipment is clean, correctly configured for processing requirements
- Sensors and controls are correctly positioned
- Any scheduled maintenance has been carried out and all safety guards are in place and operational

Keys to pre-start checks including:-

- **Mechanical:**

All workers must have adequate PPE (Personal Protection Equipment). Generally, this includes, as a minimum, safety shoes, safety glasses, a hard hat, and work gloves**.**

- **Electrical:**

Review the wire wiring specification with the electrical contractor to ensure it follows the provided cabling and conduit-run instructions. Make sure all power is “locked out/tagged out” while the electrical work is being done.

Think through which machines are fixed and which are movable. Do not apply power to the main panel or any other parts of the system until the appropriate technician is on-site and has inspected the installation**.**

- **Filling and checking fluids**

Confirm that gear box in the system is filled with the correct grade of oil.

- **Safety checks**

A safety team must evaluate the installation for potential hazards and confirm that issues that being addressed systematically by the site’s safety/health program.

- **Start-up phase**

Before any production, a preliminary evaluation of the equipment is conducted.

Self-Check 8	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Pre-start checks involves a routine examination of a piece of automated equipment by its operator that is standardized via a checklist (3point)

Test II: Choose the best

1. Which one of the following is true about Check the Cleaning of the machine (3points?)

A. Remove the dust and dirt deposited on the surface during transport.

B. Carefully clean and dry each part C.A and B D. All

Test III: Short answer

1. Write the purpose of an inspection (5point)

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Operation Sheet 1- Carrying out Pre-start checks of food processing equipment

Objectives: to know how to check equipment befor starting opiration

Materials: Voltemeter, testlight,

Procedure

Step 1: Apply safety rules .

Step 2: Prepare machine operating(checking) equipment and put in operating (checking) area

Step 3: Prepare food processing equipment functionality befor starting/opirating for product,equipment/operator safety.

Step 4: Disinfect food processing equipment by using recommended detergent.

Step 5: Operate food processing equipment.

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 1 hour. The project is expected from each student to do it.

Task-1 Pre-start checks

LG#20	LO#2 Operate and Monitor the Food Process

Instruction sheet

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

- Delivering ingredients and additives to the food equipment
- Starting and operating the process
- Monitoring equipment to identify variation in operating conditions
- Identifying and reporting maintenance equipment operation variation
- Monitoring the process
- Identifying,Rectifying and Reporting out-of-specification product/process/packaging outcomes
- Transferring product
- Maintaining workplace
- Maintaining Workplace records

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:

- Delivere ingredients and additives to the food equipment
- Starte and operate the process
- Monitor equipment to identify variation in operating conditions
- Identify and report maintenance equipment operation variation
- Monitor the process
- Identify,Rectify and report out-of-specification product/process/packaging outcomes
- Transfere product
- Maintain workplace
- Maintain Workplace records

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Information Sheet 1- Delivering ingredients and additives to the food equipment.

1.1 Food ingredient is any substance that is added to a food to achieve a desired effect. The term “food ingredient” includes food additives, which are substances added to foods for specific technical and/or functional purposes during processing, storage or packaging. Ingredients that either maintain or control the acidity or alkalinity of foods are known as pH control agents.

Examples of food additives:

- pH Control Agents: **pH control** involves the use of a nonvolatile base
- Preservatives

preservative is a substance or a chemical that is added to products such as food products, beverages,to prevent decomp

- Emulsifiers.

osition by microbial growth or by undesirable chemical changes.

Emulsifier, in foods, any of numerous chemical additives that encourage the suspension of one liquid in another, as in the mixture of oil and water in margarine, shortening, ice cream, and salad dressing.

- Stabilizers, Thickeners and Gelling Agents.

Starches, pectin and gums are the most common commercial **thickeners**

Starches, pectin and gums are the most common commercial **thickeners**

Fig 1 Food additives

Self-Check 1	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Food ingredient is any substance that is added to a food to achieve a desired effect. (3point)

Test II: Choose the best answer

1.Which one of the following is food additives(3points).

A. pH Control Agents.

B. Preservatives

C. Emulsifiers

D. All

Test III: Short answer

1. Write at least three food additives (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Starting and operating the process.

2.1 Starting and operating the process

Start, operate, monitor and adjust process equipment to achieve required outcomes, including monitoring control points and conducting inspections as required to confirm process remains within specification, such as:

- time/temperature, flow rates, churn speed

Flow diagram of tomato processing

- Ingredient addition systems

Fig 2 Ingredient addition systems

Basic operating principles of equipment, such as main equipment components, status and purpose of guards, equipment operating capacities and applications, and the purpose and location of sensors and related feedback instrumentation

The operators in the industry are - in general - craftsmen knowing how to manufacture a good product and not just technicians. Tanis control systems are built and designed to operate the plant without the need for special computer skills

Self-Check 2	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Start, operate, monitor and adjust process equipment to achieve required outcomes. (5point)

Test II: Short answer

2. Write basic operating principles of equipment (5points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 3- Monitoring equipment to identify variation in operating conditions.

3.1 Monitoring equipment

Monitoring equipment is the systematic process of collecting, analyzing and using information to identify variation in operating conditions. The objectives of monitoring equipment is to guide management decisions. There are three basic categories of monitoring equipment;technical monitoring, functional monitoring and business process monitoring.

Workers have to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors. There are the obvious functions of monitoring and controlling the process for reasons of safety and product specification. Additionally, there is invaluable information to be gained from the process parameters that can give an understanding of the current health of the asset.

Fig 1 Monitoring equipment

Condition monitoring has historically focused on the acquisition and analysis of measurable parameters that would give useful information as to the condition of machine components and, hence, a forecast of the likely serviceability of the machine.

Methods used to monitor the production process, such as inspecting, measuring and testing as required by the process

- Inspection or test points (control points) in the process

3.2 Monitoring equipment variation in operating conditions.

- **I**nspecting control points in the process
- Measuring

Fig 2 Measuring juice filling equipment

- Testing: time/temperatureadjustement

Fig 2 Monitoring operating conditions.

Self-Check 3	Written Test

Name…… ID…… Date…….

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

Test I: Say true/fals

1. Monitoring is the systematic process of collecting, analyzing and using information to track a programmer's progress (5point)

Test II: Short answer

1. Write the methods used to monitor the production process (5point)

_____

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

InformationSheet 4- Identifying and reporting maintenance equipmen operation variation.

4.1 Identifying variation in equipment maintenance operation

Maintenance defined as efforts taken to keep the condition and performance of a machine/food processing equipment always like the condition and performance of the machine when it is still new.

Five (5) types of equipment maintenance variation have been distinguished, which are differentiated by the nature of the tasks that they include:

- **Corrective maintenance**: The set of tasks is destined to correct the defects to be found in the different equipment and that are communicated to the maintenance department by users of the same equipment.
- **Preventive Maintenance**: Its mission is to maintain a level of certain service on equipment, programming the interventions of their vulnerabilities in the most opportune time. It is used to be a systematic character, that is, the equipment is inspected even if it has not given any symptoms of having a problem.
- **Predictive Maintenance:** It pursues constantly know and report the status and operational capacity of the installations by knowing the values of certain variables, which represent such state and operational ability. To apply this maintenance, it is necessary to identify physical variables (temperature, vibration, power consumption, etc.). Which variation is indicative of problems that may be appearing on the equipment This maintenance it is the most technical, since it requires advanced technical resources, and at times of strong mathematical, physical and / or technical knowledge.
- **Zero Hours Maintenance (Overhaul):** The set of tasks whose goal is to review the equipment at scheduled intervals before appearing any failure, either when the reliability of the equipment has decreased considerably so it is risky to make

forecasts of production capacity . This review is based on leaving the equipment to zero hours of operation, that is, as if the equipment were new. These reviews will replace or repair all items subject to wear. The aim is to ensure, with high probability, a good working time fixed in advance.

- **Periodic maintenance (Time Based Maintenance TBM):** the basic maintenance of equipment made by the users of it. It consists of a series of elementary tasks (data collections, visual inspections, cleaning, lubrication, retightening screws) for which no extensive training is necessary, but perhaps only a brief training. This type of maintenance is the based on TPM (Total Productive Maintenance.

4.2 Reporting variation in equipment maintenance operation

The cost of regular maintenance is very small when it is compared to the cost of a major breakdown at which time there is no production.Themain purpose of regular maintenance is to ensure that all equipment required for production is operating at 100% efficiency at all times.The final component of reporting the defect is sharing the experience. This involves

- discussing the problem and solution with other members of the operations and quality control staffs through one-on-one discussions
- group discussions
- written communications, or
- formal training sessions so that each team member gains the experience of defect recognition

Proactive types of maintenance:-

- Preventive maintenance.
- Predictive maintenance.
- Condition-based maintenance.
- Scheduled maintenance.
- Planned maintenance.

- Routine maintenance.
- Emergency maintenance.
- Corrective maintenance.

The basic types of proactive maintenance falling under MRO include:

- Preventive maintenance, also known as PM.
- Corrective maintenance, where equipment is repaired or replaced after wear, malfunctions or breaks down.

The principle of maintenance

Maintenance is regularly planned and performed on a piece of equipment while the equipment is still working so that it does not break down unexpectedly. By minimizing unexpected breakdowns, unplanned downtime is avoided and equipment and asset up-time can be maximized

Self-Check 4	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. The main purpose of regular maintenance is to ensure that all equipment required for production is operating (3point).

Test II: Choose the best answer

1. Which one of the proactive types of maintenance? (3points)

   A. Preventive maintenance B. Predictive maintenance.

   C. Routine maintenance D. All

Test III: Short answer

1. Write primary goal of equipment maintenance (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 5- Monitoring the process

5.1 Monitoring is the regular observation and recording of activities taking place in a production. It is a process of routinely gathering information on all aspects of the production the Periodic tracking (for example, daily, weekly, monthly, and quarterly, annually) of any activity's progress by systematically gathering and analyzing data and information is called Monitoring.

Workers to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors. There are three basic categories of monitoring; technical monitoring, functional monitoring and business process monitoring.

Monitoring the process may include:

- Use of high temperatures
  - ✓ During canning, chlorophyll is converted to pheophytin due to the high temperatures.
- Thermal processing
  - ✓ Thermal processing is the commonly used method in household and industrial food production. However, high processing/cooking temperatures can affect heat labile vitamins and amino acids.
- Dry heat cooking
  - ✓ Cooking is necessary in order to improve the palatability and digestibility of vegetables.
- Moist heat cooking
- Heat application

- ✓ Heat treatment is also responsible for nutritional and quality losses. There are slight changes in color, fl vor, texture, and overall acceptability of the produce. During heat treatment, vitamin C losses range from 15 to 40%. Such losses even continue during storage of canned items.

- Dehydration
  - ✓ During the drying/dehydration process, extra heat is applied to evaporate the moisture and in such cases, interaction between amino acids and reducing sugars (Maillard reaction) may occur, resulting in quality and hedonic loss.

Use of low temperatures

- Chilling
  - ✓ Chilling is only a short-term barrier to microbial growth.

It should be noted that the thermal destruction of some yeasts and moulds is more complex than simple

logarithmic destruction.

- Freezing
  - ✓ Freezing ensures the shelf life of the produce with maximum nutrient retention.
  - ✓ The important benefit derived from freezing of vegetables are described as follows:
    - ➢ Prevents the growth of spoilage organisms and retards the activity of enzymes
    - ➢ Minimizes the deteriorative changes in nutritive value
    - ➢ Enhances the shelf life of the produce

Monitoring and Controlling process

- Measuring performance of the project to the project management plan
- Approving change requests
- Recommended corrective and preventive action

- Defect repair.

The reasons to trigger project monitoring and control processes. These are:

Requested changes

- Initiating Process Group to review Project Charter
- Planning Process Group to Re-Plan
- Executing Process Group is to repair defects
- Closing Process Group if project is finished

Fig 1. Monitoring the process

Self-Check 5	Written Test

Name…… ID…… Date…….

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

Test I Say true/false

1. Monitoring is the regular observation and recording of activities taking place in a production.

Test I: Choose the best answer

1.Which one of the following is true about monitoring and Controlling process(3point)

A. Measuring performance of the project to the project management plan

B. Approving change requests

C. Recommended corrective and preventive action.

D. All

Test II: Short answer

1. Write at least three monitoring process (5point)

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 6- Identifying, Rectifying and Reporting out-of-specification product/process/packaging outcomes

6.1 Identifying out-of-specification outcomes

The term out of specification, is defined as those results of in process or finished product/ process/packaging machine testing, which falling out of specified limits, results includes all test results that fall outside the specifications that are mentioned in compendia, drug master file. So, the result occurrences have to be investigated and addressed.

1.3 Rectifying out-of-specification outcomes

out-of-specification results may indicate a flaw in product or process design. For example, a lack of robustness in product formulation, inadequate raw material characterization or control, substantial variation introduced by one or more unit operations of the manufacturing process, or a combination of these factors can be the cause of inconsistent product quality. In such cases, it is essential that redesign of the product or process be undertaken to ensure reproducible product quality. The specifications of product have their own specification. Identifying and rectifying the processes and the products outcomes take place throughout the process and take actions when they occur, the processes or products will be out-of-specifications.

1.4 Reporting out-of-specification outcomes

The reasons for out-of-specification can be classified as assignable and non-assignable. out-of-specification results will be greatly facilitated if the retained sample preparations are examined promptly. When the limits are not in specified limits is called out of specifications. When out-of-specification has occurred, the analyst should inform to QC manager. Then the senior manager will ask QA for issuing out-of-specification form to

analyst. The designated personnel will classify the OOS as either assignable cause or non-assignable cause and report to the supervisor.

The final component of reporting the defect is sharing the experience. This involves

- discussing the problem and solution with other members of the operations and quality control staffs through one-on-one discussions
- group discussions
- written communications, or
- formal training sessions so that each team member gains the experience of defect recognition
- solution determination
- Implementation for as many situations as possible.

Parameters for out-of-specification food processing equipment

- Time/temperature
- Juice flow rate
- Washer pressure adjustement

Self-Check 6	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. The reasons for OOS can be classified as assignable and non-assignable (5point)

Test II: Short answer

1. What is the term out of specification mean (5point)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answer

Information Sheet 7- Transferring product

1.1 Introduction

product needs to be relevant the users must have an immediate use for it. A product needs to be functionally able to do what it is supposed to, and do it with a good quality. Food Product in the following forms

- Fresh/chilled products
  - ✓ Chilled food is food that is stored at refrigeration temperatures, which are at or below 0 – −5 °C (32–23 °F).

    The key requirements for chilled food products.
- Canned products
  - ✓ Canned foods are given a severe heat process, which is primarily designed to destroy spores of Clostridium botulinum.

Canned food has a long shelf life because the sterilized food is separated from the outside environment by the sealed

containers (i.e., metal can, glass can, and aluminum foil). Thus, food is not contaminated with outside air or microorganisms.

- Bottled products

Fig 1 Bottled products

A bottle is a narrow-necked container made of an impermeable material in various shapes and to provide a chamber into which the marble was pushed to open the bottle

- Poached products Water produced may include:

✓ Purified water

Purified water is water that has been filtered or processed to remove impurities like chemicals and other contaminants

✓ Deionized Water

Deionized (DI) water is water that has been treated to remove all ions – typically, that means all of the dissolved mineral salts. Distilled water has been boiled

✓ Reverse Osmosis (RO)

Reverse osmosis occurs when the water is moved across the membrane against the concentration gradient, from lower concentration to higher concentration.

Distilled water and Water for Injection (WFI)

Self-Check 7	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Chilled food is food that is stored at refrigeration temperatures, which are at or below 0 – −5 °C (32–23 °F).

(3point)

2. Canned foods are given a severe heat process, which is primarily designed to destroy spores of Clostridium botulinum.

(3point)

Test II: Short answer

1. Write at least three food product (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 8- Maintaining workplace

1.1 Introduction

1.2 Maintaining a clean workplace is vital for employers to reduce their workers compensation claims and keep efficiency high. When employees work in a messy environment, they may not notice all hazards, which increase the risk of an accident. 5S or good housekeeping involves the principle of waste elimination through workplace organization. 5S was derived from the Japanese words seiri, seiton, seiso, seiketsu, and shitsuke.

The plan also makes sure that work areas are not used as storage areas by having workers move materials to and from work areas as needed. Housekeeping order is "maintained" not "achieved." Cleaning and organization must be done regularly, not just at the end of the shift. Integrating housekeeping into jobs can help ensure this is done. A good housekeeping program identifies and assigns responsibilities for the following:

- clean up during the shift
- day-to-day cleanup
- waste disposal
- removal of unused materials
- inspection to ensure cleanup is complete

Poor housekeeping can be a cause of incidents, such as:

- tripping over loose objects on floors, stairs and platforms
- being hit by falling objects
- slipping on greasy, wet or dirty surfaces
- striking against projecting, poorly stacked items or misplaced material
- cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

Safety Before operation

- Short term training is necessary for the operators
- Become familiar with the safe operation of the equipment, operator must know the machine working principle and operation
- All operators should train. The owner of the machine is responsible for training the users.
- Check bolts and other loosen parts and tighten it before operation will start.
- When maintaining, inspecting, attaching and detaching parts, park the machine at flat and safe place.
- Use proper tools to maintain the machine and check working area is safe. During Operating

  Only allow responsible person, who are familiar with the instructions, to operate

Fig 1 maintaining workplace

Effective housekeeping results in:

- reduced handling to ease the flow of materials
- fewer tripping and slipping incidents in clutter-free and spill-free work areas
- decreased fire hazards
- lower worker exposures to hazardous products (e.g. dusts, vapors)
- better control of tools and materials, including inventory and supplies
- more efficient equipment cleanup and maintenance
- better hygienic conditions leading to improved health

- more effective use of space
- reduced property damage by improving preventive maintenance
- less janitorial work
- improved morale
- improved productivity (tools and materials will be easy to find)

Self-Check 8	Written Test

Name…… ID…… Date…….

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

Test II: Say true/false

1. Housekeeping order is "maintained" not "achieved (3point**)**

Test I: Choose the best answer

1. What are the benefits of good housekeeping practices? (5point)

A. Tripping over loose objects on floors, stairs and platforms

A. being hit by falling objects

B. slipping on greasy, wet or dirty surfaces

C. All

Test III: Short answer

1. Write at least three effective housekeeping results (5point)

_____

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 9- Maintaining Workplace records

9.1 Maintaining Workplace records

Workplace records management concerns more of the day-to-day activities involving physical or digital files, like capturing, storing, modifying, or sharing them**.**

Workplace information may include to:-

- standard operating procedures (SOPs)
- specifications
- production schedules and instructions
- manufacturers' advice

9.1.1 Records management has several goals:

- Organizing existing and future documents
- Improving workflow
- Allowing quick search and retrieval of documents
- Maintaining organization of files to reduce the number of lost and misfiled documents
- standard forms and reports

Fig1 workplace record

Analysis of these records can identify:-

- common problems by model
- spare parts most frequently used by model
- maintenance activities performed in a month by administrative area
- service histories of individual devices
- equipment operator training needs and
- Cost–effectiveness of equipment maintenance and repair services.

Methods of work place record use notecards or a notebook to record the information.

- Print out the information you find and then
- Take notes on notecards or in a notebook.
- Find it easier to remember information if you have written it down yourself.
- Document each source as you work

Fig 2 workplace record

Table 1.Work record scedule

Type of record	Information to be recorded
Production records	Recipes Raw materials and ingredients received and suppliers Wastage % at different stages of the process Stock levels for each ingredient Production volumes and measurements Maintenance programs and schedules
Quality assurance records	Target amounts of ingredients and any changes made to recipe Measurements made at process control points Batch numbers and product code numbers Cleaning procedures and schedules
Sales records	Names of customers and amounts sold to each Weekly and monthly sales volumes
Financial records	Income from sales Costs of all process inputs Staff records Cash flow Profit/loss Tax records Bank statements

Checklist 3

Can you answer these questions? Tick the box if you know the answer. Write notes on what you currently do or need to do to find the answer.

Question	Tick	Notes
1. Do you know how to calculate your production rate?		
2. Do you know how to calculate the amounts and true costs of ingredients required for a given production rate?		
3. Do you know how to calculate the yield of product and levels of wastage?		
4. Do you know how to calculate moisture losses during drying and boiling?		
5. Do you know how to plan labour requirements and how to allocate jobs to different workers to maximise efficiency?		
6. Can you calculate equipment size requirements using product throughput?		
7. Do you have correct maintenance procedures for your equipment?		
8. Have you developed safety training and checked the process to ensure that equipment and procedures are safe?		
9. Do you keep adequate records?		

Table 2 Work record schedule checklist

Self-Check 9	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Workplace records are an important part of any work environment (3point)

Test II: Choose the best answer

1. Why are records essential? (3points)

A. For continuous monitoring of quality system B. To identify failures in equipment

C. To revisits information; reference D. All

Test III: Short answer

1. Write five types of records (4points)

_____

_

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Operation sheet - 1	Starting and operating the process

Objective: after the end of these operation the student must be opirate the food processing equipment

Materials: Voltemeter,testlit and other opirating equipment

Procedure

Step 1: Apply safety rules

Step 2: Prepare equipment's which is used for operation and put in operating area.

Step 3: Check the electric line by voltemeter befor operating

Step 4: Maintain food processing equipment for operation

Step 5: After maintaining clean and disinfect the equipment/food processing line

Step 6: Adjust and check pressure limits,temperature ranges and flow rate of the process

Step 7 : Starting and operating the process

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 1 hour. The project is expected from each student to do it.

Task-1 Start and operate the process

LG #21	LO #3 Prepare pumps for operation

Instruction sheet

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

- Identifying shut down procedure
- Shutting down the process
- Identifying, reporting, and conducting maintenance requirements

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 shut down procedure
- Shut down the process
- Identify, report, and conduct maintenance requirements

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- Identifying shut down procedures

1.1 Shutting down procedure:

is a process of factory machine; a termination/suspension of operation, services is turn off or stop. Shutdown includes steps to render the systems safe, such as removal of hazardous process materials and inert (asphyxiating) gases. The systems might be cleaned as part of the shutdown; Plant shutdown, or turn around, is a temporary closure of a building to perform maintenance.

Fig1 Shut down procedures

Reading, interpreting and following information on written job instructions, specifications and other applicable machine reference documents

- Checking and clarifying task-related information
- Entering information onto preforms and standard workplace forms
- Shutting down machine/equipment
- Purging/de p energizing equipment
- Installing safety/security lock-off devices and signage

Shut down procedure :

- Undertake shut-down sequence safely and to standard operating procedures.
- Depressor/empty/de-energy/bled machine/equipment to standard operating procedures.
- Verify safe shut-down of machine/equipment.
- Install safety/security lock-off devices and signage to standard operating procedures.
- Do not start a miller until the bowl is locked in place and the attachments are securely fastened.
- Turn off motor before you scrape down the sides of the bowl, when using a miller.
- Left machine/equipment in clean and safe stat
- Make sure they cannot fall, when working with tools at height

Self-Check 1	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Cleaning carried out by a dedicated cleaning crew (5point).

Test II: Choose the best answer

1. List shutdown procedures (5point).

_____

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Shutting down process

1.2 Shutdown Process is shutdown of all process system. Process Shutdown is activated automatically by various process sensors. Process Shutdown will shut down and isolate all related process equipment or systems, to limit the probability of an abnormal operating condition leading to emergency situation. Opirating machine shutdowns in process industries typically happen in frequently (every year/ two) and take several days to complete.

In general, these shutdowns should have two objectives:

1. To repair problems identified during previous major shutdowns, and
2. To inspect parts of the plant not accessible during operation in order to identify problems that will be repaired during future planned shutdowns

Many processors have their own procedure for starting up and shutting down an automated machine or injection molding machine and, depending on the process, there may be reasons for the specific method.

Some examples of shutdown objectives are:-

- Zero harm to shut down workforce
- Emergent work to be restricted to 10% of planned work
- Shutdown costs to be within budgeted costs
- Shutdown overrun to be less than 5%

Fig 1 Shutting down process

Shutdown process of equipment machine

Step 1 Make sure power tools are properly grounded or are double insulated

Step 2 Switch off cutting equipment and unplug power tools before changing blades or servicing and repairing

Step 3 Wear appropriate personal protective equipment (PPE), such as glasses, goggles, dust masks, face shields, hearing protection, etc.

Step 4 Keep by standers at a safe distance

Step 5 Keep all guards and shields in place

Step 6 Unplug and store tools after use

Step 7 Consider keeping power tools locked up to prevent unauthorized use

Step 8 cleaning and other activities by turning off cutting equipment by unplugging a power or by pressing emergency button.

Self-Check 2	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1. Process Shutdown is shutdown of all process system (3point).

Test II: Short answer

1. What are the key issues which must be addressed during the shutdown initiation phase (3point?)

A. Shutdown date

B. Shutdown duration

C. Overall Shutdown budget

D. All

Test III: Short answer

1. Write two objectives of shutdown process (4point)

_____

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 3- Identifying, reporting, and conducting maintenance requirements

1.1. Inroduction

1.2 Identifying maintenance requirements

Maintenance refers to planned technical activities or activities carried out in response to a breakdown, to ensure that assets are functioning effectively, and require skills, tools and spare parts

When working with equipment and machinery (maintenance personnel), observe the following rules:

- Ensure that it cannot be started or operated by either disconnecting the means of starting/by isolation at the panel and the local stop.
- Always use the correct tools for the job.
- Before Keep chisels in good condition.
- Use the correct grade of protective visors or goggles.
- Do not manhandle heavy objects. Use lifting gear.
- Always replace belt guards and other safety shields.
- Always read the carefully instructions carrying out any maintenance operation on specialized equipment
- Test turbidity of effluent on a regular basis and whenever the water quality or flow rate changes.

Preventative maintenance and operating procedures that are necessary to ensure Satisfactory operation.

The following preventative maintenance and operating procedures includes:-

- Corrective or breakdown maintenance: this is carried out when components Fail and stop working.

- Preventive maintenance: this is a regular, planned activity that takes place so that breakdowns are avoided. Examples of preventive maintenance would include servicing of equipment, inspecting equipment for wear and tear and replacing as necessary, cleaning and greasing moving parts of equipment, and replacing items that have a limited lifespan.

Maintenance plan in fruit and vegetable machine processing includes:-

- maintenance activities and schedules
- maintenance costs and budget details
- Staff resource and supply requirements
- staff roles and responsibilities
- contingency plan for staff and supply problems
- reporting requirements
- hazard and risk control measures
- OHS procedures, personal protective clothing and equipment requirements Environmental impact control measures.

3.1.2 Reporting maintenance requirements according to workplace Requirements

The main problem areas of machine are related to:-

- Poor design.
- Variations in raw water quality.
- Lack of maintenance.
- inadequately trained operators,
- inadequate process monitoring,
- poor record-keeping and poor management

Table.1 maintenance schedule

Date	**Tool**	**Maintenance check points**	**Signature**	**Maintenance required**	**Signature**
10/2/2013	Fruit and vegetable machine	Conver velt		Conver	
Maintenance Performed				Date	**Signature**
Automated cutting machine					

Table.2 maintenance check list of fruit and vegetable opirating machine

	Tool	Yes	No	Remark
1	Are tools in safe condition?			
2	Are instruction manuals available?			
3	Are power tools properly grounded?			
4	Are guards and shields in place?			
5	Is Personal Protective Equipment available?			
6	Are tools properly stored?			

Self-Check 3	Written Test

Name…… ID…… Date…….

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

Test I: Say true/false

1**.** Preventative maintenance and operating procedures that is necessary to ensure Satisfactory operation (3point)

Test II: Choose the best answer

1 The main problem areas of maintenance (3point)

A. poor design,

B. Variations in raw water quality.

C. lack of maintenance,

D. All

Test III: Short answer

1. List the main problem areas of maintenance (4point?)

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Operation sheet - 3	Shutting down process clean and maintain the food process equipment

Objective: After the end of these operation/production the student must know Shutting down process

Materials: Voltemeter,testlit and other opirating equipment

Procedure:

Step 1: Apply safety rules

Step 2. Shut down the process eg. equipment

Step 3. Check electric line breaker by testing voltmeter for our safety if it's a problem happen maintain before cleaning.

Step 4. After mentaining clean internal of opirating equipment by recommended detergents/chemicals

Step 5: Cover the food process equipment by plastic/other materials to control physical/other hazards.

LAP Test 1	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 1 hour. The project is expected from each student to do it.

Task1: Shutting down process

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