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FOOD PROCESSING & PACKAGING TECHNICIAN

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019

NAVTTC

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1. INTRODUCTION

This course is aimed at introducing and developing the basic skills and knowledge of Food processing Industry. The trainee is introduced in a step by step manner to the various elements of the discipline and their implications. Ranging from the knowledge and skills required to prepare work environment according to the food processing order, product raw materials and perform packaging. The trainees are encouraged to experiment with a focus on acquiring a wide range of new skills for meeting the new trends in food industry both in processing and packaging. Trainee is also exposed to the commercial market and taught how to deal with clients and their demands in food processing industry.

In order to improve the quality of training and to ensure relevance, National Vocational & Technical Training Commission (NAVTTC) through Qualification Development Committee (QDC) developed National Competency Standards for Food Processing & Packaging Technician. The learning outcomes provided in this curriculum forms the basis, which is in accordance with the approved National Competency Standards for Food Processing & Packaging Technician. The curriculum can be implemented in a variety of pathways and provides flexible learning opportunities in public and private sector as well as industry based institutes.

1. PURPOSE OF THE TRAINING PROGRAMME

In this training program trainee will learn and acquire specialized knowledge and practical skills required to function as a Food Processing & Packaging Technician in Food Processing and Packaging industry. The specific objectives of developing these qualifications are as under:

- Improve the overall quality of training delivery and setting national benchmarks for training of Food Processing & Packaging Technician in the country.
- Provide flexible pathways and progressions to learner enabling them to receive relevant, up-to-date and current skills in Food Industry.
- Provide basis for competency-based assessment which is recognized and accepted by employers in modern days.
- Establish a standardized and sustainable system of training in consultation with the industry for Food Processing & Packaging Technician in the country.

2. OVERALL OBJECTIVES OF TRAINING COURSE

The primary objective of this two years certificate course in Food Processing & Packaging Technician is to provide the trainees with a comprehensive introduction in food industry. At present there are no skill standards at national level in Food Processing Industry. These standards will develop trainee's abilities, interests and offers outstanding opportunities at different stages of Food Sector. It will encourage individual to learn knowledge and skills in related field of Food Processing. He/she should have the capability to get job in food industry after successful completion of two years (level 1-4) course. Trainee must take part in commercial activities after seeking training in this sector. It will help the trainees to start their own commercial activities as an independent skilled worker in Food Sector or an employee in a commercial setup. He/she will also made aware of the ever changing and evolving demands and challenges of market trends in Food Industry. This course will be opened to all Science matriculate students for enhancing their capabilities in this field.

3. COMPETENCIES TO BE GAINED AFTER COMPLETION OF COURSE

The study of Food Processing & Packaging Technician enables trainee to develop a range of competencies including, creative thinking, research skills, personal management, presentation skills, communication, negotiation skills and technical competence related to their job assignment. Such competencies acquired and enhanced during the course of study results in highly employable pass outs. In addition, the trainee will be able to acquire the following competencies after completing this course:

- Demonstrate and apply basic knowledge and concepts in food processing industry
- Develop creative thinking skills and perceptual awareness in food processing industry

- Develop skills necessary for understanding and applying skills during work
- Explore and discuss unique properties and potential of technical work
- Demonstrate techniques and processes for food processing and packaging
- Communicate and express ideas through a variety of skills and techniques in food industry
- Evaluate and select materials, techniques and processes to process food and packaging the products as per order.
- Demonstrate the safe and responsible use of tools and materials at workplace
- Ability to work in a commercial or apprenticeship setup

4. JOB OPPORTUNITIES AVAILABLE IMMEDIATELY AND IN THE FUTURE

The Pass outs of this course may find job / employment opportunities in the following areas:

- Work as Assistant Technician in Food Processing & Packaging Industry (Level-II)

5. TRAINEE ENTRY LEVEL:

- Middle or equivalent with level 1.

6. MINIMUM QUALIFICATION OF TRAINER

- 2-5 years of professional experience in food industry after DAE (Food Technology)/ Bachelor's degree (Food Technology).

7. RECOMMENDED TRAINER: TRAINEE RATIO

- The recommended trainer and trainee ratio is1:25 per class

8. MEDIUM OF INSTRUCTION:

- Urdu, English or Local Language

9. DURATION OF COURSE (TOTAL TIME, THEORY & PRACTICAL)

Module #	Title	Theory (Total Hours)	Practical (Total Hours)	Total Hours	Credit Hours
102200844	**Comply with Personal Health and Safety Guidelines**	20	30	50	5
041700839	**Communicate the Workplace Policy and Procedure**	20	20	40	4

001100851	**Perform Basic Communication (Specific)**	20	30	50	5
061100856	**Perform Basic Computer Application (Specific)**	20	40	60	6
072100980	Maintain tools and equipment	08	32	40	4
072100981	Receive Raw Materials as per Manufacturing order	08	32	40	4
072100982	Perform Food Cleaning and Sanitation	12	48	60	6
Total Hours		**108**	**232**	**340**	**34**

SUMMARY OF MODULES

The proposed curriculum is composed of 7 modules that will be covered in 600 hrs. It is proposed that the course may be delivered in 3 months period. The distribution of contact hours (practical & theory) is given below:

- **Theory** (20%) **: Practical** (80%)
- **Theory:** 108 **hours**
- **Practical:** 232 **hours**

10. SUMMARY – OVERVIEW OF THE CURRICULUM

Module Title	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1 **Comply with Personal Health and Safety Guidelines**	**LU1.**	20	30	50
Module 2 **Communicate the Workplace Policy and**	**LU1.**	20	20	40

Procedure				
Module 3 **Perform Basic Communication (Specific)**	**LU1.**	20	30	50
Module 4 **Perform Basic Computer Application (Specific)**	**LU1.**	20	40	60
Module 5. **Maintain Tools and Equipment**	**LU1.** Perform cleaning of tools and equipment **LU2.** Apply food grade lubricants of tools/equipment **LU3.** Implement Internal Control Plan (ICP) for tools and equipment's **LU4.** Adopt housekeeping practices for tools/equipment (e.g. 5 S)	08	32	40
Module 6. **Receive Raw Materials as per Manufacturing Order**	**LU1.** Identify different raw materials as per food processing manufacturing order **LU2.** Ensure raw material quality parameters (physical, chemical, biological, color or flavor retention) **LU3.** Measure the ingredients according to manufacturing order/recipe **LU4.** Maintain record of all received/labeled materials as per SOPs **LU5.** Store the ingredients according to standard procedure **LU6.** Handle the raw materials in an appropriate manner **LU7.** Provide raw materials to processing unit as per requirements of manufacturing order	08	32	40

Module 7. **Perform Food Cleaning and Sanitation**	**LU1.** Ensure availability of all cleaning and sanitation materials **LU2.** Ensure all utilities are available **LU3.** Perform cleaning and sanitation as per schedule/procedure **LU4.** Verify cleaning and sanitation by analytical/swab test/ATP-testing **LU5.** Prepare log sheets as per procedure **LU6.** Control cleaning solution temperature to melt fats/meats **LU7.** Ensure equipment free of visible soil, haze or water beads **LU8.** Sanitize inaccessible parts of machinery prior to assembling **LU9.** Ensure pre-operation Inspection	12	48	60

Module.1: Comply with Personal Health and Safety Guidelines

Objective: After completing this module, the learner will be able to apply skills and knowledge to perform processing functions in accordance with the industry's approved guidelines and procedures:

Duration:	**Total hours**	**50**	**Practical**	**30**	**Theory**	**20**

Module.2: Communicate the Workplace Policy and Procedure

Objective: After completing this module, the learner will be able to apply skills and knowledge to perform processing functions in accordance with the industry's approved guidelines and procedures:

Duration:	**Total hours**	**40**	**Practical**	**20**	**Theory**	**20**

Module.3: Perform Basic Communication (Specific

Objective: After completing this module, the learner will be able to apply skills and knowledge to perform processing functions in accordance with the industry's approved guidelines and procedures:

Duration:	**Total hours**	**50**	**Practical**	**30**	**Theory**	**20**

Module.4: Perform Basic Computer Application (Specific)

Objective: After completing this module, the learner will be able to apply skills and knowledge to perform processing functions in accordance with the industry's approved guidelines and procedures:

Duration:	**Total hours**	**60**	**Practical**	**40**	**Theory**	**20**

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Module-5

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Module.5: 072100980 Maintain tools and equipment

Objective: After completing this module, the learner will be able to apply skills and knowledge to perform processing functions in accordance with the industry's approved guidelines and procedures:

Duration:	**Total hours**	**40**	**Practical**	**32**	**Theory**	**8**

Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration**	**Materials (Tools & Equipment) Required**	**Learning Place**
LU1. Perform cleaning of tools and equipment	**P1.** Check the cleanliness status of machine after completion of each batch as per the instructions given in manual **P2.** Take corrective measures in case of inappropriate cleaning **P3.** Maintain record keeping	Describe the cleaning methods tool and equipment's (dry cleaning, wet cleaning) Define cleaning measures parameters (repeat cleaning in case of any deviation) Explain procedure of maintaining and filling up of (check list, log-book, log sheet)	2 hours Theory 08 hours Practical Total:10 hours	Hose cleaning pipe, scrubbers, mopes, color coded brushes, water gun, suction blowers	Class Room and workplace
LU2. Apply food grade lubricants of tools/equipment	**P1.** Check gauge of food lubricants as per machine manual **P2.** Ensure proper food lubrication of machinery as per schedule	Define food grade & non-food grade lubricants. (quinpiex, silicone spray oven chain lubricants) Describe the importance of lubrication of machinery/machinery (decrease friction loses, decrease wear and tear, smooth run)	2 hours Theory 08 hours Practical Total:10 hours	Grease gun, lubrication gun	Class Room and workplace
LU3. Implement Internal Control Plan (ICP) for tools and	**P1.** Inspect the tools/equipment regularly	Describe the inspection schedule for tools and equipment.	2 hours Theory	Drill Machine, grinder, Electric and instrument	Class Room and workplace

	equipment's	**P2.** Identify damaged tools/equipment **P3.** Perform repair/replace tools/parts **P4.** Perform calibration as per defined frequency **P5.** Maintain all record of tools/equipment's as per industry SOPs	Define inspection methods of tools and equipment (visual, and calibration of tool and equipment) Define repair/replacement techniques (trainings) Define calibration methods (physical, by PLC) Describe the procedure of inventory of tools and equipment (inventory sheets, consumption record)	08 hours Practical Total:10 hours	Tools, thermometer, conductivity meter	
LU4.	**Adopt housekeeping practices for tools/equipment (e.g. 5 S)**	**P1.** Identify and eliminate all unnecessary items from the workplace Step 1, Seiri, or Sort **P2.** Put every necessary item in good order, and focused on efficient and effective storage methods, Step 2. *Seiton*, or Systematize **P3.** Inspect the workplace and equipment for defects Step 3. *Seiso*, or Sweep **P4.** Keep the workplace organized, orderly and clean Step 4: *Seiketsu*, or Standardize **P5.** Ensure to follow the 5S standards Step 5: *Shitsuke*, or Self-Discipline	Describe each step of 5S of housekeeping practices for tools and equipment (Sort, set, shine, standardized and sustain)	2 hours Theory 08 hours Practical Total:10 hours	Pressure guns for oiling Hand jacks Volt and ampere meters PPE's, chemical suit, safety helmet,	Class Room and workplace

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Module-6

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Module.6: 072100981 Receive Raw Materials as per manufacturing order

Objective: After completing this module, the learner will be able to check quality raw materials in accordance with the Current Good Manufacturing Practices (CGMP) as well as industry's approved guidelines and procedures in food processing industry.

Duration:	**Total hours**	**40**	**Practical**	**32**	**Theory**	**08**

Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration**	**Materials (Tools & Equipment) Required**	**Learning Place**
LU1. Identify different raw materials as per food processing manufacturing order	**P1.** Generate requirement for raw materials as per manufacturing order **P2.** Verify quantity of received raw materials as per manufacturing order	Describe the properties of good raw material (according to company specification, according to regulatory specification) Describe the importance of verification of raw material (smooth plant running)	1 hours Theory 04 hours Practical Total hours 05	Hand jacks, trolleys, hand buckets, Weighing scales, Pellets	Class Room and workplace
LU2. Ensure raw material quality parameters (physical, chemical, biological, color or flavor retention)	**P1.** Perform testing of raw materials as per specification **P2.** Ensure materials identification labels as per the specifications of food specific processing order **P3.** Check expiry date on each labeled food raw material as per specifications	Explain quality control procedures for testing of raw material (taste, smell, pH, acidity,) Enlist the components of Label (product name, MFG, EXP date, quantity, storage condition etc.) Define the methods of checking expiry date of raw material (use by date, best	1 hours Theory 05 hours Practical Total hours 06	Refractometer, burettes, moisture analyzer, colorimeter, muffle furnace, pH meter, Kjeldhal apparatus, TDS meter,	Class Room and workplace

		before use)			
LU3. Measure the ingredients according to manufacturing order/recipe	**P1.** Perform balancing and zero-tare of measuring equipment's **P2.** Ensure volumetric and by-weight measurement of ingredients as per requirements	Explain Importance of taring the weighting devices (remove error, accurate weighting if ingredient, facilitate batch standardization) Describe the Importance of measuring of ingredients in manufacturing of food item (facilitate the batch standardization)	1 hours Theory 04 hours Practical Total hours 05	Weighing balance, master weights, measuring cylinders, measuring tools	Class Room and workplace
LU4. Maintain record of all received/labeled materials as per SOPs	**P1.** Maintain log book/log sheets for record of all received materials **P2.** Analyze quality trends of raw materials	Define record management; Describe the Importance of record keeping (facilitate tractability, facilitate rework, control plant operation) Describe the effect of raw material trend (indicate strength and weakness of process)	2 hours Theory 04 hours Practical Total hours 06	Log sheets, log books	Class Room and workplace
LU5. Store the ingredients according to standard procedure	**P1.** Ensure the cleaning of storage area **P2.** Place the raw materials in designated areas to avoid cross contamination **P3.** Ensure storage of raw materials as per SOPs	Enlist the methods of cleaning (wet and dry cleaning) Enlist parameters for storage of different types of ingredients. (e.g. temperature, Humidity, nature of ingredients.) Describe the protocol for raw materials of raw material storage (cleaning of storage	1 hours Theory 06 hours Practical Total hours 07	scrubbers, mopes, color coded brushes, Thermometer, hand lifter, troll pallets	Class Room and workplace

		area, follow FIFO and FEFO)			
LU6. Handle the raw materials in an appropriate manner	**P1.** Use of appropriate PPEs for handling raw materials **P2.** Use hand jacks and trolleys in case of high weight	Enlist PPE's for handling raw material (gloves, safety shoes, gum shoes, chemical suite, face shield) Describe the methods of handling of high weight material (use hand jacks and trollies)	1 hours Theory 04 hours Practical Total hours 05	PPE's, Hand jacks and trolleys	Class Room and workplace
LU7. Provide raw materials to processing unit as per requirements of manufacturing order	**P1.** Check the inventory of raw materials as per manufacturing order **P2.** Hand over the raw materials to production in charge	Describe the importance of inventory checks (facilitate check and balance) Define procedures of handing over raw materials (receive MIR and hand over the raw material to production in charge)	1 hours Theory 05 hours Practical Total hours 06	Lifters, Trolleys, Hand jacks, Conveyer belt	Class Room and workplace

Module.7: 072100982 Perform Food Cleaning and Sanitation

Objective: After completing this module, the learner will be able to apply skills and specific knowledge to perform cleaning and sanitation in accordance with the industry's approved guidelines and procedures.

Duration:	**Total hours**	**60**	**Practical**	**48**	**Theory**	**12**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place

LU1. Ensure availability of all cleaning and sanitation materials	**P1.** Verify cleaning and sanitation materials as per requirement **P2.** Check quality parameters of cleaning chemicals (pH, Purity, Reactivity, Conductivity)	Describe the handling procedures of cleaning & sanitation materials according to the nature of material. (check quality and quantity) Explain the procedures to check the quality of cleaning solution (concentration, composition, pH etc.)	1 hours Theory 05 hours Practical Total hours 06	Cleaning trolleys, mobs, brushes, pH meter,	Class Room and workplace
LU2. Ensure all utilities are available	**P1.** Check the availability of potable water for cleaning **P2.** Check the availability of heating source **P3.** Check the availability of compressed air	Define portable water Enlist the sources of heating (wet steam, dry steam hot water) Enlist the uses of compressed air.	1 hours Theory 05 hours Practical Total hours 06	Cleaning hose pipes, shower guns	Class Room and workplace
LU3. Perform cleaning and sanitation as per schedule/procedure	**P1.** Select appropriate method of cleaning as per product nature (dry and wet cleaning) **P2.** Use of color-coded cleaning tools for food and nonfood surfaces **P3.** Apply 4Ts (Time, Temperature, Titration, Turbulence) of cleaning **P4.** Perform disinfection of food contact surfaces where required	Define cleaning and sanitation; Explain different cleaning techniques like dry cleaning, wet cleaning, cleaning in place etc. Describe the use of color coded of cleaning tool (red for toilets, blue for low risk area, green for food containing areas, yellow for clinical). Define 4t's of cleaning Describe the importance of disinfection of food contact surfaces (remove microorganisms, reduce hazard risks)	2 hours Theory 06 hours Practical Total hours 08	Conductivity meters, level switches, flow meters, color coded buckets, mobs, pumps, automizer, burettes flask, beakers, thermometer	Class Room and workplace

	P5. Validate cleaning method as per requirement	Describe how to verify cleaning (swab and ATP test)			
LU4. Verify cleaning and sanitation by analytical/swab test/ATP-testing	**P1.** Perform visual verification of surface after cleaning **P2**. Analyze pH of initial and final rinsing water **P3.** Ensure all analytical/Swab/ATP results are as per standards	Describe the visual inspection of cleaned surface (visual, smell, and by hand) Define TDS and pH of water. Describe the process of swab and ATP test	1 hours Theory 05 hours Practical Total hours 06	PPE's (Goggles, face shield, comical suite, chemical gloves), swab sticks, petri dishes, autoclave	Class Room and workplace
LU5. Prepare log sheets as per procedure	**P1.** Maintain record of all 4Ts **P2.** Maintain records of all lab results	Describe how to maintain the records of 4T's (log sheet) Explain the importance of record keeping (facilitate check and balance, facilitate to control operation efficiently)	1 hours Theory 06 hours Practical Total hours 07	Log sheets, log books	Class Room and workplace
LU6. Control cleaning solution temperature to melt fats/meats	**P1.** Consider the water temperature & pressure during cleaning process **P2.** Ensure cleaning solution temperature as per specification of food processing to remove product debris	Define importance of water temperature and pressure in cleaning (effective cleaning) Define the Effect of temperature on cleaning efficiency (increase the cleaning efficiency desolation the deposits)	1 hours Theory 05 hours Practical Total hours 06	Pumps, Air Blowers	Class Room and workplace
LU7. Ensure equipment free of visible soil, haze or water beads	**P1.** Ensure cleaning of stainless steel (SS) equipment with acid on regular basis **P2.** Ensure filtration of cleaning solutions and water before cleaning	Enlist cleaning solutions (Nitric acid, sodium hydro oxide) Describe the purpose of filtration of cleaning solution. Enlist the types of cleaning filters (in reuse solution)	2 hours Theory 05 hours Practical Total hours 07	Brushes, scrappers, sponge, Vacuum Pump	Class Room and workplace
LU8. Sanitize inaccessible parts of machinery prior to assembling	**P1.** Ensure cleaning of hard to reach parts by dismantle cleaning	Enlist the types of cleaning (CIP, COP)	1 hours Theory	Toolkit, hose pipe, scrappers,	Class Room and workplace

	P2. Rinse equipment from top to bottom	Write down the procedure of equipment cleaning (initial rinsing, acid circulation, intermediate rinse)	05 hours Practical Total hours 06	brushes	
LU9. Ensure pre-operation Inspection	**P1.** Verify by sight, feel and smell the workplace regularly **P2.** Use flashlights and other lights to see non visible parts of machinery before start operation **P3.** Ensure equipment free of visible soil, haze or water beads **P4.** Inspect visible parts and inaccessible parts of machinery after assembling **P5.** Inspect that equipment is free of chemicals, tools and cleaning supplies **P6.** Inspect that guards are in place before starting equipment **P7.** Complete formal pre-operation inspection according to plant Sanitation Standing Operating Procedures (SSOP)	Describe the physical inspection of work place (by visual check, smell) Describe the process of visual inspection of non-visible parts of machinery (flash lights) Describe the importance of inspection of parts before assembling (assure plant cleaning and eliminate rework) Describe how to assure the completion of cleaning process (Visually inspection, turn off cleaning supplies, pH of drainage water) Describe the importance of safe guards on equipment (reduce safety hazards, provide safety to equipment) Enlist the elements of the SSOC's (identify affected areas, identify cleaning tools, dis assembling process and methods of cleaning)	2 hours Theory 06 hours Practical Total hours 08	Artificial nose, flash light, pH meter, Turbidity meter, BOD meter	Class Room and workplace

SUPPORTIVE NOTES:

Assessment context, Critical aspects, Assessment conditions

Formative assessment: The specification of the expected performance demonstrated by the trainee at the conclusion of the learning experiences in a particular module or course. It is used to assess the necessary knowledge, skills and attitudes, reflecting the performance standard in the relevant industry or competency standards. Formative assessment may include observation, simulation, questioning, presentation/ demonstration and written assessment at the end of each module. The various methods or techniques used to gather evidence of sufficiency and quality in which to make a sound judgment on the competency of a learner

Summative assessment: Assessors need to plan in advance how they will conduct summative assessments covering all modules. There must be a maximum of 6-8 trainees per assessor and if there are two assessors than 12 students can be assessed within a day and 24 students in 2 days. The entire course can be tested in the summative assessment covering all 16 modules. Direct observation is an important approach in assessing the attitude of the students toward work, observance of safety rules and regulations, and how they interact and relate with other trainees and instructor. Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of 6-8 trainees. Assessment methods may include observation, simulation, questioning, presentation/ demonstration and written assessment. The various methods or techniques used to gather evidence of sufficiency and quality in which to make a sound judgment on the competency student or learner. Training providers must agree the settings for practical assessments in advance.

LIST OF TOOL AND EQUIPMENT		
SR.NO	**Tools**	**Required items for 24 candidates**
1.	**Food processing system** with retort, pump, boiler, cooker, steamer, dehydrator, concentrator, separator, heat exchanger and all types, mixers, valves all type, actuators, thermocouples, transducers, flow meters, motors (induction & servo), conductivity meters, level switches, sensors type, angle encoders, VFD (variable flow drives), photocells, nozzles, gauges, Solenoid valves and operation, conveyors, weighing scales	1 Unit each
2.	Chiller, compressors, RO (reverse osmoses), Filters.	1 Unit each
3.	Refrigerator, cooling agents,	1 Unit each
4.	Freezer, incubators	1 Unit each
5.	Stoves	6 No.
6.	**Food packaging system** with filling and sealing, can seamer, shrink wrapper, stripper, case packer, labeler, cap applicators, case sealer, lifters, card board packer, milters	1 Unit each
7.	Jack lift, fork lifter, hand jack's lifter, material moving lifters, hydraulic lifters, palletizers	1 Unit each
8.	Trolley, liquid jacked tanks	1 Unit each
9.	Wheeler	1 No.
10.	Poly/temperature sealer, shrink machines, cylinders	1 Unit each
11.	Cap sealer	1 No.
12.	Pressure canner	1 No.
13.	Pressure cooker	2 No.
14.	Cap seal	1 No.
15.	Oven	1 No.
16.	Steam-jacketed kettle	1 No.
17.	Smoking trays	6 No.
18.	Meat grinder	1 No.

19.	Stuffer/linker	1 No.
20.	Silent cutter	1 No.
21.	Brix refractometers (0-90^{o} brix)	2 No.
22.	Clinometers	1 No.
23.	Electronic scales (0.1 gm. capacity)	1 No.
24.	Consist meter/viscometer	1 No.
25.	Vacuum pack machine	1 No.
26.	Laboratory scale cabinet drier or forced draft oven	1 No.
27.	Headspace gauge	2 No.
28.	Test equipment – pH meter, centrifuge, moisture meter, color chart/colorimeter, texture meter	2 Unit each
29.	Computer	1 No.
30.	**Firefighting equipment**, fire extinguisher types and uses, fire hydrants, smoke detector, SCABA (Self containing and birthing apparatus), fire Alarms, manual and automatic emergency haters, safety shower, safety harness,	2 unit each
31.	First aid kit	1 No.
32.	**PPE** – apron, face mask, gloves (chemical gloves, surgical, electrical & Steam gloves), gum shoes (rubber shoes) chemical suit, face shelled, safety helmet, air protectives, goggles	24 No.
33.	Computer system	1 No.
	TOOLS/SUPPLIES	
1.	Weighing scales and balances of various capacities and sensitivities	1 No.
2.	Dietetic scales (1 kg. capacity)	6 No.
3.	Paring knives	6 No.
4.	Peelers	6 No.
5.	Measuring spoons	6 Set

6.	Measuring cups (solid)	6 Set
7.	Measuring cups (liquid)	6 Set
8.	Wrench, screw driver, belts, nuts and bolts, spanners (open, ring combinations) pliers, L kays, star keys, stretched pliers, gas pipe	
9.	Clocks/timer	6 No.
10.	Mixing bowls, stainless steel	6 No.
11.	Hard plastic chopping boards (white, blue, green)	6 unit each
12.	Thermometers of varying temperature range	10 No.
13.	Jar liter	24 No.
14.	Food processor set	2 No.
15.	Wire baskets	3 No.
16.	Casseroles stainless steel	3 No.
17.	Saucepan, stainless steel	6 No.
18.	Spoons, wooden	6 No.
19.	Spoon, basting	6 No.
20.	Paddles, wooden	6 No.
21.	Food tongs	6 No.
22.	Steamer	1 No.
23.	Soaking container	6 No.
24.	Fermented containers	2 No.
25.	Utility trays	6 No.
26.	Colanders, stainless steel	2 No.

PACKAGING MACHINERY		
1.	Automatic can opener	1 No.
2.	Can seam saw	1 No.
3.	Can seam counter sink	1 No.
4.	Can seamer	1 No.
5.	Vacuum can sealer	1 No.
6.	Capping machine	1 No.
7.	Crown corking machine	1 No.
8.	Form fill seal machine (a) 3 side sealing (b) Pillow type	1 No.
9.	Cup filling & sealing machine	1 No.
10.	Horizontal packing machine	1 No.
11.	Twist wrap machine	1 No.
12.	Fold wrap machine	1 No.

Sr. No.	Consumable Items	Quantity for 24 candidates
1	NaoH (PELLETS)	3 Kg
2	HNO_3	3 ltr
3	H_2SO_4	2.5 ltr
4	Ethanol (Absolute)	5 Ltr
5	Phenolphthalein	1 Bottle (100 gm)
6	Burette Set	6 No.
7	Pipette 1ml	10 No.
8	Pipette 5ml	10 No.
9	Pipette 10 ml	10 No.
10	Pipette 10.94 ml	5 No.
11	Auto sucker	10 No.

12	Volumetric flask 100 ml	5 No.
13	Volumetric flask 250 ml	5 No.
14	Volumetric flask 500 ml	5 No.
15	Volumetric flask 1000 ml	5 No.
16	Measuring Cylinder 100 ml	5 No.
17	Measuring Cylinder 500 ml	5 No.
18	Measuring Cylinder 1000 ml	5 No.
19	Reagent Bottles	10 No.
20	Glass Beaker 50 ml	5 No.
21	Glass Beaker 100 ml	5 No.
22	Glass Beaker 250 ml	5 No.
23	Glass Beaker 500 ml	5 No.
24	Pycnometer	5 No.
25	Capillary tube	1 Box
26	Filter paper (90 mm)	2 Box
27	Butyrometer 8 %	5 No.
28	Butyrometer 40 %	5 No.
29	Butyrometer 80 %	5 No.
30	Lactometer	10 No.
31	Rubber stoppers	20 No.
32	China Dish	10 No.
33	Iso amyl alcohol	1 ltr
34	Test tube 20 ml	20 No.
35	Thermometer (0-100 C)	10 No.
36	Plate Count Agar	1 box
37	Violet Red Bile Agar	1 box
38	Potato Dextrose Agar	1 Box
39	Swab Sticks	1 Box
40	S-S Agar	1 Box
41	Inoculating loops	5 No.
42	Spirit lamp	5 No.
43	Hexane	2.5 ltr
44	CMC	1 kg
45	Citric Acid	1 kg
46	Pectin Powder	1 kg
47	Sodium benzoate	100 gm
48	KMS	100 gm
49	Sodium Citrate	100 gm
50	Baking Powder	1 kg

51	Yeast (Sachet)	50 No.
52	Baking Soda	1 kg
COLORS		
53	Caramel Liquid	100 ml
54	Apple Green	100 gm
55	Sunset Yellow	100 gm
56	Apple Red	100 gm
57	Cloudifying Agent	250 ml
58	Lime YELLOW	100 gm
FLAVORS		
59	Apple	250 ml
60	Strawberry	250 ml
61	Mango Chaunsa	250 ml
62	Chocolate	250 ml
63	Vanilla	250 ml
64	Orange	250 ml
65	Pineapple	250 ml
SPICES		
66	Salt	1 kg
67	Red Chili (Powder)	1 kg
68	Black pepper (Powder)	500 gm
69	Mix masala	500 gm
70	Chicken Tikka Masala	5 Box
71	Chicken Tandoori Masala	5 Box
72	Chaat Masala	5 Box
73	Chicken Cubes	2 Box
Grocery/fruits/vegetables		
74	Chicken, Beef, Mutton, Fish	10 kg each
75	Fine Flour	20 kg
76	Sugar	50 kg
77	Cooking Oil	10 ltr
78	Ghee	5 kg
79	Peas	10 kg
80	Lemon	5 kg
81	Tomatoes	10 kg
82	Potatoes	10 kg
83	Green Chili	2 kg
84	Capsicum	2 kg
85	Carrot	10 kg

86	Apple	10 kg
87	Mango	10 kg
88	Orange	10 Dozen
89	Strawberry	10 kg
90	Pineapple	10 kg
91	Cheddar Cheese	10 kg
92	Mozzarella Cheese	10 kg
93	Skimmed Milk Powder	1 Kg
94	Condensed Milk	5 Jar
95	Fresh Milk	20 ltr
96	Empty Metal Can (500 gm)	25 No.
97	Empty Plastic Bottles (750 ml)	50 No
98	Empty Glass Jars (500 gm)	25 No.
99	Plastic Wrapping Sheet	1 Roll
100	Aluminum Foil	2 Roll

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