

JAN SHIKSHAN SANSTHAN

PARTICIPANT HANDBOOK

**ASSISTANT – FRUITS AND VEGETABLES PROCESSING AND PRESERVATION
(Divyangjan)**

Code: 2022/PWD/JSS/06002

Level : 2



**Government of India
Ministry of Skill Development and Entrepreneurship
Directorate of Jan Shikshan Sansthan
New Delhi**

For:
Locomotor Disability (LD)
Intellectual Disability (ID)
Low Vision (LV)
Speech and Hearing Impairment (SHI)

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Note: SCPwD

SCPwD has borrowed the qualification of Assistant- Fruits and Vegetable Processing and Preservation (Divyangjan) from JSS which is approved by

NCVET in the 40th meeting of NSQC on 22 Oct 2024 (Link of MOM
<https://ncvet.gov.in/wp-content/uploads/2024/11/MoM-for-40th-NSQC-Meeting-1.pdf>

And uploaded on NQR WWW.nqr.gov.in

The book caters to the job role aligned to the following disabilities as per the NQR codes mentioned below.

LD - QG-02-PD-03340-2024-V1-SCPwD

SHI - QG-02-PD-03341-2024-V1-SCPwD

ID - QG-02-PD-03343-2024-V1-SCPwD

LV- QG-02-PD-03342-2024-V1-SCPwD



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the
Skill Council for Persons with Disability
for

SKILLING CONTENT: PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

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Authorised Signatory
(Skill Council for Persons with Disability)

ASSISTANT - FRUITS AND VEGETABLES PROCESSING AND PRESERVATION

**PARTICIPANT HANDBOOK for
JAN SHIKSHAN SANSTHAN BENEFICIARIES, DECEMBER 2022**

Mentor

Dr. Ramakrishna Sura

Subject Specialist

Mrs. Shruti Chawla

Ms. Punita Bhatia

Curriculum Development

Ms. Sunita Brahma

Mrs. Babyrani Barik

Dr. Racheal Raykumari

Typing & Editing

Mr. Joseph Chetty

Ms. Pritimayee Dash

PREFACE

India's growing economy needs skilful workforce. For meeting this need, different types of vocation skills training are imparted by Jan Shikshan Sansthan throughout the country. In these training programmes maximum number of neo literate, rudimentary and school dropout beneficiaries are covered. Local based instructors are selected to provide training in respective skills. These instructors are subject specialist in their respective skills. However, their training skills and methods of training are different. Hence uniformity is not maintained during the trainings. In this context there was a need for a handbook to be available to the instructors to bring uniformity and standardization in the training.

As an initial step, 15 most popular vocational course handbooks have been prepared. Different Jan Shikshan Sansthan have contributed to the preparation of these handbooks. Orientation training was imparted to those Jan Shikshan Sansthan Directors who were involved in the preparation of the handbooks. These JSS team along with subject specialist gave final shape to the handbooks.

This is the first attempt by the Directorate of Skill development for publication of the 15 handbooks. All the handbooks are designed according to the National Occupational Standard based Model Curriculum Framework of various NSQF.

In this handbook difficult topics related to skills development are explained in simple language through pictures and diagrams. After each chapter questions related to the chapter is also given. This gives opportunity to the learner to understand and memories the topic. This will enable the interest among the beneficiaries.

These handbooks have been finalized by an expert group under the leadership of

Dr. Ramkrishna Sura.

I hope that these handbooks will serve as a guide to the instructors and also give new direction to the beneficiaries in pursuing their livelihood.

I appreciate the role of Dr. Ramkrishna Sura in completing the publication of 15 handbooks successfully. I appreciate his valuable contribution. I also express my gratitude the subject specialist and experts who have played a very important role in preparation of the handbooks.

I look forward to the suggestions and feedback from readers and experts for any further improvement in the handbooks.

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Atul Kumar Tiwari


Secretary

**Ministry of Skill Development and Entrepreneurship
Government of India.**

December 2022

ASSISTANT - FRUITS AND VEGETABLES PROCESSING AND PRESERVATION

National Occupation Standards followed for the Assistant – Fruits and Vegetables Processing and Preservation course

 Job Details	NQR Code	2022/FI/JSS/06002
	NSQF Level	2
	Job Role	Assistant – Fruits and Vegetables Processing and Preservation
	Sector	Food Industry
	Sub Sector	Food Processing
	Occupation	Fruits and Vegetable Processing and Preservation
	Course Duration	180 Hours
	Theory	30 Hours
	Practical	90 Hours
	Employability skills (Including LEE)	60 Hours

Assistant - Fruits and Vegetables Processing and Preservation course follows the following Occupational Standards:

1. Introduction
2. Knowledge on tools and equipment's
3. Prepare and Maintain Work area
4. Concept on Fruits and Vegetables Processing and Preservation
5. Preparation of vegetable and fruit processing products
6. Ready to Serve (RTS) concept
7. Bottling, Pouching, canning and storage
8. Licence and Registration under FSSAI
9. Food Safety and First Aid
10. Entrepreneurship and Market exposure

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08	Concept of Fruit and Vegetable Processing and Preservation	16-21
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10	Knowledge of ingredients required for fruit and vegetable processing and preservation	28-32
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13	Preparation of fruit products like jam, jelly, candies, fruit pulps, custard etc.,	41-46
14	Ready to Serve (RTS) Concept – preparation of squash, juice, shakes and Ready to Serve drinks	47-55
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Introduction:

Cultivation of Fruits and Vegetables and its preservation is one of the major aspects of human existence. We have a rich tradition of cultivation and preservation of fruits and vegetables using traditional techniques for a very long period of time. Fruits and vegetables are highly perishable and hence there is a great need to preserve them for a long time for consumption. There is a great change in the food habits of people all over the world which involves preservation techniques.

There is been an increased production of fruits and vegetables due to new technologies introduced in our Country. Although farmers make ample production, they do not have proper storing and preservation facilities and hence they cannot make good profit. There is a felt need to improve the practice of processing and preservation of fruits and vegetables. On one hand it will save the fruits and vegetables from getting spoiled and other hand it can generate income both in the domestic and international market as there is huge demand for fruits and vegetables processed products in the rural and urban areas. There is lot of employment opportunities in Fruit and Vegetable processing and Preservation like they can be self employed, wage employed or initiate micro start-ups. Due to change in life styles especially among the working population and urban households, there is great demand for ready made products like jam, jellies, chutneys, pickles, sauce, ketchup, fruit juice etc., There is great demand for trained manpower to manufacture these products. There is also huge scope in bottling, pouching and branding of these products which needs to be done with utmost safety and hygienic methods. The market demand has been kept in mind while designing this course of Fruit and Vegetable processing and Preservation. The objective of the course is to create a trained workforce keeping in mind the current employment prospects. Elements of life enrichment education is also incorporated in this course with an aim of creating a realistic outlook on work and life.



Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”

COURSE OBJECTIVES:

The main objective of the course is to enable to participants especially the neo literates to take up Fruit and Vegetable Processing and Preservation as a vocation to earn their livelihood to generate income

Specific objective of the course is to provide knowledge and skills relating to:

- Locally available fruits and vegetables and their selection for processing and preservation
- Use of equipment's and materials
- Advantages of preservation
- Different methods of fruit and vegetable processing and preservation
- Preservation of surplus fruits and vegetables and avoid spoilage
- Techniques of canning botting and pouching the Products
- Quality testing
- Packing methods and labelling
- First Aid and Food Safety
- FSSAI Registration and compliance of Food Safety Norms

COURSE STRUCTURE:

Knowledge Domain:

1. Demonstrate an understanding on the market segmentation for Fruit and Vegetable processed foods
2. Use appropriate methodologies for combination of ingredients for processing and preservation of fruits and vegetables
3. Use appropriate methods for Food safety, hygiene and sanitation for processing of the Fruits and vegetables

Skill Domain:

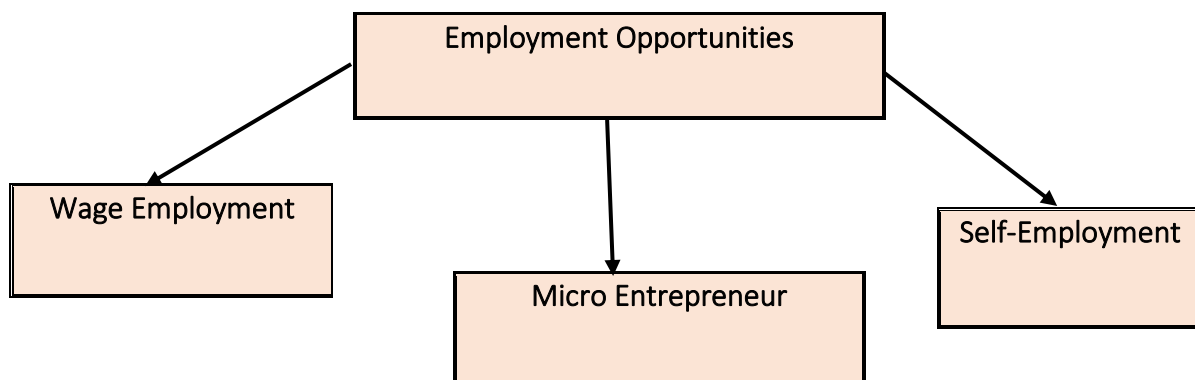
1. Prepare different varieties of Fruit and Vegetable items with longer shelf life through preservation by both Traditional and Chemical methods
2. Demonstrate an understanding of preparing different types of processed foods as per the need of the customers

Weightage of Theoretical, practical and Life Enrichment skills

Theory	Practical	Life enrichment education
25%	65%	10%

Employment Opportunities:

After successful completion of this course the trainee can be self-employed, wage employed or become a micro entrepreneur.



Wage Employment:

Work as a wage employer in Fruits and vegetables processing and preservation industry

Self Employed:

Start own shop to sell in local market

Micro Entrepreneur:

Collect orders from shops/institutions and supply to the clients/catering services

Target Group:

Socially and economically backward women and men, especially illiterates, neo literates and minorities.

Age Limit: 15 years to 45 years

Duration: Duration of the course is **180 Hours**, the details of which are given below:

S.No	Module	Instruction period in			Total duration in hrs.	Remarks
		Theory in hrs.	Practical in hrs.	Life enrichment education in hrs.		
01	Assistant - Fruits and Vegetable processing and Preservation	30	90	60	180	3 hours per day

Course fee:

SC/ST beneficiaries and BPL families will be exempted from course fee

Registration fee will be collected from other beneficiaries

Process:

Theory, practical and life enrichment education are highly emphasised by Jan Shikshan Sansthan, for the course along with basic knowledge on information and technology. Following process will be followed:

Theory and Practical sessions

Use of IEC materials

Use of Audio and visual contents during session

Use of online training contents

Field Visits

On the job training

Follow up

Session Plan:

S.No	Content	Expected Learning Outcome	Necessary equipment's/ resources	Training hours
01	Topic: Introduction on JSS Scheme and scope of the course "Assistant - Fruits & Vegetables Processing & Preservation"	Understand the importance of JSS objectives in skill development and nation building Understands the relevance and utility of the course Assistant - "Fruit and Vegetable Processing and Preservation" in income-generation	JSS IEC materials Black-board/ projector Required stationery	03
02	Topic: Understanding the Importance of Vegetables and Fruits in daily diet and health benefits Description of various fruits and vegetables and their vitamin and calorie content and its benefits to human body Identification of different types of vegetables and fruits according to their availability, season, usage etc.,	Understands the importance of consumption of vegetables and fruits for healthy life style	Blackboard/ Projector Required stationery IEC resources related to nutrition and health	03
03	Topic: Concept of Fruit and Vegetable processing and preservation	Understands importance and different methods of fruit and vegetable	Blackboard/ Projector Required stationery	06

	<p>Evolution of the processing of fruits and vegetables preservation</p> <p>Reasons for spoilage, different methods of preservation and advantage</p>	processing and preservation	Demonstration kits	
04	<p>Topic: Knowledge on Tools, equipment's and materials, maintenance and cleanliness of work area</p> <p>Use of different tools, equipment's and materials</p> <p>Methods of sterilization of containers and utensils</p> <p>Cleanliness of work area</p>	<p>Understand the basic use of tools and equipment's for preparation of different items</p> <p>Understand the importance of maintaining cleanliness and sterilization of tools and equipment's and workspace</p>	<p>Utensils of different sizes</p> <p>Gas stove</p> <p>Mixer/Grinder</p> <p>Juicer/Squeezer</p> <p>Digital weighing machines upto 5 kg</p> <p>Clay jars – glass containers, bottles</p> <p>Stainless steel forks</p> <p>Spoons of different sizes- ladles</p> <p>Lids, covers and caps to – Jars/ Bottles and peelers</p> <p>Bowls</p> <p>Stainless steel knife- different sizes and different purpose</p> <p>Measuring glass</p> <p>Baskets/ Boxes for storing</p> <p>Kitchen towels, dusters</p> <p>Measuring Spoons</p>	06

			Strainer Sieve- Stainless Steel of various sizes. Any other materials depending on the processing activity	
05	Topic: Knowledge of ingredients required for fruit and vegetable processing and preservation Methods for preparation of various ingredients used for Fruit and vegetable preparation	Gains knowledge and skills about various ingredients and their availability in the local market Composition and combination of ingredients for preparing various raw materials required for Fruit and Vegetable Processing	Required preservative items for processing and preservation	06
06	Topic: Simple methods of preservation- Traditional and modern Techniques of drying and dehydration. Use of natural preservatives and storing Use of modern preservatives and caution in use	Understands the different traditional and modern preservatives, edible colour and essence Enhanced skills in use of traditional and modern methods for preservation technique Understand the use of various ingredients for longer shelf life	Traditional and modern preservative items Fruits and vegetables	03
07	Topic: Preparation of Vegetable products like pickles, chutney, puree,	Acquires necessary skills in preparing	Fruits and Vegetables	24

	<p>sauce, dried vegetables, ketchup, soups, ginger garlic paste, Tomato puree etc.,</p> <p>Identify and select fresh fruits and vegetables</p> <p>Recipes using vegetables like pickles, chutney, puree, sauce, dried vegetables, ketchup, soups, ginger garlic paste etc.,</p> <p>Identify spices and preservatives</p> <p>Preparing techniques</p>	<p>preserved items using vegetables</p> <p>Acquires necessary skills in preparation of various items of pickles using raw materials like mango, lemon, vegetables, chillies, garlic, tomato, ginger, carrot, radish etc.,</p> <p>Acquires skills on preparation of puree and ketchup items using tomato, onion etc.,</p> <p>Acquires skills on preparation of ginger garlic, chilli paste etc.,</p> <p>Acquires skills on preparation of garlic sauce, chilli sauce, tomato sauce, white sauce etc.,</p> <p>Skills on making various chutney with mint, coriander, dry chilli, tomato, peanuts, coconut etc.,</p>	<p>Preservatives</p> <p>Spices</p> <p>Refined oil</p> <p>Required utensils</p> <p>Gas stove</p> <p>Any other items required for preparation of different recipes</p>	
08	<p>Topic: Preparation of Fruit products like jam, jelly, candies, tutti frutti, marmalade, fruit pulps, fruit chaats, custards etc</p> <p>Recipes using fruits for making jam, jelly,</p>	<p>Acquires skills on preparation of Jam, Jelly and marmalade using fruits and other ingredients</p> <p>Understand methods of preparation of</p>	<p>Fruits and Vegetables</p> <p>Preservatives</p> <p>Spices/Sugar</p> <p>Refined oil</p> <p>Required utensils</p>	27

	candies, tutty frutty, marmalade, fruit pulps, fruit chaats, custards etc preparation techniques	different types of candies using fruits and other ingredients Acquires knowledge on preparation of various recipes like fruit chaats, custards, tutty fruity etc.,	Gas stove Any other items required for preparation of different recipes	
09	Topic: RTS Concept – Preparation of squash, juices, shakes and Ready to Serve drinks, Ready to serve drinks preparation using fruits	Acquires necessary skills in preparation of Ready to Serve (RTS) drinks Acquires necessary skills on preparation of squash items like lemon, orange, pine apple, mango, black berry, grapes etc., Acquires knowledge on preparation of various recipes like fruit shakes and juice with mango, orange, banana, pomegranate, black berry etc.,	Fruits Grinder/ Juicer Preservatives Any other items required for preparation of different recipes	27
10	Topic: Bottling, pouching and canning and storage of products Techniques of canning, pouching, bottling, sealing, labelling and storage of preserved items	Understand the different techniques of pouching canning, bottling, sealing, labelling etc., Understand the FPO norms	Different types of bottles, cans etc., as per size and volume Weighing scale Sealing equipment Labels	03

	Precautions to be taken as per FPO norms			
11	Topic: Need for Licence and Registration under FSSAI	Understand the importance of Registration under FSSAI and Licencing procedures	Black Board/ projector IEC materials and resources related to FSSAI	03
12	Topic: Food Safety and First Aid Safety precautions to be taken while during work First aid in case of Electric shock, knife cut, fire from gas/stove etc., Different types of fire extinguisher and how to use if required Understanding the Food safety norms to be taken up during production	Acquires skills in taking precautionary measures on Food safety and providing First aid during emergency	Black Board/ projector First Aid Box IEC on fire extinguisher	03
13	Topic: Entrepreneur skills, numerical skills and book keeping Understand the basic book keeping and accounting skills Understanding the different opportunities available in the district for development of entrepreneurs like loan linkages etc.,	Understand the importance of book keeping, accounting and has basic knowledge on entrepreneur skills	Required stationery for beneficiaries Black board Different IEC materials related to entrepreneurship	03
14	Topic: Market exposure	Understand the different marketing technologies and		03

	Visit to different markets to understand the opportunities and challenges in relation to the product	challenges with classroom inputs		
15	Employability skills including Life Enrichment Education	Enable the beneficiary to set up own small shops/units and inculcate good documentation and marketing skills	Black board/ Projector Audio and video materials on various topics of LEE	60

SYLLABUS

Chapter - 1

Introduction:

Introduction on JSS Scheme and scope of the Course “Assistant – Fruits and Vegetables processing and Preservation”

Introduction to Jan Shikshan Sansthan:

Jan Shikshan Sansthan was earlier known as “Shramik Vidhyapeeth”. In the year 1967, Government of India under the Ministry of Education and Culture started this scheme to provide educational and vocational training needs to youth from unorganised, informal sector.

In the year 2000, the name Shramik Vidhyapeeth was changed to Jan Shikshan Sansthan. In the year 2018, JSS was transferred from Ministry of Human Resource Development to Ministry of Skill Development & entrepreneurship.

At present, there are 304 JSS in 27 States and 7 Union territories. Every year around 4 lakhs beneficiaries are covered under in this scheme of which more than 85% are women.

Jan Shikshan Sansthan is a 100% Grant in aid project implemented by Non-government organisations. JSS is Registered under Societies Registration Act 1860.

JSS is managed by Board of Management constituted with the approval of Government of India.

The major clientele of the programme are from the neo illiterate, illiterate, rudimentary level of education and the age group is from 15 to 45 years. The clientele is given vocational education in various trades.

The objective of the scheme is educational, vocational and occupational development of the socio economically backward and educationally disadvantaged groups of the urban/rural population particularly neo literates, semi literates, SCs, STs, women and girls, slum dwellers, migrant workers etc.,

In order to meet the needs of the most disadvantaged population, JSS reaches to the nook and corner of the country. JSS reaches to the door step of the clientele and provides skills training using basic infrastructure and resources.

Introduction to the course, its objective and scope in the food processing industry.

The Course “Assistant – Fruit and Vegetable Processing and Preservation”

The main objective of the course is to enable to participants especially the neo literates to take up Fruit and Vegetable Processing and Preservation as a vocation to earn their livelihood to generate income

There is great scope for this course as there is ample scope for Ready made food having longer shelf life. One can become self-employed, wage employed or become a micro entrepreneur after completion of the skills training.

Question:

- 1. Fill in the blanks** (5)
 1. JSS is a _____ sponsored scheme (Central/State).
 2. There are _____ number of JSS in India (303, 250)
 3. JSS is a _____ institution (Vocational/Academic)
 4. The target group of JSS is _____.(Neo-literate /Non- Literate/ Undergraduate/Postgraduate)
 5. Age group of JSS beneficiary is _____ to _____

- 2. Tick True or False.** (5)
 1. JSS gives Academic education ()
 2. JSS does not give training for male beneficiaries ()
 3. JSS is present in every district ()
 4. The training provided by JSS is long term duration ()
 5. JSS gives certificate after completion of training ()

- 3. Answer the following in one word** (5)
 1. What is full form of JSS?
 2. How many JSS are present all over India?
 3. Do SC/ ST candidate pay for course fee?
 4. Do assessment happen for training?
 5. Can children be beneficiaries in training?

- 4. Write short answer for the following in 4 -5 lines** (30)
 1. JSS is sponsored under which Ministry?
 2. Where is the head office of JSS located?
 3. How many JSS are in Odisha?
 4. How many JSS in Koraput district?
 5. Name 5 trades imparted by JSS ?
 6. Name the Prime Minister of your Country?
 7. Name 5 vegetables from your locality?
 8. Name 5 fruits from your locality?
 9. How do the course - Assistant - Fruits and Vegetables processing and preservation help in income generation?
 10. What is meant by processing of fruits and vegetables?
 11. Why do we preserve fruits?
 12. What are the employability scope under vegetable processing an preservation?
 13. Name 5 products of made through vegetable and fruit processing?
 14. Name 5 perishable items in kitchen?
 15. What is the objective of the course - Assistant - fruits and vegetables processing and preservation?

Chapter - 2

Understanding the importance of Vegetables and Fruits in daily diet and health benefits:

Fruits and vegetables have been recognized as a good source of vitamins and minerals for nearly a century now. Adding fruits and vegetables to the diet is probably one of the most important steps toward eating healthy.

Fruits can be eaten in all forms, fresh, dried, frozen, canned and 100% juice. Whole fruits, however, usually contain more fiber than juice. People who eat more generous amounts of fruits and vegetables as part of a healthy diet are likely to have reduced risk of chronic diseases, including strokes, type 2 diabetes, some types of cancer, and perhaps heart disease and high blood pressure.

Eating enough fruits and vegetables helps to get adequate nutrients and fiber which can help lower the risk for many diseases.

Fruits and vegetables add colour, variety and taste to the meals and are packed with vitamins, fibre and minerals. Vitamin A for instance, maintains eye health and boosts the body's immunity to infectious diseases. Potassium promotes proper nerve and muscle functioning, and B Vitamins are necessary for converting food into energy. Vitamin C can increase the body's absorption of calcium and iron from other foods. Calcium is an essential mineral for strong bones and teeth and low iron levels can lead anaemia.

Fruits and vegetables are also classified into five colour groups, according to the phytochemicals they contain. There are many phytochemicals that work together to protect health. So, in order to receive a great variety of phytochemicals in the diet, there is need to choose fruits and vegetables from each of the colour groups every day.



Questions:

1.Fill in the blanks

(5)

1. Whole fruits contain _____(fiber, pulp).
2. Fruits and vegetables are rich in _____ and minerals.
3. Vitamin _____ is good for the eye health
4. ----- is essential for bone strength
5. There are _____ colour groups of fruits and vegetables.

2. Choose True or False

(10)

1. Dried fruits can be eaten. ()
2. Fruits and vegetables lower risk of heart diseases ().
3. Lemon is good for Vitamin A ()
4. Potassium promotes nerve and muscle function ()
5. Low level of iron causes Anemia ()
6. Green Leafy vegetables improves immune system ()
7. Beetroot improves blood health()
8. Canned fruits are not good for health ()
9. Fiber is lost when we make fruit juice()
10. Junk food is good for health ().

3. Match the following

(6)

(Vegetable/fruits Colour)

Red	Reduces cancer
Orange	Powerful anti oxidant
Yellow	Improve Immune system
Green	Promote collagen growth
Blue	Help in vision & digestion
White	Blood health and support joint

4. Answer in one word sentence

(5)

1. Name 3 recipes made from processing of fruits
2. Name 3 recipes made from processing of vegetable
3. What are the fruits and vegetables you eat?
4. What are the different forms of eating fruits?
5. Which fruit has more vitamin C?

1. Write short answer for the following in 4 -5 lines

(28)

1. What is the difference between eating whole fruits and fruit products
2. Name three diseases that can be controlled through healthy diet
3. Name four fruits which are yellow in colour.
4. Which fruit has more vitamin A?
5. Which fruit has more potassium?
6. What are the color groups of fruits and vegetables?
7. Why we should eat different color fruits every day?
8. What are the benefits of eating fresh fruits and vegetables?
9. How can we eat healthy?
10. What is type 2 diabetes?
11. How do you know you have high blood pressure?
12. What is the health problem caused by Vitamin A deficiency?
13. What is the essential mineral for strong bones and teeth?
14. What is Rainbow for health?

XXXXXX

Chapter – 3

Concepts of Fruit and Vegetable Processing and Preservation:

Agriculture is the backbone of the Indian economy. The produce from various agriculture-based business is primarily used for consumption within the country. It is also exported to different parts of the world. Cultivated products are also used as raw materials in the food processing industry.

Food processing is the method used to convert raw materials into food products. They can be processed foods, ready to eat foods, food additives or foods used to prepare other food products. In addition to food processing, the food industry also relies on food preservation as an important factor to store food products for a long time.

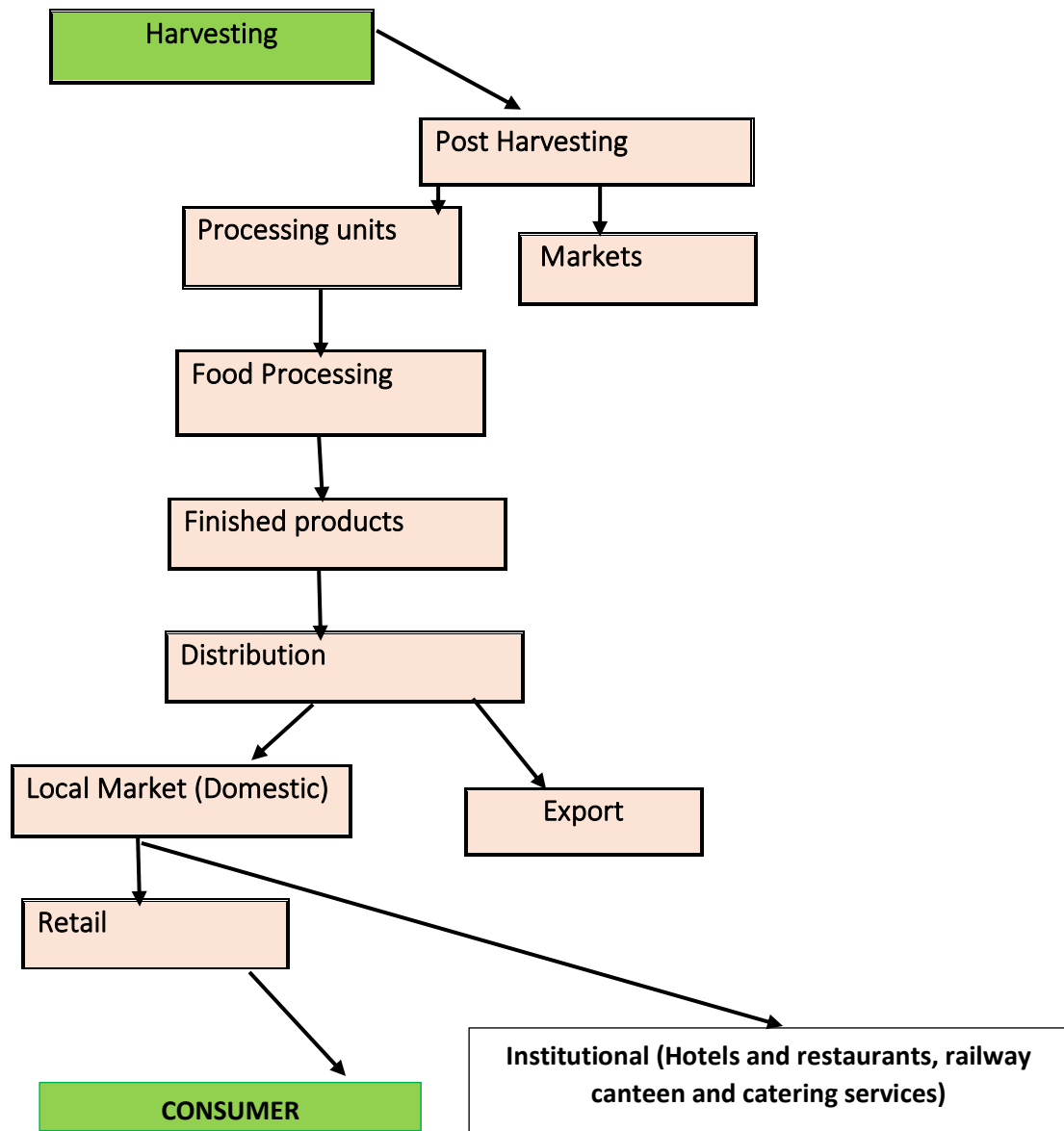
The Food processing industry in India is divided into several sub sectors. They are:

Food Processing Industry Sub Sector

Sub Sector	Products
Diary	Whole milk powder, skimmed milk, condensed milk, Ice cream, butter and ghee, cheese etc.,
Fruits and Vegetable Processing	Beverages, Juice, concentrates, pulps, slices, frozen and dehydrated products, chips, pickles etc.,
Grain and cereals	Flour products, Bakery, Malted foods, cornflakes, Vermicelli, Bean and malt extracts etc.,
Meat and Poultry processing	Frozen and canned products, Fish oil, Frozen and packaged meat, eggs etc.,
Bread and bakery	Biscuits, bread, buns, cakes, confectionery, pastries, cookies etc.,
Consumer food products	Snack food, namkeen, biscuit. Ready to Eat Food, Alcoholic and non-alcoholic beverages

Journey of Food from Harvest to Consumer:

The following chart explains the journey of harvested food undertakes to reach the consumer. The chart also shows the different types of consumers in the domestic and international market.



Overview of Fruits and Vegetables Sub Sector

India is the second largest producer of nuts and sweets in the world with an annual production of about 94 million tonnes. It has the distinction of producing almost all tropical and indigenous fruits and vegetables due to its varied climatic conditions. Due to the short shelf life of these crops, 30-35% of fruits and vegetables are perished during harvest, storage, grading, transportation, packaging and distribution. Of these, only 2% of the crops

are processed into rice flour products. Therefore, there is a need for maximum commercial utilisation of fruits and vegetables and to adapt the production and marketing activities to the requirements of the world market and to meet the domestic demand, which has been increasing over the last few years due to various socio-economic reasons. If the nutritional value of processed food products can be maintained, the sector will emerge as a major value-added food industry.

Fruits and Vegetables are processed into a variety of products such as

- Juice
- Jelly
- Jams
- Pulps
- Concentrated foods
- Frozen Food
- Wafers
- Pickles etc.,

There are certain parameters that are important when selecting Fruit and Vegetable Processing and Preservation.

They are:

- Demand for processed food made from the vegetable/fruit
- High quality produce
- Continuous supply
- Huge supply in case of seasonal fruits/vegetables

Methods of Processing Fruits and Vegetables

Some common methods of processing fruits and vegetables are:

- Drying
- Concentration
- Heating
- Fermentation
- Sterilisation
- Pasteurization
- Blanching
- Canning

Requirement of Fruit and Vegetable Processing:

The processing of fruits and vegetables is of great importance to produce products for direct consumption and as a food item. During processing, the main purpose is to preserve colour, flavour, texture and nutrition, while prolonging the shelf life of perishable fruits and vegetables. Almost all food is processed in some way before it is eaten. Processing makes food more edible, tasty and safe, and preserves it so that it can be eaten beyond the harvest season. Food processing is also one such tool which provides greater transparency in food items and hence enhances consumer choice.

Questions:

Fill in the blanks

(20)

1. The produce from agriculture is primarily used for _____
2. Excess of produce is _____ to different parts of world (imported/exported)
3. Cultivated products are raw materials in _____ industry
4. _____ is the method used to convert raw material into food products
5. _____ is the method to store food products for long time
6. The food processing industry is divided into _____ sub sectors
7. Milk Powder, Skimmed milk come under _____ sub sector
8. Jam , jelly , Juice come under _____ sub sector
9. Fish oil is under _____ sub sector
10. Pastries and cookies comes under _____ sub sector
11. Ready to Eat food comes under _____ food sub sector
12. Butter comes under _____ food sector
13. Chips comes under _____ sub sector
14. Bread and buns come under _____ sub sector
15. Eggs come under _____ sub sector
16. Fruits and vegetables processing comes under -----sub sector
17. Drying and _____ are common methods of processing fruits and vegetables
18. Main purpose of processing it to _____ of perishable fruits and vegetables
19. Two parameters for food processing are _____ and _____.
20. Food processing Is called value addition in _____ industry.

1. Match the following**(10)**

Condensed milk	Poultry
Juice	Grains
Eggs	Dairy
Corn flakes	Fruits and vegetables
Bread	Consumer food
Ready to eats	Bakery
Producer	Production
Demand	Preservation
Perishable	Supply
Consumption	Consumer

2. Tick True or False**(15)**

1. Food processing decrease nutritional value of fruits and vegetables (True/False)
2. Food preservation will lead to spoilage of food (True/False)
3. Ready to eat food are not healthy (True/False)
4. Skimmed milk is not good for health (True/False)
5. Corn flakes, vermicelli is made from grains (True/False)
6. All harvested produce is consumed before processing (True/False)
7. Retailers sell produce in local market (True/False)
8. India does not export food grains (True/False)
9. Sterilization of fruit and vegetables is a processing technique (True/False)
10. Heating of food removes bacteria (True/False)
11. Fermentation is process of cultivating good bacteria (True/False)
12. Blanching is a method of food processing (True/False)
13. While drying fruits and vegetables it loses its vitamins and minerals (True/False)
14. Namkeen and biscuits are consumer food products (True/False)
15. There is domestic and world market demand for processed foods (True/False)

3. Write one word/sentence answers for the following**(15)**

1. Name any one food processing industry
2. What is the difference between eating whole fruits and fruit products?
3. Name 4 fruits which are yellow in colour?
4. Which fruit has more vitamin A?
5. Which fruit has more potassium?

6. Name 3 sub sectors of food processing industry?
7. How can we store seasonal fruits and vegetables?
8. What is fermentation?
9. What is drying?
10. What is sterilization?
11. What is blanching?
12. What is pasteurization?
13. What is canning?
14. Name two domestic markets in your area?
15. Name one food product exported by India?

4. Write short answer for the following in 4 -5 lines

(20)

1. What is food processing?
2. What is food preservation?
3. Why we have to preserve food?
4. Name four products we make from fruits and vegetable processing?
5. Explain in short, the journey of food from harvest to consumer?
6. Why is food processing a major food industry?
7. What are the different products made from fruits and vegetables?
8. What are the parameters for selecting fruit and vegetables for processing?
9. Why is it important to preserve color, texture and nutrition during processing?
10. What are the requirements of fruit and vegetable processing?

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Chapter – 4

Knowledge about Tools, equipment, material, maintenance and cleanliness of Work area:

Following are the equipment's, tools and materials needed for Assistant – Fruit and Vegetable processing” course:

1. Utensils of different sizes
2. Gas stove
3. Mixer/Grinder
4. Juicer/Squeezer
5. Digital weighing machines upto 5 kg
6. Clay jars – glass containers, bottles
7. Stainless steel forks
8. Spoons of different sizes- ladles
9. Lids, covers and caps to – Jars/ Bottles and peelers
10. Bowls
11. Stainless steel knife- different sizes and different purpose
12. Measuring glass
13. Net and muslin (cloth and aluminium)
14. Dustbin
15. Small wiper
16. Silver foil and cling foil
17. Wax
18. Small towel 5-10 No.
19. Stainless steel funnel/ glass tunnels of various sizes
20. Working table
21. Students’ book/ manual
22. Board, Eraser, marker and Chalk
23. Teachers Table/ Chair
24. First Aid Box
25. Baskets/ Boxes for storing
26. Kitchen towels, dusters
27. Measuring Spoons
28. Strainer Sieve- Stainless Steel of various sizes.
29. Preservatives, Edible Colours essence
30. Fresh water, arrangement in the kitchen – Kitchen sink of Stainless Steel
31. Audio visual aids- Computer, Bar code Printer
32. Wooden, Silicon, Spatulas of different sizes
33. Chopping board
34. Labels
35. Refrigerator with freezer

Cleanliness of Work area:

Cleaning and Sanitisation of the work area is extremely important for every food handling operation. Hence it is extremely important to ensure that there is no bacterial growth due to presence of rotten and left-over particles. For cleaning purpose, the work area is divided into two. They are:

Food contact surfaces	Non-food contact surfaces
Work tables	Overhead structures
Utensils	Walls, ceilings, and windows
Equipment	Lighting equipment
Tools like knives	Refrigeration equipment, cooking stoves
Machines that process foods	Heating and ventilation structures

Some common types of cleaners and sanitizing agents to clean the food contact and non-food contact surfaces are:

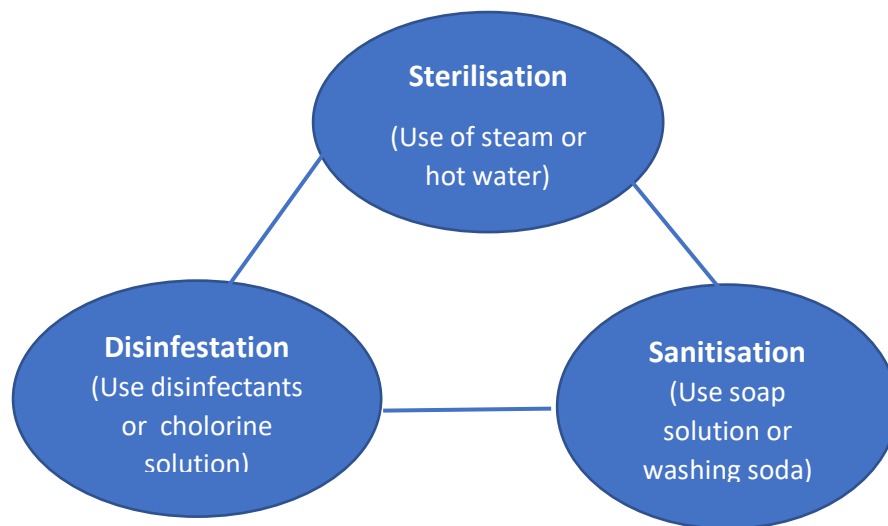
Cleaning agents	Used for	Risk	Safety measure
Hypochlorite like potassium hypochlorite, sodium hypochlorite, and calcium hypochlorite	Cleaning stainless steel food contact surfaces	Leads to corrosion	Ensure pH and concentration levels are maintained
Liquid chlorine	Internal cleaning of stainless-steel equipment and vessels	Leads to corrosion	Ensure concentration levels are maintained
Hydrogen peroxide	Killing bacterial spores, pathogens, spoilage organisms, and other microorganisms	Has a strong odour	Use in well-ventilated and open spaces

The cleaning of the processing units should be followed weekly or monthly and should stick to a cleaning schedule.

The cleaning tools and materials needs like cleaning knives and spoons, cleaning or sanitizing agents, brushes and scrubbers etc., should be available along with the tools and equipment's.

Sterilising should also be done after the cleaning process. It helps to eliminate any residual microbiological contamination.

Sterilisation is a combination of three processes: viz. sterilisation, disinfestation and sanitization



Pest control measures should also be adopted so that there would be no flies, rats, lizard and other insects and animals in the working area.

Personal Sanitation and hygiene:

Sanitation and hygiene are the most important aspects to take care of when working in the foodprocessing unit. Some important personal hygiene practices that must be followed are:

Maintain a high standard of personal cleanliness viz. have a bath every day and wear clean clothes

Wear Personal Protective Equipment (PPE) such as aprons, mouth mask, head cover, face mask, handgloves, etc., at all times during the training

Always keep fingernails trimmed

Always keep hair trimmed and wear hair net while working

Wash hands and feet at the designated area or wash stations provided

Wash hands with soap and water each time before entering the training centre

Refrain from smoking, spitting, chewing paan, sneezing or coughing over any food when in the working area

Do not handle food when suffering from a disease, illness, burns, injury or infection

Take proper and timely medical treatment when ill or if met with an accident

Questions:

1. Fill in the blanks

(20)

1. _____ is used for chopping fruits and vegetables
2. Squeezer is used for _____.
3. Weighing machines are used for _____.
4. Silver foil is used for _____.
5. The use of strainer is for _____
6. _____ and sanitization of work area is very important
7. _____ growth happen during rotting of vegetables
8. Hypochloride is a _____ agent
9. Bacterial spores are killed by _____ cleaning agent
10. Stainless steel equipments are cleaned with _____ cleaning agent
11. _____ should be done after cleaning process
12. Sterilization eliminates _____ contamination
13. Three process of sterilization are _____ , _____ and _____.
14. Cockroach is a _____.
15. _____ is a personal protective equipment
16. _____ is used on head as PPE
17. Use of excess hypochlorite lead to _____.
18. Wall ceiling and windows are _____ contact surfaces
19. Tube well water is _____ water
20. Measuring glass is used for _____

2. Tick True or False

(15)

1. Food contact surface should be kept clean (True/False)
2. Preservatives and edible colour essence are not good for health(True/False)
3. Hypochlorite is a cleaning agent(True/False)
4. Hydrogen peroxide kills bacteria (True/False)
5. We have to clean the processing unit every week (True/False)
6. Sanitization agent, brushes and scrubbers are cleaning tools (True/False)
7. We have to do sterilization before cleaning (True/False)
8. Use of steam or hot water is called sterilization (True/False)
9. Disinfestation removes germs (True/False)
10. Pest causes health problems (True/False)
11. Smoking, Chewing, Spitting Pan are not good personal hygiene (True/False)
12. Lighting equipment is a nonfood contact surface (True/False)
13. Machine that process foods are nonfood contact surface (True/False)
14. Glass jars, bottles clay jars are used for storing processed foods (True/False)
15. Vegetables and fruits are nonperishable items (True/False)

3. Match the following

(10)

- | | |
|---|-------------------------------|
| 1. Stainless steel, ladles, fork, spoon | Measurement |
| 2. Measuring glass | Sieve |
| 3. Strainer | Chopper |
| 4. Knife | Cooler |
| 5. Fridge | Utensils |
| 6. Hypochloride | killing bacteria |
| 7. Hydrogen peroxide | cleaning food contact surface |
| 8. Sterilization | contamination |
| 9. Hair particles | pest |
| 10. Cockroach | hot water |

4. Write one word /sentence answer for the following:

(15)

1. Name one food contact surface?
2. Name one Nonfood contact surface?
3. What is use of chopping board?
4. What is Stainer used for?
5. Why we use edible colours?
6. Name two storing utensils?
7. What is need for labels?
8. What is use of silver foil?
9. What is use of peeler?
10. What are forks used for?
11. Name any two materials found in First Aid box?
12. Why we use measuring spoons?
13. What is use of wiper?
14. What is use of funnel?
15. What is use of Hydrogen peroxide in cleaning?

5. Write short answers in 4- 5 lines:

(80)

1. Mention 10 equipment's and tools used in Food processing?
2. What is the use of a juicer?
3. What is the use of a squeezer?
4. Why do we use mixer grinder?
5. What is the work of a fridge?
6. Why do we use measuring glass?
7. Why Is it important to clean the work area?
8. Why is it important to sanitize the work area?
9. How can we stop bacterial growth in the work area?
10. What are the 2 types of work area?

11. What is food contact surfaces?
12. What is nonfood contact surfaces?
13. What is hypochloride used for?
14. What is the safety measure to use hypochloride?
15. How can liquid chlorine be used?
16. What is the use of hydrogen peroxide?
17. How can we kill bacteria?
18. How often should you clean your working area?
19. Name five cleaning tools and materials?
20. What is sterilization?
21. What is the need for sterilization?
22. What is the process of sterilization?
23. Mention three processes in sterilization?
24. Name five pests?
25. How can we control pest?
26. Name any two pesticides for domestic use?
27. What is personal hygiene and sanitation?
28. Why should we bath every day?
29. What is PPE?
30. Why should we wear PPE?
31. Why should we cut our finger nails?
32. Why should we use hair net while working?
33. Why should we wash our hands and feet before processing food?
34. Name three handwash items?
35. Why should we not smoke in work area?
36. Why we should not handle food when we are ill?
37. What is an infection?
38. What is an accident?
39. What is covid ?
40. How to prevent covid?

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Chapter – 5

Knowledge of ingredients required for fruit and vegetable processing and preservation:

Raw material Procurement and Storage:

Following procedures to be taken care of for procurement of raw materials:

- Fresh fruit and vegetables to be bought from the supplier
- Frozen, chilled or cold stored fruit bought from vender
- Use of Fruit/Fruit pulp available in the market
- Used of dried fruits and vegetables

Following chart shows the crop season, raw materials and their time of availability:

Crop Season	Fruits/vegetables (raw material)	Availability
One	Mango	January to May
	Apple	July to September
	Lime	November to February
	Orange	December to March
	Pear, peach, and apricot	April to July
	Strawberry	February to April
	Eggplant/brinjal	October to March, July to September
	Tomato	October to April
	Carrot	October to March
Two	Pineapple	November to January and June to July
	Guava	November to January and June to July
	Papaya	November to January and June to July
No season	Banana	Throughout the year
	Lemon	Throughout the year

Fruits and vegetables (Raw Material)	Availability	Used in
Mango	January to May	Mango pickle, mixed pickle, jam and jelly
Lemon	Throughout the year	Lemon pickle, mixed pickle, juice
Lime	November to February	Lime pickle, juice, squash
Karonda	July to August	Karonda pickle
Jackfruit	March to June	Jackfruit pickle, jam
Pear	April to June	Pear pickle, jam, fruit juice
Local fruits like Ber, pine apple, berries, pomegranate, guava etc.,	Seasonal	Fruit pulp, pickles, jam and jelly
Carrot	October to March	Carrot pickle, juice
Chillies (Green and Red)	October to March, July to September	Chilly pickle, mixed pickle, stuffed pickle
Green Pepper	September to October	Green Pepper pickle
Long Pepper	June to August	Long Pepper pickle
Eggplant/ (Brinjal)	October to March, July to September	Brinjal pickle, stuffed pickle
Tomato	October to April	Tomato pickle, stuffed pickle, ketchup, tomato sauce,
Onion	March to May	Onion pickle
Garlic	March to April	Garlic pickle, mixed pickle, ginger garlic paste
Ginger	April to May	Ginger pickle, mixed pickle, ginger garlic paste
Bamboo Shoot	July	Bamboo pickle
Gongura	July to September	Gongura pickle

The raw materials should be brought fresh, free from spoilage and stored in cool, dry place.

Handling of Raw materials:

It is important to understand the process of handling raw materials procured from the farmer/supplier.

- Check for maturity of the fruits/vegetables, colour and size
- Sort fruits and vegetable in a carter
- Grade fruits and vegetables of similar size, quality together
- Wash vegetables and fruits thoroughly to remove stones, debris, leaves, dust etc.,
- Cut, peel, shred, cube, dice vegetables/fruits as per requirement

Questions:

1. Fill in the blanks: (10)

1. Raw materials for fruit and vegetable processing can be bought from-----
2. Mango is a -----fruit (seasonal/ all time)
3. Lime and Banana are -----fruits (all time, seasonal)
4. We get Carrot in the -----season (summer, winter)
5. Papaya is a -----(Fruit/vegetable/both)
6. Jackfruit is available in the month of -----(August/March)
7. We make ketchup from -----
8. We use onion in -----making
9. Grading of fruits is done by -----(sorting, mixing)
10. Tamarind has -----taste (sour/sweet)

2. Match the following: (10)

- | | |
|---------------------------|----------------|
| 1. Fresh fruits | Quality |
| 2. Frozen /chilled fruits | Size |
| 3. Apple | vegetable |
| 4. Strawberry | All time fruit |
| 5. Brinjal | Fruit |
| 6. Banana | Seasonal fruit |
| 7. Orange | Spice |
| 8. Grading | Vitamin C |
| 9. Sorting | Vendor |
| 10. Garlic | Supplier |

3. Tick True or False: (20)

1. We procure fruits and vegetables from vendor (True/False)
2. It is important to sort to maintain quality(True/False)
3. Mango is a tropical fruit (True/False)
4. Lime is used for pickle making (True/False)
5. Carrot cannot be used for juice making (True/False)
6. Pine apple is used to make juice and pickles (True/False)
7. We cannot use Guava for making fruit juice (True/False)
8. Lemon is a No season fruit (True/False)
9. Tomato is available throughout the year (True/False)
10. Brinjal is also called egg plant (True/False)
11. Green chillies are used to make jelly (True/False)
12. Green pepper is an important spice for food processing (True/False)

13. Chilli is used for making stuffed pickle (True/False)
14. Gongura is a vegetable (True/False)
15. Ginger is not a vegetable. It is a spice (True/False)
16. Bamboo shoots are not consumable (True/False)
17. Washing of vegetables and fruits is compulsory before food processing (True/False)
18. Cutting, peeling, cube and dice are some methods of chopping vegetables/fruits (True/False)
19. Frozen foods are not good for health (True/False)
20. Dried fruits lose their vitamins and minerals (True/False)

4. Write one word /sentence answer for the following: (10)

1. Name nearest market in your locality?
2. Write one major ingredient of pickle?
3. Write one major use of lemon?
4. Mention one seasonal fruit?
5. Mention one all time fruit?
6. Mention one use of Ginger?
7. Mention one use of Garlic?
8. Why we use spice in cooking?
9. What is use of Bamboo shoot?
10. Name one famous pickle in your locality?

5. Write short answers – 4 to 5 lines each (40)

1. Where can we get raw material for food processing in your locality?
2. How can dried fruit and vegetable used for processing?
3. What are the fruits available in summer season in your locality?
4. What are the fruits available in winter season in your locality?
5. Name 2 fruits that are available throughout the year
6. Name 4 fruits/vegetables for making pickle?
7. Name common fruits used for making pickle?
8. Name 3 fruits with which you can make fruit juice?
9. Name 4 local fruits with which you can make jam and jelly?
10. What is the use of chilly in food processing?
11. How can we use green pepper in pickle making?
12. How to make ginger garlic paste?

13. What is the use of tomato in fruit and vegetable processing?
14. What vegetable/fruit is used for making ketchup?
15. What is the process of handling raw materials procured for vegetable and food processing?
16. what is meant by sorting of fruits and vegetables?
17. what is meant by grading of fruits and vegetables?
18. Why it is important to sort and grade fruits and vegetables?
19. How can you know that a fruit is mature?
20. How do we dry fruits and vegetables?

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Chapter – 6

Simple methods of preservation:

Food preservation is the process by which processed and unprocessed food is protected against microbes, spoiling agents, and contaminants. The objective of preserving processed food is to:

- Retain the original nutritive value
- Retain the original colour
- Retain the original flavour
- Retain the original texture of the food
- Extend the shelf life of the food
- Ensure year-round availability
- Prevent or delay spoilage

Common Methods of Food Preservation – Traditional and Modern

The most commonly followed methods of food preservation are:

Fresh storage

- Cold storage
- Freezing
- Drying/dehydration
- Concentration
- Chemical preservation
- Preservation with sugar
- Pasteurization
- Sterilization
- Filtration
- Curing
- Fermentation
- Salting

Questions:

1. Fill in the blanks: (10)

1. Food preservation reduces -----of food (spoilage/ bacteria)
2. ----- helps in extending shelf life of food
3. All year-round availability of food can be achieved through -----(food preservation/consumption)
4. Food preservation ----- spoilage(promote/delay)
5. Freezing is one method of -----(Food processing/Food preservation)
6. Two methods of preservation are traditional and -----
7. Filtration is one method of -----(food processing/preservation)
8. Drying/Dehydration of food can lead to longer-----life
9. Salt is an important -----(preservative/enzyme)
10. Food preservation retain -----flavour and colour of food (original /artificial)

2. Match the following: (5)

- | | |
|----------------|-------------------|
| 1. Traditional | Preservation |
| 2. Modern | cold foods |
| 3. Freezing | Vinegar |
| 4. Dehydration | Processing method |
| 5. Shelf-life | Salting |

3. Write True or false: (10)

1. Using salt is a traditional method of preservation (True/False)
2. Preservation will destroy the original nutritive value of the product (True/false)
3. Preservation will increase the shelf life of the food (True/false)
4. Preservation will ensure year-round availability of food (True/False)
5. Preservation leads to spoilage of food (True/false)
6. Concentration is one common method of preservation (True/False)
7. We can preserve food with sugar (True/False)
8. Vinegar is used for food preservation (True/false)
9. Drying/Dehydration leads to spoilage of food (True/False)
10. Filtration is not used for preserving food (True/False)

4. Write one word /sentence answer:

(5)

1. Name one ingredient used at home for preserving food?
2. What is need for washing vegetables and fruits before preservation?
3. Name one chemical used for preserving food products?
4. Why food get spoiled?
5. Name one contaminant?
6. Name one method of preservation?
7. Name one cold storage appliance?
8. Name one reason why food spoil?
9. State one method of food preservation?
10. What is shelf life?

5. Write short answers (4 to 5 lines each)

(30)

1. why should we wash vegetables before processing?
2. what are the simple methods of preservation?
3. why do we preserve food?
4. what is the objective of preserving processed food?
5. how can we extend shelf life of food?
6. Name 5 common methods of food preservation?
7. What is cold storage?
8. What is drying/dehydration?
9. What is concentration?>
10. How can we preserve food with sugar?
11. What is salting?
12. What is filtration?
13. What is fermentation?
14. What is spoilage of food?
15. How do we delay spoilage of food?

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Chapter – 7

Preparation of Vegetable products like pickles, ketchup, puree, chutney, sauce, ginger garlic paste etc.,

Pickle making:

Pickling is a food preservation method used to produce pickles. This process extends the life of a particular food. Food is immersed in salt solution and/or vinegar in order to pickle it. The preservative quality of salt combined with acid prevents spoilage. This combination also produces lactic acid. This is performed under a controlled environment where the temperature, storage condition, moisture in the air, etc. are monitored. The resulting product has a salty and sour taste that people enjoy as 'Pickle'.

What is Pickle:

Pickles are foods made from fruits or vegetables. They are flavoured with spices and preserved in salt solutions or vinegar to prevent spoilage. Traditionally, pickles were made at home.

However, in the recent years, there has been an increase in the demand for purchasing pickles from reputed brands. Hence, pickle-making companies are entering the market to fulfil the domestic and international demand for pickles.

Latest technology and better-quality ingredients are used to produce pickles so that they last longer. Pickles made with good quantity edible oils have a shelf life of more than a year.

However, there are other varieties of pickles that are made from local produce, which have a relatively lower shelf life.

Types of Pickles:

Type of pickle	Example	Popular in
Chutney	Gongura, tomato	South India
Dry	Lemon, mango	UP, Bihar
Stuffed	Chillies	North India
Oil	Mango, mixed	Throughout India
Fermented	Cucumber, onion	Outside India
Non-vegetarian	Chicken, mutton, pork	HP, Uttarakhand, Punjab

Processing of Pickles:

Pickles can be processed in two ways: Curing and Fermentation

1. Curing:

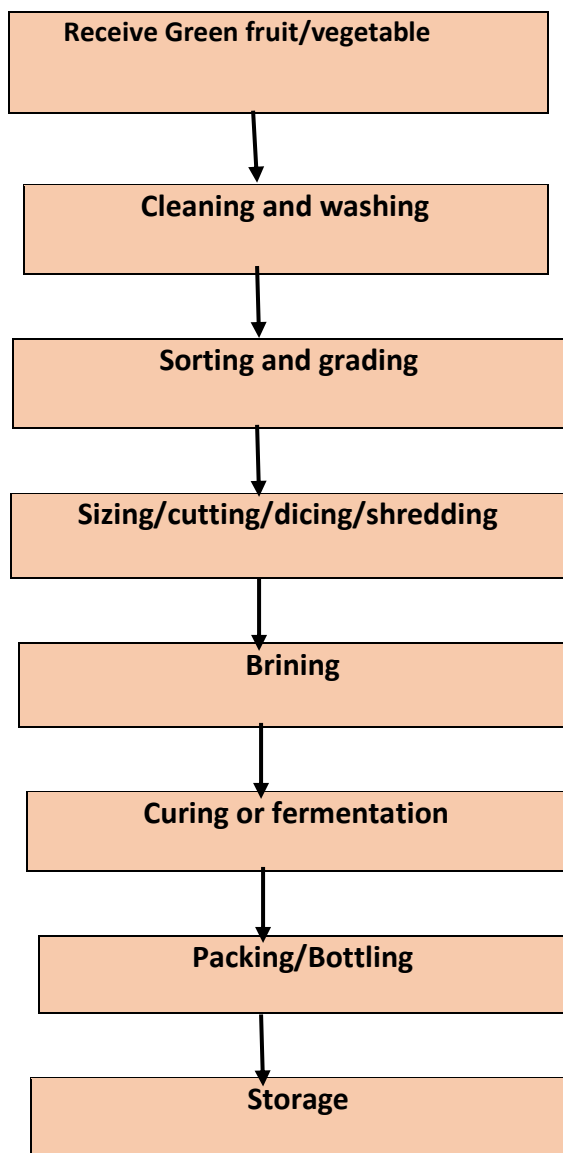
Fruits and vegetables are washed, cleaned, and cut. After this, they are kept in 12% salt solution, also called as brine. The cured fruit or vegetable is stored in barrels. When required, the cured fruits and vegetables are mixed with spices and ingredients. Then, the mixture is covered with oil to make oil pickles.

2. Fermentation:

Cured fruits and vegetables are mixed with vinegar or acetic acid and are kept for fermentation. In this process, the fermentative bacteria produce acids necessary for the preservation process.

These bacteria also generate flavour compounds. This helps to enhance the taste of fermented pickles.

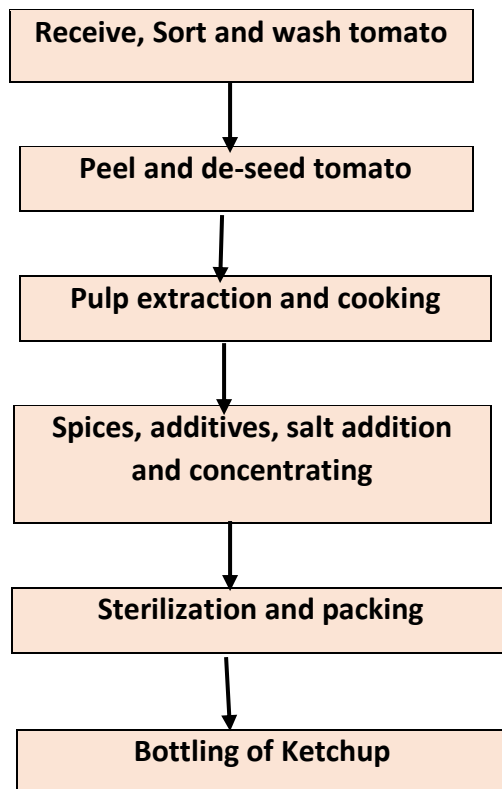
Pickle making process:



Ketchup:

Ketchup is made from strained tomato juice or pulp and spices, salt, sugar and vinegar, with or without onion and garlic, and contains not less than 12 per cent tomato solids and 25 per cent total solids

Ketchup Processing process:



Preparation of puree:

Tomato puree can be made by using ripe tomatoes. To make tomato puree, bring to a boil a large vessel full of water. Scoop out and discard the eyes of the tomatoes using the tip of a sharp knife. Make a criss-cross cut at the base of each tomato. Put in boiling water for 3 to 4 minutes. Remove and put in cold water for some time. When tomatoes are cool, peel and discard the skin. Chop roughly and blend to a smooth puree in a blender. Tomato puree is ready to be packed.

Apart from Tomatoes, pumpkin and squash can also be used to make puree. Similar procedure has to be followed.

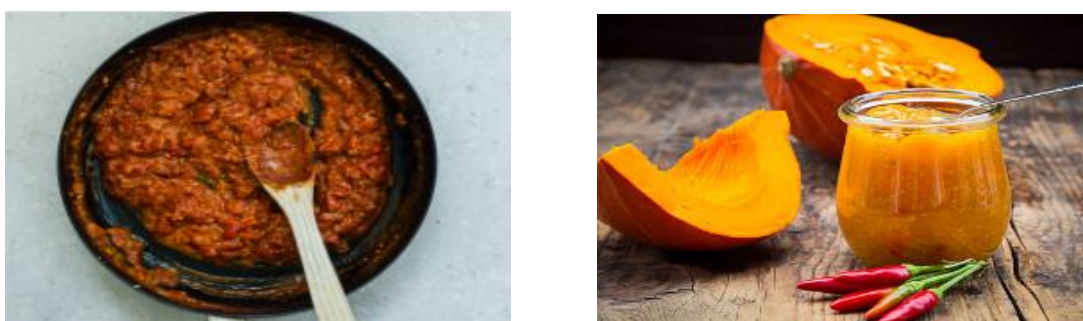


Preparation of chutneys:

Chutneys can be made from different vegetables like tomatoes, onions, carrot, raisins etc.,

The basic procedure to make chutney is to select the desired vegetable, clean and sort them and dice them as per required shape and size. Use sugar and vinegar as preservatives. For every three kilos of veggies we need one litre of vinegar and 500grams of sugar. Choose the seasonings like ginger, garlic, cloves, turmeric powder, chilli flakes, etc., as per requirement.

Put the vegetables in a pan and add sugar and vinegar and boil. Sugar will melt into vinegar and cook for around 15 minutes. Add the condiments using a muslin cloth tied to it so that the essence of the condiments will dissolve in the chutney. Keep stirring until the mixture becomes thick. Keep the lid covered to control the spill off of the chutney. Allow the mixture to cool and it can be transferred into a desired jar. Mature the chutney for three to four months and check once in a while for spoilage if any. The shelf life will be around 9 months to one year.



Dried vegetables:

Dried vegetables are mainly used in recipes for seasonal vegetables. When the moisture content is low, there is less bacterial damage to the vegetables and can be preserved for long shelf life. Dried vegetables are light in weight and have higher sweetness and better flavour than the fresh vegetables.

Vegetables can be sun dried, dehydrated, oven dried or vacuum dried or freezer vacuum dried. However the common method used is drying them in the sunlight. Vegetables are cut into desired shape and size and washed thoroughly. Wipe the water and the vegetables are stacked so that there is enough air supply. They are sun dried for a period of 7 to 10 days depending on the vegetable and the heat. They are then stored in air tight containers for further usage.



Ginger garlic paste:

Ginger garlic paste is one of the major ingredients in any Indian home kitchen for seasoning of the food. Due to their particular season of harvesting, the rates of both these spices are usually high during other periods and non-available in the market as well. Hence ginger garlic paste can be a better alternative for making income by preparing them during the season and storing them up for business during lean seasons.

Preparation of Ginger Garlic paste is easy process. Garlic pods should be cleaned after removal of the skin. Similarly ginger skin to be peeled and washed thoroughly. Add required salt and pinch of turmeric powder to the diced ginger and garlic and blend it to make a smooth paste. This can be stored in air tight containers and pouches and have longer shelf life.



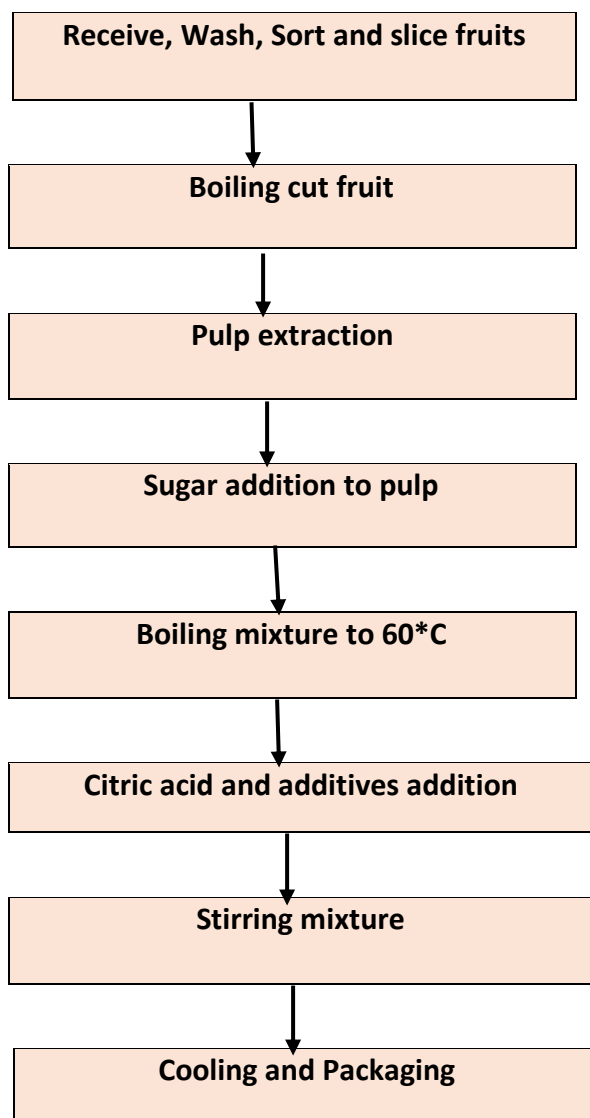
Chapter – 8

Preparation of Fruit products like Jam, jelly. Candies, tutty frutty, marmalade, fruit pulps, fruit chaats and custards etc.,

Preparation of Jam:

Jam is a product made by boiling fruit pulp with sufficient sugar to a reasonably thick consistency, firm enough to hold the fruit tissues in position, Apple, pear, sapota (chiku), apricot, peach, papaya, karonda, carrot, plum, straw- berry, raspberry, mango, tomato, grapes and muskmelon are used for preparation of jams. It can be prepared from one kind of fruit or from two or more kinds. Commercial jams such as tutti-frutti can be prepared from pieces of fruit, fruit scraping and pulp adhering to cores of fruits which are available in plenty in canning factories. Jam contains 0.5-0.6 per cent acid and invert sugar should not be more than 40 per cent.

Preparation of Jam: Flow chart





Jelly making:

A jelly is a semi-solid product prepared by boiling a clear, strained solution of pectin containing fruit extract, free from pulp, after the addition of sugar and acid. A perfect jelly should be transparent, well-set, but not too stiff, and should have the original flavour of the fruit. It should be of attractive colour and keep its shape when removed from the mould. It should be firm enough 'to retain a sharp edge but tender enough to quiver when pressed. It should not be gummy, sticky or syrupy or have crystallized sugar. The product should be free from dullness, with little or no syneresis (weeping), and neither tough nor rubbery.

According to their pectin and acid contents:

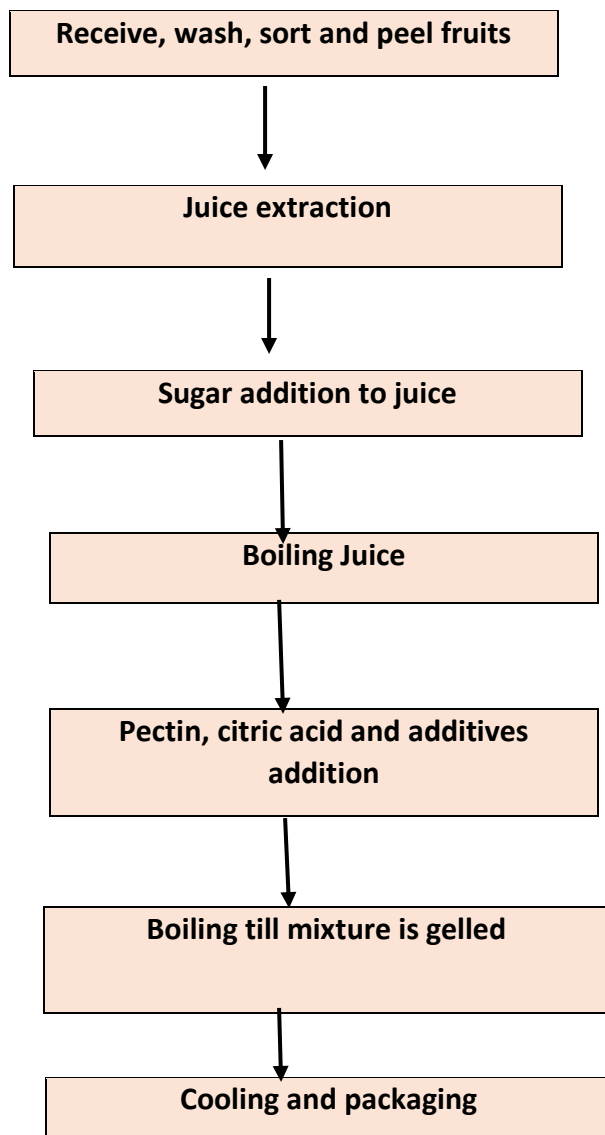
Rich in pectin and acid: Sour apple, grape, sour guavas, lemon, oranges (sour), plum (sour), jamun.

Rich in pectin but low in acid: Apple (low acid varieties), unripe banana, sour cherry, fig (unripe), pear, ripe guava, peel of orange and grapefruit.

Low in pectin but rich in acid: Apricot (sour), sweet cherry, sour peach, pineapple and strawberry.

Low in pectin and acid: Ripe apricot, peach (ripe), pomegranate, rasp berry, strawberry and any other over-ripe fruit.

Jelly Processing process is as follows:



Candies:

Various types of candies can be made from fruits.

Imli candy (tamarind candy) recipe for class work :

Ingredients required are as follows:

100 grams Tamarind and 80 grams Dates

(quantity can vary as per requirement)

2 cup hot water

100 grams jaggery

1tsp chilly powder, 1tsp chaat masala, ½ tsp cumin powder, 1/2tsp salt

1tsp ghee

Preparation:

In a bowl take 100 grams of tamarind and 80 gram of date and add two cups of hot water and soak for 30 minutes

Transfer dates and tamarind into mixer jar and blend to smooth paste

Strain to a smooth mixture into a saucepan. Add 100gms of jaggery and continue to cook.

Cook on medium flame until mixture starts to thicken. Add all the condiments like masala and salt and ghee. Cook until mixture thicken and leave the pan and form a dough.

Take a table spoon of mixture and wrap in cling wrap. Candy is ready.

Similarly amla(gooseberry), mango etc., can also be used for making candies.



Tutty-Frutty:

Tutty Frutty is mainly prepared from papaya fruit and is generally used for toppings in ice creams, dessert or cakes.

Preparation of Tutty Frutty:

Ingredients:

500 grams raw papaya

7 cups water, 2 cups sugar

1 tsp vanilla extract

4 drops food colour (red, yellow, green)



Take papaya and peel the skin of it and cut into small cubes

Boil papaya cubes in four cups of water for five minutes. Cook until the papaya cubes are semi-transparent.

Drain off water and keep aside

In a large pan take two cups of sugar and three cups of water and add the semi cooked papaya cubes and stir.

Boil for 20 minutes stirring in between.

Check for 1 string consistency of sugar syrup and papaya to turn soft yet retain its shape.

Turn off flame and add 1 tsp vanilla extract. Mix well.

Divide cooked papaya into three parts along with sugar syrup.

Add four drops of red, yellow and green food colour to each part and mix well.

Allow to soak for 12 hours or a day making sure the papaya absorbs all the colour

Drain off the sugar syrup and allow them to dry.

Once tutti frutti dries off completely it will not be sticky. Mix the colours together.

Tutti Frutti is ready to be packed or utilised.

Marmalade Preparation Recipe:

Ingredients required:

750 grams oranges, 100 grams lemon

1.5 litres of water

1.5 kg of sugar

1 tsp butter

Preparation :

Squeeze the juice of the oranges and lemons. Cook the juice along with water over a moderate flame.

Remove membrane, pips and pith from the fruit and tie securely inside a muslin bag.

Shred peel into strips and add to the juice along with the muslin bag.

Cook juice until the liquid has evaporated to 1/3. Add sugar and dissolve. Boil rapidly until setting point is reached.

Drop in butter and skim out any impurities from the surface.

The orange marmalade is ready for packing.



Preparation of Mango fruit custard:

Ingredients:

For Custard:

2 cups milk

3 tsp custard powder

¼ cup sugar

Fruits:

1 cup mango (cubes) ,3 tsp mango chopped

3 tsp pomegranate

6 grapes

½ apple

2 tsp of nuts like almond, cashew, pistachios etc.,

¼ tsp cardamon powder

Preparation:

In a large pan boil two cups of milk stirring occasionally

Pour custard milk /custard powder and stir until the custard is well combined with milk.

Add ¼ cups of sugar and stir well

Cook on low flame for 10 minutes until milk thickens and turns creamy

Cool the mixture completely

Add the ¾ cups of mango pulp and whisk smooth until custard and mango pulp is well combined

Add all other ingredients like dry fruits, fruits and cardamon powder

Mix well until fruits are well combined

Cover and refrigerate for one hour.

The Mango custard is ready for serving.

In this process various fruits can be used for making jam, jelly, fruit pulps, marmalade, custard, candies etc., The processing methodology will be more or less the same using different types of fruits.



Chapter – 9

RTS concept – Preparation of Juice, shakes, squash and Ready to Serve drinks:

Fruit and vegetable juice making:

Fruit and vegetable juice contains all kinds of nutrients that human body needs, especially the content of vitamin C is more abundant. It can prevent arteriosclerosis, anti-aging, and increase the immunity of the body. Fruit and vegetable juice is a popular drink. The common fruit and vegetable juices are orange juice, pineapple juice, grape juice, apple juice, guava juice and carrot juice.

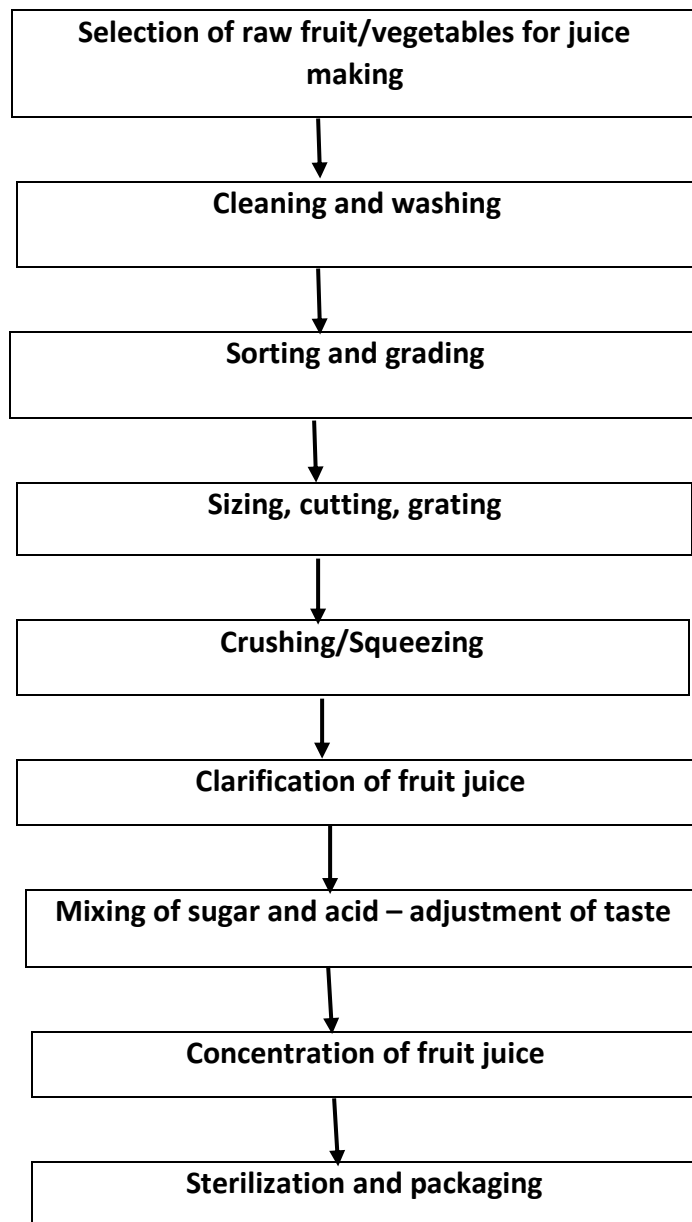
Fruit Juice Production Process:

Natural fruit juice (original juice) drink, fruit juice drink or fruit juice drink with pulp, the basic principle and process of their production are roughly the same. Fruit juice production process mainly includes fruit raw material pre-treatment, juice extraction, clarification and filtration, homogenization, deoxidization, concentration, ingredient adjustment, packaging and sterilization.

Selection of fruit raw materials

1. Fruit raw materials should have good flavour and aroma, stable colour and moderate acidity. In the process of processing and storage, they still maintain these excellent qualities and have no obvious adverse changes.
2. The fruit juice is rich and easy to take, and the extraction rate of juice is high.
3. The fruit is fresh and not rotten.

Fruit juice making process:



Preparation of orange squash:

Ingredients:

Ripe oranges – 2kgs.

Sugar – 1 kg

Water – 1 litre

Lemon juice – 3 to 4 tsp

Potassium metabisulphite – ½ tsp

Preparation:

Dissolve the sugar in the water in a pan and let it to boil until the sugar becomes a thick and flowing solution. Remove from flame and let it to cool. Remove any impurities from the sugar solution.

Peel and cut the oranges and put them into a blender to make a juice. Strain the juice and add to the sugar syrup and stir. Take ¼ cup of orange squash in a bowl and add Potassium metabisulphite and stir well until it is dissolved completely. Add the solution into the remaining orange squash and transfer the squash into the bottles. Refrigerate them for 3-4 days or one week and the taste gets better the longer it is kept.

Fruit Shakes:

Fruit shakes can be prepared using different types of fruits like mango, banana, raspberries, grapes, pomegranate or any of the fruit of the choice.

In order to make a thick and creamy fruit shake, blend the desired fruits in a blender and add ice cubes or ice creams as per desired taste. Top it with fresh diced fruits and mint if necessary.



Questions

- 1. Fill in the blanks: (35)**
1. Jam is a product made by boiling fruit pulp with -----(Sugar/Salt)
2. Consistency of jam should be -----(thick, loose)
3. Three fruits namely -----,-----,----- can be used to make jams frequently
4. Jam contains ----- per cent acid(0.5 %, 50%)
5. Invert sugar in Jam should be more than ----- % (40 %, 60%)
6. ----- is extracted from fruits for making jam (Pulp, seeds)
7. We have to----- the fruits for making jam(freeze/boil)
8. We should add ----- for making jam(sugar/salt)
9. We should add -----acid to the boiled pulp of jam (citric acid/amino acid)
10. We should ----- before packaging the jam (Cool, steam)
11. Ketchup is made from ----- (tomato, banana)
12. Ketchup contains ----- juice(tomato/potato)
13. We should -----tomato before making ketchup (de seed/ use seed)
14. We should use ----- of tomato for making ketchup (pulp, skin)
15. We use ----- spice to tomato ketchup (chilli, pepper, both)
16. We use ----- for preservation of ketchup (additives/ sugar)
17. We use ----- tomatoes for ketchup(ripe/unripe/both)
18. Tomato ketchup consists of ----- percent tomato solids(12 % , 50%)
19. Tomato ketchup consists of ----- percent total solids (25 %, 80%)
20. Ketchup is stored in -----(jars/bottles)
21. Jelly is a ----- product (solid, liquid, semi solid)
22. Jelly consists of ----- extract (fruit/vegetable)
23. Jelly should be ----- (sticky, tender)
24. We add ----- to jelly during processing (sugar/salt)
25. We ----- fruits during making jelly(boil/cool)
26. We can store jelly in -----(Containers/bottles)
27. We use ----- as additives in jelly making
28. ----- Fruits are used in making jelly
29. Jelly comes in different ----- and shapes (colours/white)
30. Unripe banana is ----- in pectin (rich/low)
31. The main ingredient for making puree is -----(Tomato, Chilli)
32. The main ingredient for making tutti-fruity is -----(papaya, mango)
33. ----- and ----- are main ingredients to make imli candy(imly, dates, grapes)
34. -----are commonly used for making marmalade (oranges, pine apples)
35. -----Is the main ingredient for making fruit custard(custard powder, maida)

2. Write True or false:

(25)

1. Jam is made by cooling of fruit pulps (True/false)
2. Sugar is used in making jam (True/False)
3. Tutti frutti can be prepared from fruit scrapping (True/False)
4. Jam contains invert sugar (True/false)
5. Jam does not contain acid (True/false)
6. We can make jam from papaya (True/false)
7. Consistency of jam is solid (True/false)
8. We use whole fruits for making jam (True/false)
9. We use dry fruits for making jam (True/false)
10. Jam is made by pulp extraction (True/false)
11. Citric acid is used in making jam (True/false)
12. Jam is used a primary food by people (True/false)
13. There are different colours for the jam depending on the fruit (True/false)
14. Artificial colours are added to jam (True/false)
15. Ketchup is made from Tomato juice or pulp (True/false)
16. We donot use onion and garlic in ketchup (True/False)
17. Jelly is a semi solid product (True/false)
18. Jelly is crystallized sugar (True/False)
19. Jelly is made from juice extraction (True/false)
20. We do not use additives in jelly making (True/False)
21. We use butter for making marmalade (True/False)
22. Milk is used for making fruit custard (True/False)
23. Food colour is used for making tutti-frutti (True/False)
24. Dried vegetables can be made through de-hydration (True/False)
25. Ginger garlic paste is the important spice for Indian cusine (True/False)

3. Match the following:

(5)

- | | |
|----------------------------|---------------|
| 1. Rich in Pectin | Grapes |
| 2. Rich in Acid | pomegranate |
| 3. Low in Pectin | unripe banana |
| 4. Low in Acid | pine apple |
| 5. Rich in Pectin and Acid | grape fruit |

4. Write one word/sentence answer:

(25)

1. Name one fruit used to make jam?
2. Name one fruit used to make ketchup?
3. Do we add salt in ketchup?

4. Do we add additives in jam making?
5. Can we make jam at home?
6. Name one local fruit available in your area to make jelly?
7. Name one ingredient you use to make ketchup tasty?
8. What is the boiling temperature for jam production?
9. Why is pectin important in jelly preparation?
10. Do we add onion and garlic to ketchup?
11. Why do we deseed tomato for ketchup?
12. What is the percentage of tomato solids in ketchup?
13. What is the percentage of total solids in ketchup?
14. Name any one brand of jam you know?
15. Name any one brand of jelly you know?
16. Name any one brand of ketchup you used?
17. Why sterilization is important?
18. What is pectin content?
19. Name one fruit with high pectin and high acid content?
20. Name one fruit with low pectin and low acid content?
21. Name one fruit which is used for making tutti-frutti?
22. Name two fruits used commonly for making marmalade?
23. Why is turmeric used while making ginger garlic paste?
24. Name three common vegetables used for making chutney?
25. Name two vegetables which can be dried and kept for longer shelf life?

5. Write short answers(4 to 5 lines):

(70)

1. What is Jam?
2. Name 5 fruits from which you can make jam?
3. Can 2 or more fruits mix together to make jam?
4. What is tutti Frutti?
5. What is the use of jam?
6. Name 3 jam which you have tasted?
7. Explain flowchart of Jam?
8. At what boiling temperature should the sugar added to pulp?
9. What is importance of citric acid to be used in Jam?
10. How can you extract pulp from fruit?
11. Why we add sugar to pulp?
12. What is ketchup?
13. What is the process of ketchup making?
14. What is the main ingredient for ketchup?
15. How do you extract pulp from tomato?
16. What are the spices you add during ketchup making?
17. How do you concentrate ketchup preparation?
18. What is jelly?
19. What is pectin?

20. What are the ingredients in a jelly?
21. What are the characteristics of a perfect jelly?
22. How can we give colour and shape to jelly?
23. What are the different jelly available in your locality?
24. Name some fruits which are rich in pectin and acid?
25. Name some fruits rich in pectin but low in acid?
26. Name some fruits rich in acid but low in pectin?
27. Name some fruits low in acid and low in pectin?
28. Name some fruits low in pectin and low in pectin?
29. Write the flow diagram for jelly processing?
30. What are the additives used for jelly preparation?
31. Explain the process of making tomato puree?
32. Explain the process of making tutti-frutti?
33. How to make imly candy?
34. Explain the preparation of mango fruit custard?
35. How to make fruit shakes?

Pickle making, Ready to Serve Fruit Juice and other processed foods from vegetables and Fruits:

1. Fill in the Blanks:

(25)

1. ----- are the food preservation methods used to produce pickles
2. Food is -----in salt solution and/or vinegar to pickle.
(floated/immersed)
3. Required quantity of salt combined with acid prevents -----
4. What is the taste of most pickles? (Salt and sour/ bitter)
5. Pickles were made traditionally at(home/industries)
6. Pickles made with good quality edible oils have ----- shelf life(lesser/larger)
7. Fermented pickles are mostly done -----India (In india, Outside India)
8. Chicken, mutton etc., are used in -----pickles
9. Chillies are used in -----pickles (stuffed/ fermented)
10. Priya, Ruchi etc., are common brand of -----(pickles, soup)
11. Pickles are processed in two ways namely ----- and -----
12. Composition of brine is -----
13. ----- and ----- are used for curing vegetables through fermentation
14. The flavour of fermented pickles is due to -----
15. Fermented bacteria produce ----- necessary for preservation process(acid/base)
16. Main ingredient of sauce is -----
17. Main ingredient of ginger-garlic paste is -----
18. Main vegetables used for making vegetable pickles are ----,----- and -----
19. Mint is the main ingredient for -----(chutney, jam making)
20. Peanuts are used for making(chutney, juice)
21. Carrot juice is rich in -----Vitamin
22. Lemon is rich in -----Vitamin

23. Vitamin C helps in ----- of the body system (immunity, weakening)
24. -----is used for sterilization of fruit juice
25. Fruit juice comes in -----flavours (same, different)

2. Match the following:

(10)

- | | |
|--------------------------|-----------------|
| 1. Stuffed pickle | Gongura |
| 2. Oil pickle | Cucumber, onion |
| 3. Non vegetarian pickle | Lemon, mango |
| 4. Fermented pickle | Chicken, mutton |
| 5. Chutney | Chillies |
| 6. Lemon | Healthy juice |
| 7. Natural fruit juice | pickle |
| 8. Flavour | Colour |
| 9. Pink | clearing |
| 10. Filtration | Sour |

3. Tick True or False:

(15)

1. Pickling is a food preservation method (True/False)
2. Immersion of food in salt solution helps in pickling (True/False)
3. Usually, pickles are sour and salty taste (True/False)
4. We can use all vegetables to make pickles (True/False)
5. There is no international demand for pickles (True/False)
6. Chutney is not a pickle (True/False)
7. Stuffed pickles are made from chillies(True/False)
8. Non vegetarian pickles include meat/poultry (True/False)
9. Keeping of cut vegetables in brine is called fermentation (True/false)
10. 12% Salt solution is called brine (True/false)
11. Bacteria through fermentation lead to spoilage of food (True/false)
12. Natural fruit juice cause cold (True/False)
13. Drinking vegetable juice strengthen the immune system (True/false)
14. Drinking packaged fruit juice is not good for health (True/false)
15. Sugar should not be added to natural fruit juice (True/False)

4. Write one word sentence answers:

(10)

1. Name one brand of pickle you know?
2. Name one pickle you have done in home?
3. Is Chutney a pickle?
4. Is it necessary to add oil to pickles?
5. Name one edible oil?
6. Which jar is good locally for storing pickles?
7. Can we use fruits to make pickles?
8. Name one common fruit juice available in your locality?
9. Name one common fruit juice sold in Tetra pack in your locality?
10. Is it necessary to consume fruit juice every day?

5. Write short answers (3 to 4 lines)

1. What is pickle making?
2. Why do we make pickle?
3. What is traditional pickle making?
4. What is the use of salt in pickle?
5. What is pickling?
6. Name 5 types of pickle in your locality?
7. Name 2 reputed brands of pickle in your locality?
8. What are the different types of pickles?
9. What is chutney pickle?
10. What is stuffed pickle?
11. Name 2 non-vegetarian pickle?
12. What are the 2 ways of processing pickles?
13. What is curing?
14. Why is fermented bacteria good for pickle?
15. Write the flow chart of pickle making?
16. What is brining?
17. Name 5 ready to serve juice from your locality?
18. Name 1 fruit juice which has high vitamin C?
19. Name 3 common juice from vegetables?
20. What is fruit juice with pulp?
21. What is natural fruit juice?
22. What is the process of fruit juice production?
23. What is clarification?
24. What is filtration?
25. What are the requisites for selection of fruits for fruit juice?
26. What is flow chart for making fruit juice?
27. To make tomato puree?
28. How to make sauce?
29. How to make mint chutney?
30. How to make coconut chutney?
31. How to make marmalade?
32. What are the ingredients in fruit chaats?
33. How to make custard?
34. How to make fruit shakes?
35. What is the price of fruit shake in your locality?
36. What is white sauce?
37. How to make chutney from peanuts?
38. How to make garlic sauce?
39. What is the shelf life of ginger-garlic paste?
40. How to make carrot juice?

Chapter – 10

Bottling, pouching, canning and storage of products:

Bottling, Pouching and canning of products is an important part of the food processing to have more shelf life.

Following procedure is to be followed before storage of finished products:

Cans, bottles and jars need to be heated in boil water to sterilize them before transferring the products into them. Head space is the distance from the product in the jar to rim of the jar/bottle. Different recipes require different head spaces and it should be stored accordingly.



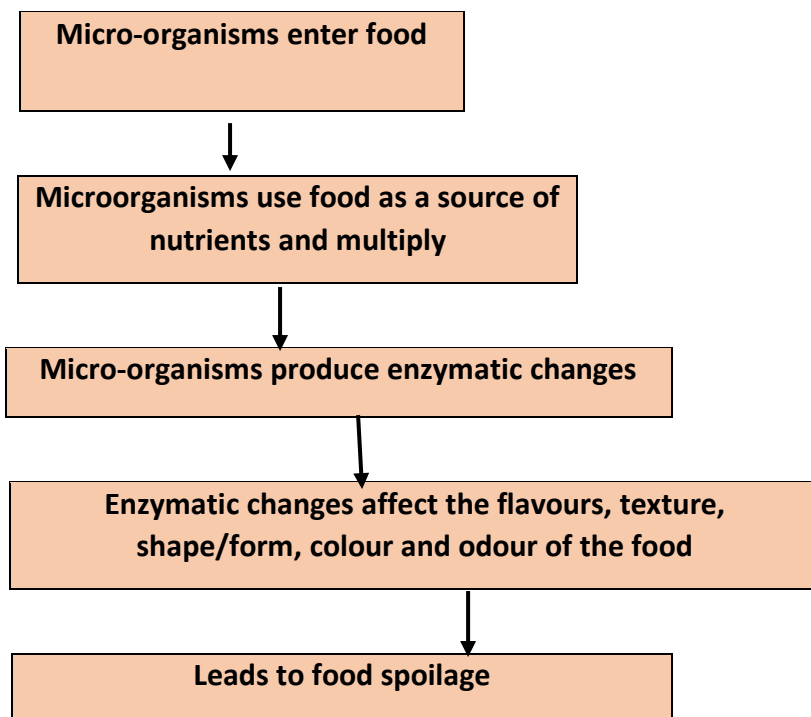
Food spoilage:

Food spoilage is the process by which the original nutritional value, texture, flavours, and the form of food is damaged. The food then becomes harmful and unsuitable for human consumption.

Some types of contaminants in foods are:

Types of contaminant	Examples
Microbial	Bacteria, moulds, yeasts, viruses, etc.
Biological	Hair, excreta, bone splinters, etc.
Chemical	Pesticide residues, detergents, etc.
Physical	Bolts from machinery, stones, glass, etc.

Process of Food spoilage:

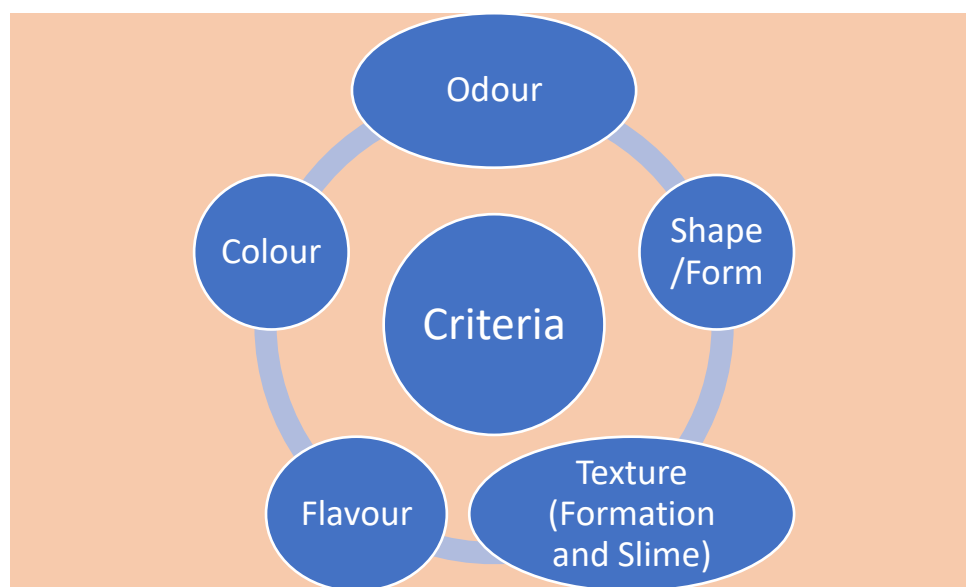


Classification of Food Based on Spoilage:

The following table shows how food is classified based on spoilage

Non - perishable foods	Semi-perishable foods	Perishable foods
Does not spoil unless handled carelessly E.g.: Sugar	Spoils only if handled carelessly or stored improperly E.g.: Potatoes	Spoils readily and needs to be stored with special preservatives/processes E.g.: Milk

Criteria to Check for food spoilage:



Questions:

Fill in the blanks:

(5)

1. Pouching is method of -----processed products
2. Bottles are largely used to store -----(Jams/ sweet products)
3. Using boiling water is means of -----the bottles(sterilize/sanitize)
4. -----Is the space between the rim and the product in the bottle
5. -----is the method to preserve cut vegetables and fruits for long time (canning, cutting)

1. Match the following:

(5)

- | | |
|-------------|-------------|
| 1. Bottle | custard |
| 2. Pouching | sweets |
| 3. Canning | Pickles |
| 4. Jars | Vegetables |
| 5. Packets | Fruit juice |

2. Give short answers:

(10)

1. What are the different methods of storing fruit and vegetable processed foods?
2. How to increase shelf life of processed foods through better storage?
3. How to sterilize cans, bottles and jars used for storage?
4. What is headspace in bottling jam and squash?
5. What is the procedure to store processed food for longer shelf life?

Food spoilage:

1. Fill in the blanks:

(15)

1. When original nutrition value, texture of food is lost it is called -----
2. Bacteria, moulds is a ----- contaminant
3. Pesticide is a ----- contaminant
4. Stone, glass etc., are ----- contaminant
5. Hair is a -----contaminant
6. When -----enters food, food spoilage occurs (microorganism, air)
7. Microorganism produce ----- changes in food
8. Stale food has -----taste
9. Stale food has -----odour
10. Sugar is a ----- food (perishable/nonperishable)

11. Salt is a -----food (perishable/nonperishable)
12. Milk is a -----Food (perishable/nonperishable)
13. Potato is a -----food (semi perishable/perishable)
14. Change in texture of food during spoilage is called -----(slime, flavour)
15. Colour of food changes during -----(food processing/food spoilage)

2. Match the following: (10)

- | | |
|--------------------------|-------------------------|
| 1. Microbial contaminant | Hair, excreta |
| 2. Biological | Bacteria, moulds |
| 3. Chemical | harmful for consumption |
| 4. Physical | pesticide, detergents |
| 5. Microorganism | Food processing |
| 6. Pickles | Food spoilage |
| 7. Perishable food | Potatoes |
| 8. Semi perishable food | Sugar |
| 9. Non-Perishable foods | Milk |
| 10. Spoilt food | stone, glass |

3. Tick True or False: (10)

1. Eating spoilt food is harmful to health (True/False)
2. Virus is a microbial contaminant (True/False)
3. Bolts from machinery are biological contaminant (True/false)
4. Pesticide residues are harmful for body (True/False)
5. Microorganisms produce enzymatic changes (True/False)
6. Enzymatic changes affect the flavour or the food (True/False)
7. Paneer is a perishable food (True/False)
8. Salt is a nonperishable food (True/False)
9. Eating spoilt food upset stomach (True/false)
10. Perishable foods can be stored long time through preservative (True/False)

4. Write short answers: (30)

1. Why food gets spoiled?
2. What happens during food spoilage?
3. What are the different types of contaminants in food spoilage?
4. Give 2 examples of microbial contaminant?
5. Give 2 examples of biological contaminant?
6. Give 2 examples of chemical contaminant?
7. Explain the process of food spoilage?
8. What are the enzymatic changes that happen to food during food spoilage.?

9. What is the classification of food based on spoilage?
10. What is nonperishable food, give example?
11. What is semi perishable food, give example?
12. What is perishable food, give example?
13. What are the criteria to check food spoilage?
14. How can you prevent food from spoilage?
15. How does microorganism affect the food?

XXXX

Chapter – 11

FSSAI Licence and Registration:

The Food Safety and Standards Authority of India (FSSAI) governs the registration and licensing of food businesses in India. If any entity is involved in the storage, distribution, or transportation of food items, or a manufacturer of food items must have an FSSAI Registration or License, according to the rule.

FSSAI License

For conducting a food business in India, everyone who is not a petty food business operator must obtain an FSSAI License. State FSSAI Licenses and Central FSSAI Licenses are the two types of FSSAI Licenses. The licensing authority would fluctuate depending on the size and nature of the enterprise. Large food manufacturers, importers, processors, and transporters of food items require a central FSSAI License, whereas medium-sized food manufacturers, transporters, and processors require a State FSSAI License. An FSSAI License is required for FBOs (Food Business Operators) with medium and large-scale food companies. Depending on the size of their firm, they must obtain a State or Central License.

FSSAI Registration

A vendor, petty retailer, temporary stall-holder, or small-scale industries relating to food must obtain an FSSAI Registration certificate if they manufacture or sell any food items. A hawker, petty retailer, itinerant vendor, temporary stall-holder, or small-scale industries relating to food must meet the following conditions for obtaining FSSAI Registration:

- The annual turnover is not more than INR 12 lakh.
- Food production capability of up to 100 litters or kg per day
- Handling, procuring, and collecting up to 500 litres of milk per day

As a condition of gaining approval for business, the FBO is expected to follow set rules and criteria for its operations. During the approval procedure, the concerned food business must go through a verification process that includes an inspection or a quality test to ensure that the food product is prepared according to proper standards.

Any food business that wants to be registered must go through a lengthy verification and inspection process. If there is a need for improving a product then with the help of this examination business can benefit from it.

Advantageous to the Consumer

There are numerous advantages for a food business, including legal and social advantages, food safety, and business expansion prospects, as well as increasing consumer confidence in the food item made, produced, distributed, or offered for sale. Consumers are frequently misled by commercials that promise healthy and delectable foods but fail to deliver the claimed results. As a result, a food business with an FSSAI License/Registration enhances consumer trust in the food goods it sells and in the product itself.

Difference between FSSAI Licence and FSSAI Registration:

FSSAI License	FSSAI Registration
When business have more than 12 lakhs turnover at the time there is a need for FSSAI License	If the business is not more than 12 lakhs there is a need for FSSAI Registration
The FSSAI licence number should be shown on the package of the items by the producers, exporters, traders and importers	The Registration number should be displayed on the package of the product, along with that FSSAI registration should be displayed in the office premises
Large and Medium sized food business and FBO (Food Business Operators) need to obtain FSSAI License	Small FBO (Food Business Operators) needs to obtain FSSAI Registration
There are two types of FSSAI License that is State License and Central License	For FSSAI Registration there is a basic registration required
FSSAI License issued for a minimum of one year to a maximum of five years period	In FSSAI Registration duration depends on the applicability of the registration
The amount for FSSAI License fees varies from Rs.2000 to Rs.7500, depending on the types of License and Criteria	The fee for FSSAI Registration is Rs.100 per year

Non-Compliance's Consequences:

Failure to follow the FSSAI Act 2006's applicable rules and regulations may result in civil liability. A Food Safety Officer conducts the verification/inspection, which includes observing the standards of food preparation, including the water supply arrangements, and marking them as Non-compliance (NC), Compliance (C), Not applicable/Not observed, or Partial compliance (PC).

Furthermore, under Section 32 of the FSSAI Act, 2006, the Food Safety Officer may issue an improvement notice in response to any observed dissatisfaction and may cancel the registration/license after providing an opportunity to be heard.

Overall, having a food license is necessary because you cannot risk your customers' health under any circumstances. You must also ensure that your customers have faith in you. You're also shielded from a slew of misleading charges about health and food safety. FSSAI Registration and License both play an important role as they will help in gaining the trust Of a consumer, not only that but it will also help businesses in increasing their value in the market.

Questions:

1. Fill in the blanks:

(05)

1. FSSAI governs the registration of -----licensing business in India
2. -----License is mandatory for petty food business entrepreneurs
3. There are two types of FSSAI License. They are ----- and -----
4. The annual turnover is less than 12 lakhs the entrepreneur should take -----
--(Registration/License)
5. FSSAI License creates -----among the consumers (Trust/dis belief)

2. Write short answers(2-3 lines):

(10)

1. Write full form of FSSAI
2. What is difference between FSSAI license and FSSAI registration
3. For a small micro entrepreneur, should he/she go for FSSAI license or registration
4. Give 2 differences between FSSAI license and FSSAI registration
5. What is the fee for FSSAI registration?

XXXX

Chapter – 12

Food Safety and First Aid:

Foods are properly cooked when they are heated for a long enough time and at a high enough temperature to kill the harmful bacteria that cause foodborne illness. Properly storing foods preserves food quality and prevents both spoilage and food poisoning.

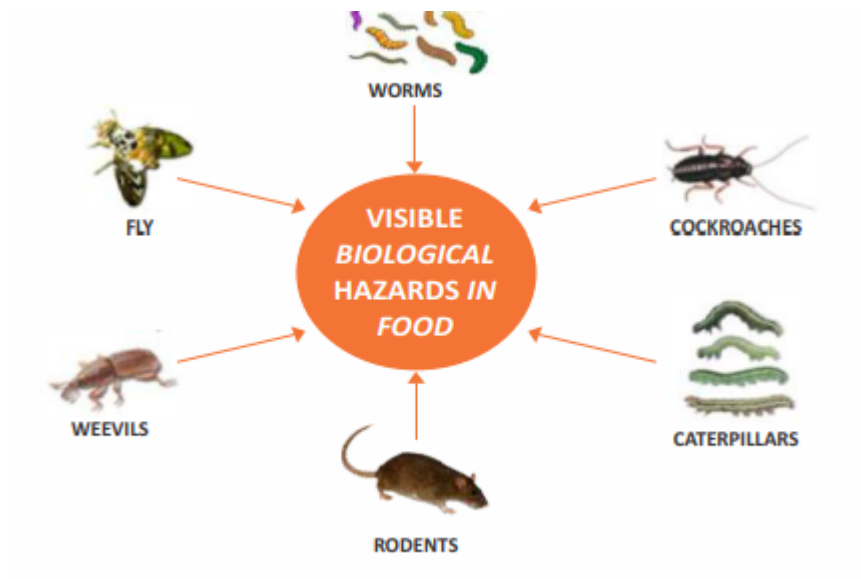
Different types of Physical hazards in food:



Different types of Chemical and Biological hazards in Food:



Different Types of Biological Hazards in Food:



First Aid:

Definition of First Aid:

When we provide basic medical care to someone experiencing a sudden injury or illness, it is known as First Aid.

In some cases, first aid consists of the initial support provided to someone in the middle of a medical emergency. This support might help them survive until professional help arrives.

In other cases, first aid consists of the care provided to someone with a minor injury. For example, first aid is often all that is needed to treat minor burns, cuts and insect stings.

First Aid for minor electric shock:

An electric shock occurs when a person comes into contact with an electrical energy source. Exposure to electrical energy may result in a small injury or may also result in devastating damage.

or death. In case of serious electric shocks and no movement in the patient, they should be immediately referred to the hospital.

For small electric shocks burns are the most common injury. Burns are treated according to the severity. Minor burns may be treated with topical antibiotic ointment and dressing.

Prevention of electric shocks:

Precaution should be taken while working on electric gadgets.

Limit use of extension cords and be sure the cord is rated for the current (measured in amps) that will be drawn by the device being powered.

Use outlet cover to protect from touching electrical outlets.

Update old, ungrounded electric outlets to grounded systems. Replace outlets near water (sink, tub etc.,) with fused outlets.

Fire extinguisher:

A fire extinguisher is an active fire protection device used to extinguish or control small fires, often in an emergency situation.

There are four classes of fire extinguishers – A, B, C and D and each class can put out a different type of fire. Multipurpose extinguishers can also be used on different types of fires and will be labelled more than one class.

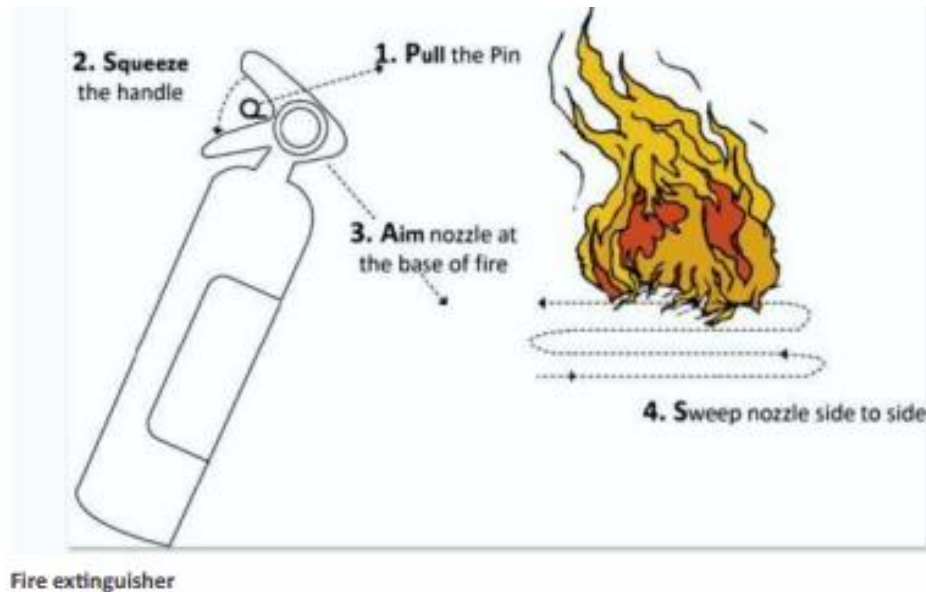
The Four steps of using a Fire extinguisher is as follows: (PASS)

Pull(Pin) Pull pin at the top of the extinguisher, breaking the seal

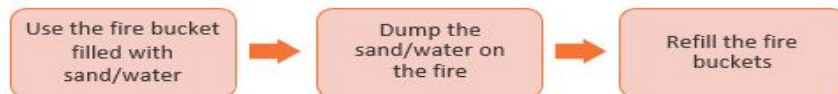
Aim. Approach the fire standing at a safe distance

Squeeze – Squeeze the handles together to discharge the extinguishing agent side

Sweep



Steps to Use the Fire Buckets



Questions:

PC 12 . Food Safety and First Aid:

1. Fill in the Blanks:

(15)

1. Heating of food for long time at enough temperature kills -----
2. -----is an example of physical hazard in food
3. Stem and seeds are -----hazards in food (physical, chemical)
4. Staple pins and rubber bands are -----hazards in food (physical, chemical)
5. Remains of cleaning chemicals is a -----hazard in food
6. -----is an example of chemical hazard in food
7. Non permissible food additives are -----hazards in food (Chemical biological)
8. Rodents are -----hazards in food
9. Caterpillars are ----- hazards in food
10. Fly is a -----hazard in food
11. Beedi, cigarettes are ----- hazards in food

12. -----is an example for biological hazard
13. When we provide emergency support to a patient it is called -----
14. Burns are a common injury due to -----shocks
15. Careless handling of electric gadgets will lead to ----- shocks
16. Four steps of Fire extinguisher are -----
17. ----- discharge when we squeeze the fire extinguisher
18. We can use ----- and ----- to control fire
19. The nozzle fo the fire extinguisher should be aimed at the ----- of fire(centre/base)
20. ----- and ----- are composition of the fire buckets

2. Match the following:

(5)

- | | |
|----------------------|-----------------|
| 1. Physical hazard | Detergents |
| 2. Biological hazard | Hair |
| 3. Chemical Hazard | Electric shocks |
| 4. First Aid | Grinder |
| 5. Electric gadgets | Rat |

3. Tick True or False:

(15)

1. Bacteria cause foodborne illness (True/False)
2. Processing of food prevents food spoilage (True/false)
3. Stones found in rice are chemical hazards (True/false)
4. Broken glass bangles are physical hazards (True/False)
5. Adulterants in food are biological hazards (True/False)
6. Excessive use of food additives is biological hazard (True/False)
7. Antibiotics found in food are chemical hazards (True/False)
8. Dead flies in food are biological hazard (True/false)
9. Cockroaches found in kitchen are biological hazards (True/False)
10. Minor burn is caused by minor electric shocks (True/False)
11. Careless use of gadgets leads to electric shocks (True/False)
12. Electric outlets should be protected and away from children (True/False)
13. Earthing of electric gadgets is not important for all electric appliances (True/false)
14. There are four classes of fire extinguishers (True/false)
15. Pull (P) is the first step in Fire extinguishing (True/false)

4. Write short answers:

(40)

1. Mention different types of physical hazards in food?
2. Beedi, cigarettes come in which type of hazards in food?
3. Name 2 biological hazards in food?
4. How can we prevent cockroaches and rodents in cooking workspace?

5. Define first aid?
6. What is medical emergency first aid?
7. What is minor injury first aid?
8. What is electric shock?
9. What is the common injury during electric shock?
10. How can we treat minor burns?
11. What should we do when there is serious electric shock?
12. Name 3 electrical gadgets with which you work?
13. What are the precautions to be taken from electric shocks?
14. What are A,B,C,D fire extinguisher?
15. What are the 4 classes of fire extinguisher?
16. What is multipurpose fire extinguisher?
17. What is full form of PASS?
18. What are the 4 steps of using fire extinguisher?
19. How to use fire buckets?
20. What is the material available in fire bucket?

XXXX

Chapter – 13

Entrepreneur skills, numerical skills and book keeping:

Definition: An Entrepreneur is an individual, who forms an organisation for commercial purpose. He/she is ready to take risk and bears uncertainty to make a profit through the business. An entrepreneur identifies a commercial need in their community, crafts a business idea and takes a lead role to start the business.

The seven skills of an entrepreneur are as follows:

- A Vision. Know exactly what you want
- Ask questions. Question yourself, your plans, your strategy, your business plans and your decisions
- Passion and energy
- Work ethic
- Create an opportunity
- Communication
- Sales

The Characteristics of a successful Entrepreneur are:

- Creativity
- Professionalism
- Risk taking
- Passion
- Planning
- Knowledge and
- Social skills

Types of entrepreneurships are classified into four categories:

They are:

- Small business
- Scalable start-ups
- Large company and
- Social Entrepreneurship

Being an entrepreneur, one can be self employed and also provide job opportunities to others.

Entrepreneurs increase competition and boost productivity. They can create new business and markets. They can introduce innovative technologies and add to the national income. Hence in order for the Country to grow, entrepreneurs are a major backbone to nation building

Through their unique ideas in offering new good and services, entrepreneurs break away from tradition and indirectly support freedom by reducing dependence on obsolete systems and

technologies. Overall, this results in an improved quality of life, general morale and economic freedom.

Book keeping, Accounting skills & Savings:

Introduction:

Book keeping is the recording of financial transactions and is part of the process of accounting in business. It involves preparing source documents for all transactions, operation and other events of a business.

Book keeping is as important as the business itself. Book keeping helps in budget preparation. With book keeping, one can able to assess the financial resources and manage income vs. expenses.

Organisation of financial records is very important. One can easily assess the financial information at any time. This can help in applying for grants, loans and getting investors. These days it a requirement under Law to keep all financial records of the business.

Accounting is the process of systematically recording and managing financial accounts. Accounting involves maintaining books like journal, ledger and cash book.

Day book, Ledger and Balance sheets are done to get knowledge on the growth of the company in money matters.

Savings:

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

Benefits of savings:

- **Become financially independent:** When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- **Invest in yourself through education:** Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- **Get out of debt:** Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- **Be prepared for surprise expenses :** Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially stressed.

- **Pay for emergencies:** Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.
- **Afford large purchases and achieve major goals::** Saving diligently makes it possible to place down payments towards major purchases and goals, like buying a home or a car.
- **Retire:** The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.

Bank Accounts, types and how to open bank accounts:

In India, banks offer four main types of bank accounts. These are:

- Current Accounts
- Savings Accounts
- Recurring Deposit Accounts
- Fixed Deposit Accounts

Current Accounts

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

Savings Accounts

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

Recurring Deposit accounts:

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

Fixed Deposit Accounts

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of

time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

Opening of a Bank Account:

Opening a bank account is quite a simple process. Following are the steps to open a savings account.

Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slip books) Ensure that you sign wherever required on the form.

Step 2: Affix your Photograph

Stick a recent photograph of yourself in the allotted space on the form.

Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual needs to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhaar) Card

Step 4: Submit All your Documents

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!

Questions:

Entrepreneurship skills, numeric skills and book keeping:

1. Write short answers:

(150)

1. Who is an entrepreneur?
2. Name 3 skills of an entrepreneur ?
3. What is communication skill?
4. What is vision?
5. What is mission?
6. What are the characteristics of a successful entrepreneur?
7. What is risk taking?
8. Name 2 social skills?
9. What are 4 categories of entrepreneurship?
10. What is startup?
11. How can entrepreneurs help the country grow?
12. How to increase sales?
13. What is work ethics?
14. What is planning in business?
15. What are the four categories of entrepreneurship?
16. What is meant by small business? Give examples?
17. Are all self-employed people entrepreneurs?
18. What is the aim of entrepreneurship?
19. Business is a -----activity (social, economic, hazardous, selling)
20. What are startups
21. What is social entrepreneurship?
22. What are the job opportunities an entrepreneur can provide to people?
23. How can entrepreneur boost Indian economy?
24. What is micro entrepreneurship? Give examples
25. How do entrepreneurs create opportunities?
26. What are different steps in communication?
27. What is inter personal relationship?
28. What knowledge and skills are required for an entrepreneur?
29. What do you mean by wage employment?
30. Which of the following is wage employed: A cook in restaurant, A food stall vendor?
31. List any two characteristics of wage employment?
32. Differentiate between wage employment and entrepreneurship?
33. What is Product business?
34. What is service business?
35. What is difference between product business and service business?
36. Write P- Product, S- Service and H- Hybrid for the following businesses.

- (a) Ice-cream seller
- (b) Restaurant/Cafeteria Owner
- (c) Car-driving School owner

37. Fill in the blanks

State whether the person engaged in the activity mentioned below is an entrepreneur or an Employee

- (a) Rahul starts a shop to sell Chaat and special Paani Puri. He is an -----
 - (b) Shahid becomes the manager of a dealership selling food products. He is an -----
 - (c) Ritu leaves the company she worked for and starts catering food for marriage programmes. She is an -----
38. List two characteristics of self-employment
39. Name one factor which is common both for entrepreneurship and wage employment?
40. What is the most important characteristic of a successful entrepreneur?

Numerical skills:

- 41. What is book keeping?
- 42. What is accounting?
- 43. What is transaction?
- 44. What is budget?
- 45. What is credit?
- 46. What is debit?
- 47. What is cash account?
- 48. What is bank account?
- 49. What is a journal?
- 50. What is cash flow?
- 51. What is bank interest?
- 52. What is income tax?
- 53. What is capital cost?
- 54. What is recurring cost?
- 55. What is the financial year of the company?
- 56. Why do we need financial record?
- 57. What is balance sheet?
- 58. Who is an Auditor?
- 59. Why we should save?
- 60. Give 3 reason for benefits of saving?
- 61. What are the different types of bank account?
- 62. What is fixed deposit account?
- 63. What is difference between current account and savings account?
- 64. What is difference between recurring and fixed deposits?
- 65. How to open a bank account?
- 66. What is KYC?

- 67. What is online banking?
- 68. What is online selling?
- 69. Tell one on line marketing platform?
- 70. How does Government help entrepreneurs?

XXXX

Chapter – 14

Market exposure:

After training the beneficiaries need to have an onsite knowledge on the work to be taken up either be it self-employed or wage employed. Hence, he/she needs first-hand information on how to run the unit and by exposing them to a market and already existing units in the nearby area, they can gain through knowledge on the trade, the pros and cons of running the business etc., Hence there is a great need for exposure to similar units in the area and also understanding the market feasibility.

Questions:

Write short answers:

(5)

1. Why there is need for market exposure?
2. What is market feasibility?
3. What are the markets available in your locality for processed food products?
4. What are the wage employment opportunities in food processing in your locality?
5. What is the self - employment opportunities in food processing in your locality?

Conclusion:

The Course “Assistant – Fruit and Vegetable Processing & Preservation” is a viable trade where the neo-literates, non-literates and rudimentary level of beneficiaries can take up the training and become self-employed, wage employed and also become micro entrepreneurs.



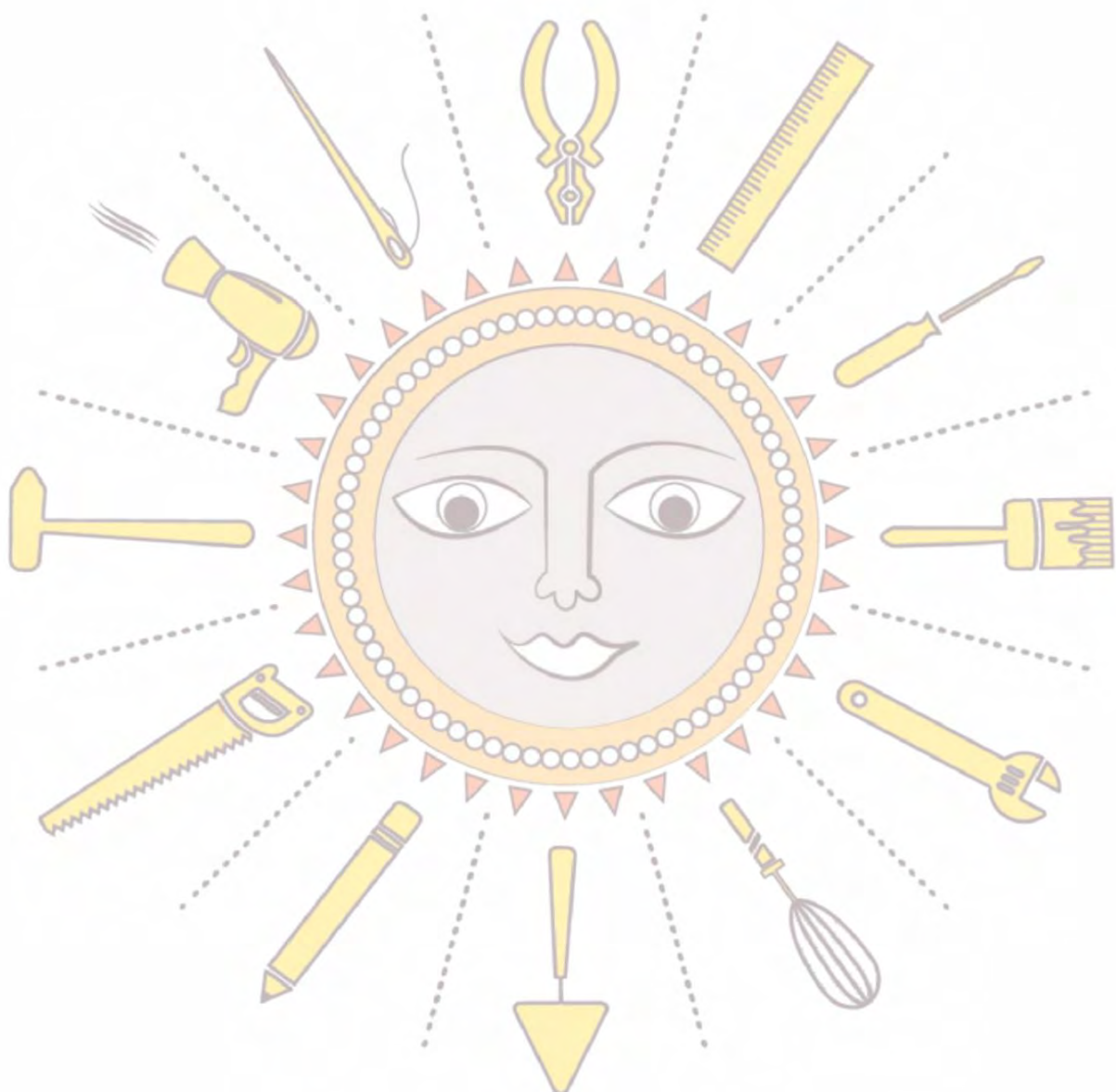
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Skill Council for Persons with Disability

Sector Skill Council Contact Details:

Address: 501, City Centre, Plot No. 5 Sector 12 Dwarka

Website: www.scpwd.in

Phone: 01120892791