

IMPORTANT OBJECTIVES FOR SEMESTER END EXAM.

HORT-366

DEFINITIONS:

Asepsis: - Maintenance of general cleanliness during picking, packing and transportation of fruit and vegetables for keep out microorganisms.

Blanching: - Treatment of fruits and vegetables with boiling water or steam for short periods, followed by dipping in cold water immediately in cold water is called Blanching. It separate pulp to maximum extent from the peel.

Breather: - If pressure gauge shows no vacuum inside a can it is called as breather

Candied fruits: - A fruit impregnated with sugar and glucose, and subsequently drained and dried is called as candied fruit covered or coated with thin transparent coating of X sugar, which impart to it a glossy appearance is called glazed fruit.

Canning: - The process of sealing food stuffs hermetically in container and sterilizing them by heat for long storage known as canning.

Cordial: This is sparkling clear, sweetened fruit juice from which all the pulp and other suspended material have been completely eliminated. Jam is prepared by boiling the fruit pulp with sufficient quantity of sugar to a remarkably thick consistency, firm enough to hold the fruit tissues in position. It should contain not less than 68% of soluble solids as determined by refract meter when cold. Fruits used: Papaya, Sapota, Pine apple, Mango, strawberry, Tomato, Cashew apple, etc.

Crystallized fruits: - When candied fruit is coated with crystals of sugar, either by rolling it in finely powdered sugar or by allowing the sugar crystals firm dense syrup to deposit on it is called as Crystallized fruit.

De-greening: - Degreening is the process of decomposing green pigments in fruits usually by applying ethylene or other similar metabolic inducer to give a fruit its characteristic colour i.e. called degreening.

Dehydration: - It is the process of removal of moisture for fruits and vegetables by the application of artificial heat under controlled condition of temperature, R.H. and air flow.

Fermentation: - Decomposition of carbohydrate by microorganisms or enzymes is called fermentation

Flipper: - This is due to mild positive pressure resulted inside the can due to under exhausting or over filling.

Food Preservation: - The science which deals with the method of prevention of decay or spoilage of fruits thus allowing it to be stored in a fit condition for future use.

Fruit Juice: This is a natural juice prepared out of a fruit and remain practically unaltered in its composition during its preparation and preservation.

Grading: - It is sorting of vegetables and fruits into different grades according to size, shape, colour and volume to fetch higher price in the market.

Harvest: - These are the activities or actions carried out to separate the commodity from the plant or plant as a whole after desired maturity.

Horticultural maturity: - It is the stage of development when fruits or vegetables required by the market or consumer.

Jelly: - It is prepared by boiling the fruit with or without water, straining, mixing the strained and clear juice extract with sugar and boiling the mixture to a stage at which it will set to a clear jelly. Pectin is most important constituent of jelly. Only such fruits which have good flavour and are rich in pectin should be used for jelly making.

Marmalade: Marmalade is fruit jelly in which slices of the fruit or peels are suspended. The marmalade is generally associated with the products made from citrus fruit like orange and lemons in which shredded peels are included as the suspended material.

Maturity: - It is the stage in which any organ of plant attains full growth and development, beyond which no further growth takes place i.e. called maturity

Nectar: - Fruit beverage contains 20% fruit pulp/juice and minimum 0.3% acid and 15% T.S.S. it is not diluted before serving.

Pasteurization: - It is the process of heating the product below boiling temperature (100°C) for sufficient time to kill majority of the microorganism but not all.

Pickle :- Pickle is the preserve product of fruits and vegetables in which common salt is added as preserving agent and spices, condiments and oil added for flavouring.

Post-harvest:- It is the condition in which commodity finds itself, & the activities carried out with it after its separation from the mother plant.

Preservative: - It is any substance capable of inhibiting, retarding or arresting the process of fermentation, acidification and decomposition of fruits but does not include salt, sugar, acetic acid or vinegar.

Preserve: - Preserve is made by cooking the entire fruit or pieces in heavy sugar syrup till it become tender and transparent.

Ripening: - Sequential changes in sensory factors of colour texture and taste which render the fruit acceptable to eat and commencement of senescence.

Shelf life: - It is the period of time during which fruit and vegetables remain fresh, attractive and appealing.

Squash: - This consists essentially of strained juice containing moderate quantities of fruit pulp to which cane sugar is added for sweetening e.g. Orange squash, Mango Squash, Pine apple squash, Passion fruit squash.

Sterilization: - It is the process of heating above boiling temperature to kill all the microorganisms completely.

Syrup and sharbat: This is clear sugar syrup which has been artificially flavored. Syrup is concentrated beverage prepared from juicy or pulpy fruits or scented material such as Rose, Sandal Wood, Raspberry, Gooseberry, Strawberry, wherein higher concentration of sugar is used (70 to 35%).

Tomato ketchup: - It is made by concentrating tomato juice or pulp without seeds and pieces of skin. Spices salt, sugar, vinegar, onion, garlic etc., are added to the extent that the ketchup contains not less than 12% tomato solids and 28% total solids.

Weeping jelly / Synergic: - It is sudden exudation of fluid from jelly due to excess of acid, too low concentration of sugar, insufficient pectin etc.

B) Match the pair.

- 1)
- | A | | B | |
|--------------------------|--|----------------|--|
| 1) Non-climacteric fruit | | a. Salinometer | |
| 2) Pickle | | b. Ethylene | |
| 3) Ripening | | c. Banana | |
| 4) Climacteric fruit | | d. Vine.g.ar | |
| 5) Brine solution | | e. Grape | |
- Ans.** (1) e (2) d (3) b (4) c (5) a

- 2)
- | A | | B | |
|--------------------------|--|------------------|--|
| 1) Non-climacteric fruit | | a. Caustic soda | |
| 2) Rich in pectin fruit | | b. Salt | |
| 3) Lye peeling | | c. Wood apple | |
| 4) Climacteric fruit | | d. Pomegranate | |
| 5) Brine solution | | e. Custard apple | |
- Ans.** (1) d (2) c (3) a (4) e (5) b

- 3)
- | A | | B | |
|--------------------------|--|--------------------|--|
| 1) Irradiation | | a. Gamma rays | |
| 2) Brining | | b. Salt | |
| 3) Antibiotic | | c. Nisin | |
| 4) Chemical preservative | | d. Sodium benzoate | |
| 5) Vinegar | | e. Acetic acid | |
- Ans.** (1) a (2) b (3) c (4) d (5) e

C) True OR False

- 1) For most fruits and vegetables, higher the temperature during the growing period earlier is the time of harvest.
Ans. True
- 2) Bhendi is harvested 15-18 days after opening of flower for vegetable purpose.
Ans. False (6-7 days)
- 3) Harvesting of banana is done either by pulling or twisting individual fruits.
Ans. False (whole bunch is harvested)

- 4) The corrugated fibre board boxes (CFB) are commonly used for packaging of grapes for distant market.
Ans. True
- 5) For preserving naturally coloured juices sodium benzoate is commonly used.
Ans. True
- 6) Sodium benzoate is used to preserve naturally coloured juice.
Ans. True
- 7) Custard apple is a non-climacteric fruit.
Ans. False (Climacteric fruit)
- 8) A good jelly should be sticky, gummy and syrupy.
Ans. False (Should not be)
- 9) Atul sapota harvester is developed by MPKV, Rahuri.
Ans. False (Developed by Dr. BSKKV, Dapoli)
- 10) Vinegar is used to preserve mango pickle.
Ans. True
- 11) Ethylene oxide is used for hastening of ripening in fruits.
Ans. False (Delaying)
- 12) The prepared jam should not contain less than 68 per cent fruit.
Ans. False (45% fruit) (68% TSS)
- 13) In Watermelon, the most important indication of maturity is metallic sound when fruit is thumped.
Ans. False (Dull sound)
- 14) The TSS of tomato ketchup preferably is 28-30 percent.
Ans. False (10-12%)
- 15) Mango fruits require 210-255 days to mature after flowering.
Ans. False (95-115 days)
- 16) Growth of micro-organism activity gets affected by lower temp.
Ans. True
- 17) In case of sweetened juice the minimum % of juice in final product should be 70%
Ans. False
- 18) By drying we get better quality product than dehydration
Ans. False
- 19) After freezing of fruits the dehydration is done in case of dehydro freezing method
Ans. False

D) Do as directed

- 1) Two names of food spoilage bacteria
Ans. Acetobacter, Lactobacillus, Proteus, Pseudomonas
- 2) Two names of useful bacteria
Ans. Acetobacter Sp., Lactobacillus Sp.
- 3) Two Antibiotics used for preservation

- Ans. Nisin, Pimaricin, subtilin etc.**
- 4) Two causes of weeping of jelly
Ans. a) Insufficient pectin b) Too low concentration of suga c) Excess of acid
- 5) Precooling define
Ans. Rapid removal of field heat from fruits and vegetable known as precooling.
- 6) Chemical used for ripening of fruits
Ans. 1) Ethylene 2) Calcium carbide
- 7) Total percentage of fruit and sugar in prepared jam.
Ans. T.S.S. – 68%
Jam – Not less than 45% fruit
- 8) In which crop neck fall is considered as indication of maturity.
Ans. Onion and Garlic
- 9) Name of mango harvester developed by Dr. BSKKV, Dapoli.
Ans. Nutan mango harvester.
- 10) Methods of manual harvesting
Ans. 1) Ladder / bag picking method 2) Poles / Clippers method
3) Harvesting by means of cutting knives
4) Harvesting by means to digging tools
- 11) Examples of climacteric fruits
Ans. Mango, Banana, Sapota, Custard apple, Papaya.
- 12) Examples of Non-climacteric fruits
Ans. Pomegranate, Grape, Citrus, Cashew nut
- 13) Name of rootstocks in citrus for increasing post-harvest quality
Ans. Trifoliate orange, Cleopatra, Tangolo etc.
- 14) Examples of vegetables in which curing is done
Ans. Potato, sweet potato, onion, Garlic etc.
- 15) Types of wax emulsion
Ans. a) Wax ‘W’ b) Wax ‘O’
- 16) Chemical that hastens ripening
Ans. Ethylene, Calcium Carbide, ABA, Hexanol, etc.
- 17) Chemical that delay in ripening
Ans. Ethylene oxide, maleic acid, GA, MH, CCC etc.
- 18) Grades according to international market
Ans. a) Extra class (b) Class 1st (c) Class 2nd
- 19) Packaging material for vegetable crop.
Ans. Gunny bags, Bamboo baskets, paper board boxes, polythene film etc.
- 20) Controlled Atmospheric Storage (CAS)
Ans. Higher conc. of Co₂ and lesser conc. of O₂ is beneficial for best storage of fruits.
- 21) Name of ionizing radiation to extend shelf life of perishable fruits

- Ans. Gamma rays**
- 22) Low temperature ranges for check the growth of micro-organisms.
Ans. 0° to 4.4°C (32° F to 40°F)
- 23) Name of chemical preservatives
Ans. i) Potassium metabisulphide (KMS) ii) Sodium benzoate
- 24) Acids used for preservation
Ans. Citric acid (lime juice), Acetic acid (vine.g.ar) and Lactic acid
- 25) Temperature range when enzymatic spoilage not happen.
Ans. 80°C
- 26) Modes of microbial spoilage
Ans. Bacteria, yeasts, Moulds
- 27) Stable / Non-perishable foods
Ans. Sugar, flour and dry beans
- 28) Semi perishable foods
Ans. Potato and some varieties of apples
- 29) Perishable food
Ans. Most of the fruits and vegetables, meat, fish, egg and milk.
- 30) Two names of food spoilage bacteria
Ans. Clostridium botulism, Lacto bacillus, Acetobacter, Profeus
- 31) Two names of useful bacteria
Ans. Acetobacter spp. Lactobacillus spp.
- 32) Two antibiotics, used for preservation
Ans. Nisin, Subtilin, Pimaricin
- 33) Two causes for weeping of jelly
Ans. Excess of acid, low concentration of Sugar, Insufficient pectin
- 34) Two products prepared from ginger
Ans. Ginger candy, Jelly, soft drinks, Pickles, Mukhwas
- 35) Name two products prepared for Mango
Ans. Mango slice, Mango Juice
- 36) Criteria (indices) for judging the maturity of aonla
Ans. Computation period
- 37) In which crop neck fall is considered as indication of maturity
Ans. Onion and garlic
- 38) Give the two causes of weeping of jelly
Ans. Excess of Acid, low concentration of sugar, insufficient pectin.
- 39) Name two climacteric fruits
Ans. Banana, custard apple, Guava, Mango, fig, Avocado
- 40) What is meant by pre cooling?
Ans. Pre-cooling means removal of field heat with the help of cool water, cool air
- 41) Which chemical is used for ripening of fruits?
Ans. Ethylene
- 42) How many days after opening of flower, Bhenidi is ready for harvesting for vegetable purpose?
Ans. 6 – 7 days

E) Fill in the blanks

- 1) Mango slices are preserved in **syrup** solution
- 2) **Bacteria** micro-organisms are responsible for formation of toxins in food
- 3) Asepsis is a method of **Temporary** preservation
- 4) **1.2% acidity and 12% salt** is used for preparation of pickles
- 5) **Ethephon, alcohol** chemical is used for hastening of ripening
- 6) At full maturity specific gravity of mango is **1 to 1.02**
- 7) Asepsis is method of **temporary** preservation
- 8) Temperature below **100°C** is essential for pasteurization
- 9) Green peas are canned in **Brine** solution
- 10) The process of removal of air from cans is known as **Exhausting**
- 11) Full slip stage is maturity indices of **Muskmelon** crop
- 12) Tenderness of pea is measured by using **Tenderometer**
- 13) At full maturity specific gravity of mango is **1 to 1.02**
- 14) Ideal maturity indices of Banana is **Angularity of fruit**
- 15) Total soluble solid (T.S.S.) of produce measured by **Refractometer**
- 16) Computation means day from **Fruit Set** to maturity.
- 17) Coconut usually matures in about **350 to 375** days after appearance of Inflorescence.
- 18) Marmalade is mostly prepared from **Citrus** fruits.
- 19) CFTRI- **Central Food Technological Research Institute, Kasargod**
- 20) Solution of Sugar in water is called as **Syruping.**
- 21) In Canning the salt is used in the form of **Brine Solution.**
- 22) Removal of outer skin of fruits is called as **Peeling.**
- 23) CFB- **Corrugated Fibre Board Box**
- 24) The fundamental principle of preservation of foods by heat is known as **Processing.**
- 25) **Ethyl** Alcohol can be produced by fermentation.
- 26) **Vinegar** is a liquid obtained by alcoholic and acetic fermentation of suitable material containing starch and sugar.
- 27) **Flame** Peelers are mostly used for peeling onions.
- 28) For natural coloured juices and pulps **Sodium benzoate preservative** is used.
- 29) As per FPO specification, percentage of TSS (W/W) in the final product of preserve should be **68%.**
- 30) Zero energy cool chamber is based on the principle of **Direct Evaporative Cooling.**
- 31) In **Onion** Neck Fall is considered as indication of maturity.
- 32) **Wine** is an Example of Fermented Fruit product.
- 33) CFB Boxes are used for **Packaging** of horticultural crops.
- 34) **Sterilization** involves complete elimination of microorganisms.
- 35) **Cordial** is sparkling clear sweetened fruit juice without any suspended material.
- 36) During sealing of the can, temperature should not fall below **74°C**

- 37) Vacuum Cooling is mostly used for **Leafy** vegetables.
- 38) According to ripening behaviour Guava & Pineapple are **Non-Climacteric fruits**.
- 39) Black neck is a problem of **Sauce/Ketch up**
- 40) Toddy is prepared from **Coconut** fruit.
- 41) **CA Storage** is a more precise method of storage.
- 42) **1-2%** only value addition done in India.
- 43) **Post-harvest technology / post-harvest management** may be defined as the branch of Horticulture that deals with all the operations right from harvesting or even the preharvest stages till the commodity reaches the consumer, either in fresh (grains, apple, mango, tomato fruits) or processed form (flour, juice, nectar, ketchup) and utilization of the wastes (pomace, peel, seed, skin etc.) in a profitable manner (manufacture of fermented beverages, colour extraction, pectin extraction etc.)
- 44) Attainment of full size by the plant organ (Root, stem ,flower, Fruit,)Or Whole plant beyond which no further growth takes place known as **maturity**
- 45) **Degreening** is the process of decomposing green pigment (Chlorophyll) in fruits usually applying ethylene or similar metabolic inducers to fruit.
- 46) **Pre-cooling** is a means of removing the field heat.
- 47) **Waxing** is accomplished to reduce the rate of respiration & to enhance the product gloss.
- 48) **Ripening** is the process by which fruits attain their desirable flavour, quality, colour, palatable nature and other textural properties.
- 49) Apple, Banana, Mango, Sapota, Papaya, Tomato- **Climacteric fruits**.
- 50) Cherry, Pomegranate, cucumber, grape, Citrus, pineapple, grapefruit, strawberry, Melons- **Non Climacteric fruits**.
- 51) Changes occurring during ripening-

Mature fruit	Enzyme's	Ripe fruits
Acid	Kinase	Neutral
Starch	Amylase	Sugar
Chlorophyll	Hydrolase	Anthocyanin/ Xanthophyll
Pectin	Pectinase	Pectic acid
Large organics	Hydrolases	Aromatics

- 52) **Chemicals that delay ripening and senescence:** (1) Kinetin, (2) GA, (3) Auxin, (4) Growth retardant (MH), (5) Alar, (6) CCC. (7)CIPC. (8)Metabolic Inducers (a) Cycloheximide, Actinomycin-D(b)Vitamin-k,(c)Maleic acid, (d)Ethylene Oxide, (e)NA-DHA, (f)Carbon monoxide,(9) Ethylene absorbents-(a)KMno4 (b)Fumigants like methyl bromide(c)Reactants

- 53) **Respiration** is the process by which stores fruits and vegetable or food materials (Carbohydrates, Protein, and fats) are broken down into simple end products with a release of energy.
- 54) **Ethylene** is a natural plant hormone that the fruit itself emits as it ripens.
- 55) Freezing injury will be initiated at **30°F (-1°C)**, depending on the soluble solids content.
- 56) **Musk melon** should be harvested at the formation of abscission layer.
- 57) **Food preservation** can be defined as the science which deals with the methods of prevention of decay or spoilage of food, thus allowing it to be stored in a fit condition for future use.
- 58) Sugar act as a preservative when its conc. **66% or more**
- 59) **Sugar** act as a preservative by **osmosis** and not as a true poison for microorganisms.
- 60) The concentration of **15-25%** is used for the preparation such as pickles. **Salt** inhibits enzymatic browning and discolouration and also acts as an **anti-oxidant**.
- 61) **14% alcohol** act as a preservative in wine because yeast.
- 62) **2% Acetic acid** prevents spoilage of many products.
- 63) Decomposition of carbohydrates by microorganisms or enzymes is called as **fermentation**.
- 64) A layer of **oil** on the surface of any food products **anaerobic conditions** which prevent the growth of moulds and yeasts.
- 65) Certain metabolic products of microorganism have been found to have germicidal effects and are termed as **antibiotics**.
- 66) **Nisin** is an antibiotics produced by *Streptococcus lactis*.
- 67) **Subtilin** is an antibiotics produced by *Bacillus subtilis*.
- 68) Pimaricin is an anti-fungal antibiotics.
- 69) **Carbonation** is the process of dissolving sufficient carbon dioxide in water or beverage so that the product served gives the gas as fine bubbles and has a characteristic taste.
- 70) Fruit juice beverages are generally bottled with **CO₂** content varies from **1 to 8gm per lit.**
- 71) The keeping quality of carbonated fruit beverages is enhanced by adding about **0.005 percent Sodium benzoate**
- 72) As per FPO, Sulphur dioxide allowed in the fruit juice is 700 ppm, in squash, crush and cordial 350 ppm, and RTS and nectar 100 ppm.

- 73) As per FPO, Sodium benzoate allowed in the squash, crush and cordial 60 ppm, and RTS and nectar 100 ppm.
- 74) For preserving natural coloring juices **Sodium benzoate** is used as a preservatives.
- 75) Principle of canning- Destruction of spoilage organisms within the sealed container by means of heat.
- 76) **Lye peeling- 1-2% Caustic soda** solution for 30 sec to 2 min.
- 77) Flame peeling- Onion Garlic
- 78) Unfermented fruit beverage- fruit juice which do not undergo with alcoholic fermentation. RTS, Nectar, Juice, squash, crush, syrup, Cordial.
- 79) Fermented fruit beverage- fruit juice which undergone with alcoholic fermentation. Wine, Champagne, Port, Perry, Sherry, Tokay, Muscat, Nira, Cidar, Perry.
- 80) Tendrometer- Tenderness of pea.

Sr. No.	Name of product	Fruit %	TSS %	Acid%
1	Natural juice	100	-	-
2	Sweetened juice	85	10	-
3	RTS(Ready To Serve)	10	10	0.3
4	Commercial RTS	10	13	0.3
5	Nectar	20	15	0.3
6	Orange, Pineapple nectar	40	15	0.3
7	Cordial	25	30	1.3-1.5
8	Squash	25	40-50	1
9	Crush	35	55	1
10	Syrup (fruit)	25	65	1.3-1.5
11	Syrup (Synthetic)	-	70-75	1.3-1.5
12	Jam	45	68	0.5-0.6
13	Jelly	45	65	0.5-0.75
14	Marmalade	45	65	-
15	Preserve	55	68	-
16	Candy	55	75	-
17	Fruit chutney	40	50	-
18	Barley water (0.25% Barley starch)	25	30	1.3-1.5
19	Tomato ketch up	12	28	-
20	Tomato sauce	12	30	-