Register Number:……..

KUMARAGURU college of technology
character is life

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Fifth Semester

BIOTECHNOLOGY

U18BTE0002**:** Food Process Engineering

COURSE OUTCOMES

CO1: Apply and analyse the pre-cleaning techniques in food processing

CO2: Apply different types of high temperature processing operations

CO3: Illustrate different drying and dehydration techniques

CO4: Categorise several low temperature processing and preservation techniques

CO5: Classify various post processing operations

CO6: Apply and analyse various packaging operations

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the Equipment with unit operations. CO1 [K_2]

List I	List II
A. Spiral Separator	i. Separates seeds based on length
B. Indented Cylinder Separator	ii. Separates seeds based on shape and size using rotating disks
C. Disk Separator	iii. Uses air flow to remove lighter impurities
D. Air Screen Cleaner	iv. Uses gravity and centrifugal force to separate seeds based on shape and density

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

2. Grading of fruits and vegetables help in: CO1 [K_1]

a) Increasing the nutritional value b) Protect the foods from microbial spoilage

c) Increasing the market value d) Increasing the shelf life of produce

3. Which of the following are potential disadvantages of high-temperature processing? CO2 [K_2]

1.Loss of heat-sensitive nutrients

2. Increased risk of contamination

3.Changes in texture and flavor

4.Reduced energy consumption

a) 1,3 b) 1,4

c) 1,2 d) 2,3

4. Evaporation in the dairy industry is important for --------- CO2 [K_2]

a) Enhancing the color of the milk b) Increasing the milk solids concentration

c) Removing solid impurities d) Reducing the microbial load

5. Assertion (A): Tunnel dryers are suitable for batch drying of large quantities of food CO3 [K_3]

Reason (R): Tunnel dryers use a conveyor system to move food through a heated tunnel, allowing for continuous and uniform drying.

a) Both A and R are Individually true and R is the correct explanation of A

b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false d) A is false but R is true

6. Maillard reaction in the process of roasting causes ----------effects on foods. CO3 [K_2]

a) A process that makes food more acidic

b) A method of preserving food

c) A technique for reducing fat content

d) A chemical reaction that causes browning and flavor development.

7. Arrange the following statements in the correct order for modified atmosphere packaging (MAP) of any food: CO4 [K_2]

1. Filling the package with the food product
2. Sealing the package
3. Flushing the package with a gas mixture
4. Storing the package at low temperature

a) 2-3-4-1 b) 1-3-2-4

c) 3-4-2-1 d) 4-1-3-2

8. What is the main challenge associated with freeze concentration? CO4 [K_2]

a) High energy consumption
b) Difficulty in removing ice crystals
c) Long processing time
d) Loss of nutritional value

9. Assertion (A): Enrobing is only used for sweet products like chocolates and pastries. CO5 [K_3]
Reason (R): Enrobing involves covering food items with a layer of chocolate or icing, which is typically used for sweet products.
a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

10. Which of the following is a key advantage of using PET for food packaging? CO6 [K_2]
a) Low cost
b) Biodegradability
c) High resistance to heat
d) Excellent barrier properties against gases and moisture

Answer any TEN Questions:-

PART B (10 x 4 = 40 Marks)

(Answer not more than 80 words)

11. Illustrate the equipment which uses centrifugal force to separate particles from an air CO1 [K_2]
12. Enlist the applications of flame peeling and add a note on its. CO1 [K_2]
13. Compare the different methods of blanching and their applications. CO2 [K_2]
14. Analyze the impact of pasteurization on the nutritional content of foods. CO2 [K_3]
15. Recall the principles and benefits of freeze drying for food preservation. CO3 [K_1]
16. Spell the **applications of osmotic dehydration?** CO3 [K_2]
17. Compare and contrast chilling with freezing as methods of food preservation. CO4 [K_2]
18. Recall the advantages of using a blast freezer in the food industry? CO4 [K_2]
19. List the types of materials commonly used for edible coatings. CO5 [K_1]
20. Relate the materials of a retort pouch with its application. CO6 [K_3]
21. Analyze the effectiveness of water spray washing in removing contaminants from fresh produce. CO1 [K_3]
22. Examine the benefits of extrusion cooking in terms of product quality and processing efficiency. CO2 [K_2]

Answer any FIVE Questions:-

PART C (5 x 10 = 50 Marks)

(Answer not more than 250 words)

23.	a)	Illustrate the construction and working of a magnetic separator with a neat diagram.	6	CO1	[K_2]
	b)	Explain the difference between grading and sorting of foods.	4	CO1	[K_2]
24.	a)	Summarize in-container sterilization of foods for a product of your interest with a neat flowchart.	6	CO2	[K_2]
	b)	Outline the steps involved in milk pasteurization process.	4	CO2	[K_2]
25.	a)	Outline the process involved in freezing of any food product of your interest.	6	CO4	[K_2]
	b)	Enumerate the applications of cryogenic freezers in food industry.	4	CO4	[K_1]
26.	a)	Recall the principle and working of a spray dryer.	6	CO3	[K_2]
	b)	Summarize the steps involved in osmotic dehydration of any food product.	4	CO3	[K_2]
27.	a)	List the applications of edible coating of fruits and vegetables.	4	CO5	[K_1]
	b)	Explain on any three methods of coating foods.	6	CO5	[K_2]
28.	a)	Summarize on various methods of modified atmosphere packaging of foods and their advantages.	4	CO6	[K_2]
	b)	With an neat illustration explain the working of form-fill-seal machine.	6	CO6	[K_2]

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