



**B.TECH DEGREE EXAMINATIONS: MAY 2018**

(Regulation 2015)

Fourth Semester

**BIOTECHNOLOGY**

U15BTT403: Food Process Engineering

**COURSE OUTCOMES**

- CO1:** Explain the scope of food processing  
**CO2:** Discuss various pre-cleaning techniques in food processing  
**CO3:** Describe different types of high temperature processing operations  
**CO4:** Explain different drying and dehydration techniques  
**CO5:** Discuss low temperature processing and preservation  
**CO6:** Describe various post processing operations

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-  
PART A (10 x 1 = 10 Marks)**

1. Match the following

CO1 [K<sub>2</sub>]

List I	List II
A. Flash steam peeling	i. Low energy and capital cost
B. Knife peeling	ii. $1500 \times 10^3$ Pa
C. Abrasion peeling	iii. 100 – 120 °C
D. Flame peeling	iv. Suitable for Citrus fruits

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

2. Cyclone separator is separating equipment based on

CO2 [K<sub>1</sub>]

- |                              |                         |
|------------------------------|-------------------------|
| a) Particle size             | b) Particle shape       |
| c) Particle size and density | d) Aerodynamic behavior |

3. During blanching the extent of vitamin loss depends on a number of factors such as CO3 [K<sub>3</sub>]
1. The maturity of the food and variety
  2. Salt concentration of the food
  3. The surface-area-to-volume ratio of the pieces of food
  4. Method of heating
- a) 1,3 b) 1,4  
c) 1,2 d) 2,3
4. Which one of the following extruder is used to form the shape of a product? CO3 [K<sub>2</sub>]
- a) Piston extruder b) Roller type extruder  
c) Screw extruder d) Twin screw extruder
5. Assertion (A): Drying preserves food by removing moisture from them. This stops microbial growth and prevents spoilage. CO4 [K<sub>3</sub>]  
Reason (R): It is important to remember that drying does not improve the quality of a food product. For this reason, only fully-ripened produce should be used for 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. Which one of the following dryer provides a large surface area for heat and mass transfer by atomizing the liquid to small droplets? CO4 [K<sub>2</sub>]
- a) Spray dryer b) Drum dryer  
c) Freeze dryer d) Microwave dryer
7. Find the sequence of frying process CO4 [K<sub>3</sub>]
1. Initial heating
  2. Surface boiling
  3. Bubble end point
  4. Falling rate
- a) 2-3-4-1 b) 1-2-4-3  
c) 3-4-2-1 d) 4-1-3-2
8. Which one of the following factor is not affecting the rate of freezing? CO5 [K<sub>2</sub>]
- a) Temperature b) Airflow  
c) Package size d) Particles shape

9. Assertion (A): In MAS, the store is made airtight, and respiratory activity of fresh foods is allowed to change the atmosphere as oxygen is used up and CO<sub>2</sub> is produced. CO5 [K<sub>3</sub>]

Reason (R): The low levels of oxygen, or high levels of carbon dioxide, which are needed to inhibit bacteria or fungi, are harmful to many foods.

- 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. .... is commonly used for liquids, pastes, powders and particulate foods. CO6 [K<sub>2</sub>]

- a) Gravity filler      b) Pressure filler  
c) Vaccum filler      d) Volumetric filler

**PART B (10 x 2 = 20 Marks)**  
**(Answer not more than 40 words)**

11. Define food process engineering and mention its scope. CO1 [K<sub>1</sub>]  
12. Write the working mechanism of air screen cleaner. CO2 [K<sub>3</sub>]  
13. Distinguish specific gravity separator from spiral separator. CO2 [K<sub>4</sub>]  
14. What are the factors that influence blanching? CO3 [K<sub>2</sub>]  
15. List the salient features of multiple effect evaporation. CO3 [K<sub>2</sub>]  
16. What are the advantages of drum dryer? CO4 [K<sub>2</sub>]  
17. Compare dehydration and rehydration. CO4 [K<sub>4</sub>]  
18. List out the advantages of freeze dried food. CO5 [K<sub>2</sub>]  
19. What do you mean by thawing? CO5 [K<sub>1</sub>]  
20. Why is coating done in food products? CO6 [K<sub>2</sub>]

**Answer any FIVE Questions:-**  
**PART C (5 x 14 = 70 Marks)**  
**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

21. Explain the unit operations of cleaning, sorting and grading for subsequent processing of food materials. CO1 [K<sub>2</sub>]  
22. There are methods used in food industry to improve the appearance of the final products of fruits and vegetables. Justify this statement with methods in detail. CO2 [K<sub>4</sub>]

- |  |     |                   |
|--|-----|-------------------|
| 23. Describe the extrusion process and different types of extruder that are used in food industry.   | CO3 | [K <sub>2</sub> ] |
| 24. Explain any three types of dryers with neat sketch and their advantages.   | CO4 | [K <sub>2</sub> ] |
| 25. Baking uses heated air to alter the eating quality of food and applied to flour-based foods or fruits. Justify the above statement in detail with neat sketch. | CO4 | [K <sub>4</sub> ] |
| 26. Write a detailed note on controlled atmospheric and modified atmospheric storage to extend shelf- life of a food product.                                      | CO5 | [K <sub>3</sub> ] |
| 27. Discuss the filling and sealing of food products during the packaging system.  | CO6 | [K <sub>2</sub> ] |

\*\*\*\*\*