

Degree: B. Tech (AgFE) & Dual Degree
Subject: AG31006 Food Science & Technology
Number of students: 68

Date: 17-04-2023 (AN)
Time: 3 Hrs
Marks: 50

Note : Answer Part A & Part B separately in the same answer script.

Part - A

Q1 (a) How do ionizing radiations stabilize food?

The D_{10} for *Salmonella* in egg yolk is 0.8 kGy. Calculate the radiation dose (kGy) needed to reduce the *Salmonella* count in egg yolk by 6 log cycles. [1+2 = 3]

(b) What is the penetration depth (m) of microwave emitted at frequency of 2450 MHz in raw potatoes which has loss factor 15 and dielectric constant 64? The speed of the wave may be taken as 2.99×10^8 m/s. [3]

Q3 (a) Discuss (i) Process principle, (ii) Pressure generation systems, and (iii) Pressure shift freezing with respect to high pressure processing of foods. [1+1+1 = 3]

(b) What is chocolate liquor? With the help of a process flow diagram discuss the technology of chocolate manufacturing. [1+2 = 3]

Q4. Giving specific examples discuss mechanism/working principle of following. [1.5x4 = 6]

- a) Microwave & Radio-frequency heating
- b) Ultrafiltration & Reverse Osmosis
- c) Roasting and Grinding of coffee beans
- d) Withering & Fermentation of tea leaves

Q4. With suitable schematic diagram, write principle on which the following food processes work. Also discuss, with examples, potential areas of their application. [3x2.5 = 7]

- (a) Aseptic processing & packaging,
- (b) Texturization of plant proteins
- (c) Baking technology

Part - B

Q5. Match the following

5 (A)

- | | |
|--------------------------|------------------------------------|
| a) Ptyalin of the saliva | 1) sugar fermenting enzyme |
| b) pepsin in the stomach | 2) fat-splitting enzyme |
| c) Galactase | 3) ripening of cheese |
| d) Lipase | 4) breaking down of the proteins |
| e) Catalase | 5) effectiveness of pasteurization |
| f) Reductase | 6) oxidizing enzyme |
| g) Lactase | 7) Starch forming maltose |
| h) Diastase | 8) oxidizing enzyme |
| i) Peroxidase | 9) starch-splitting |
| j) Phosphatase | 10) reducing enzyme |

$0.25 \times 10 = [2.5]$

5 (B)

$$0.25 \times 10 = [2.5]$$

79,340,481, , , 5

$$\lambda = \frac{\mu_0}{20\sqrt{6745}}$$

Column I

- a) Milk, vegetable juice 7.
- b) Fruit juice concentrates 9
- c) Vegetables 3
- d) Juices 10
- e) Meat products, coffee 4
- f) Milk, whole egg, egg yolk 8
- g) Fruits and vegetables 1
- h) Apples 6
- i) Fruits and vegetables 8
- j) Some meat products 5

Column II

- 1) Cabinet drier 1
- 2) Tunnel drier 2
- 3) Fluidized drier 3
- 4) Freeze drier
- 5) Rotary drier
- 6) Kiln drier
- 7) Drum drier
- 8) Spray drier
- 9) Vacuum drier
- 10) Foam mat drier

Q6 (A) Explain what are the defects of drying [2.5]
(B) Explain PEARSON SQUARE METHOD

[2.5]

[2.5]

Q7. Fill in the blanks

$$0.5 \times 20 = [10]$$

freezedrying

Mycoplasmic

- a) Grape juice and tomato juice are concentrated using -----.
- b) ----- contain a low concentration of solute relative to another solution. Mycoplasmic
- c) Largest commercial use of ----- is in the dairy industry for recovery of proteins from cheese whey and for pre-concentration of milk for cheese making. Rennet.
- d) Feeds as green grass, green alfa-alfa hay, green silage etc. are rich in ----- Olein.
- e) A yellowish green tint into the whey is due to the presence of ----- Carotene.
- f) Phospholipid present in milk is -----.
- g) 1g of lactose on bacterial decomposition forms ----- g of lactic acid.
- h) ----- resembles but not identical with blood albumin.
- i) ----- is used as spreader over foliage (horticultural work) to spread and adhere better.
- j) Grass pasture increases ----- content.
- k) Hardness or softness of milk fat and their relation to the texture of butter depend on the ----- group of fatty acid, which constitute 82.7% of milk fat.
- l) Milk with added acid -----.
- m) Dry milk contains a very high percentage of lactose, approximately ----- %.
- n) Highly concentrated viscous solution is known as lactose -----.
- o) Milk ash contains ----- in relatively large amounts.
- p) Fishy flavour of butter, a common defect is due to the decomposition of -----.
- q) Milk produced by an animal immediately after parturition and for the following three to ten milking is termed as -----.
- r) In milk, particles from 0.0001 to 0.000001 mm is known as -----.
- s) For several week storage of milk, size of the fat globules has to be less than equal to -----.
- t) For two stage homogenization, pressure of the second stage in psig is -----.

Q8. Explain merits and demerits of constituents of ice cream. OR
Discuss about cheddar cheese.

[5]

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