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M.Tech. Food Technology
End-Sem Examination (2023)-Semester II
Paper Title: Dairy Technology and Engineering
Paper Code: MFTC- 204

Roll no. _____

Time: 3 hours

Max Marks: 60

Section A (1x10=10 marks)

(All the questions are compulsory for Section A; given below are multiple choice questions; 1 mark for each question)

1. For liquid milk and milk products with fat percentage $> 6\%$, two-stage homogenization is needed with:
 - a) 2000 psi at the 1st stage and 500 psi at the 2nd stage
 - b) 1000 psi at the 1st stage and 500 psi at the 2nd stage
 - c) 3000 psi at the 1st stage and 1000 psi at the 2nd stage
 - d) 2000 psi at the 1st stage and 1000 psi at the 2nd stage
2. For the manufacture of yoghurt, the two bacteria used as starter culture are:
 - a) *Lactobacillus delbreckii* subsp. *bulgaricus* and *Streptococcus thermophilus*
 - b) *Lactobacillus casei* and *Lactococcus lactis*
 - c) *Lactococcus lactis* and *Streptococcus thermophilus*
 - d) *Lactobacillus acidophilus* and *Lactobacillus helveticus*
3. In which method of ghee manufacture, highest energy is required?
 - a) Indigenous (Desi)
 - b) Direct Cream
 - c) Creamery
 - d) Pre-stratification
4. In case of aluminium laminated cartons, the aluminium foil:
 - a) Provides liquid barrier
 - b) Provides mechanical strength
 - c) Enables the sealing process
 - d) Acts as a gas and light barrier
5. Major flavoring compound present in *Dahi* is:
 - a) Acetone
 - b) Acetaldehyde
 - c) Methylketones
 - d) Diacetyl
6. Maximum possible overrun in butter is:
 - a) 15%
 - b) 20%
 - c) 25%
 - d) 30%
7. The nozzle of pressure atomizers are made up of:
 - a) Chromium
 - b) Tungsten Carbide
 - c) Nickel
 - d) Steel
8. Curdy melt-down defect in ice-cream may be due to:
 - a) Excess protein
 - b) Excess fat
 - c) Excess sugar
 - d) Excess acidity
9. Pilot sterilization test is usually carried out before the manufacture of:
 - a) UHT milk
 - b) Sterilized milk
 - c) Sweetened condensed milk
 - d) Evaporated milk
10. Given 1200 kg of cream testing 50% fat, how much skimmed milk testing 0.1% fat must be added to obtain 40% fat in the standardized cream?
 - a) 280 kg
 - b) 200 kg
 - c) 300 kg
 - d) 250 kg

Section B (2x10=20 marks)

(Attempt any two questions from Section B; 10 marks for each question)

1. Discuss the significance of seeding and forced crystallization in condensed milk processing. Who gave the salt balance theory? State its postulates. Condensed milk contains 31 % total milk solids and 43.1 % added sugar. What is the sugar ratio?
2. Define Khoa as per FSSAI. Classify according to their fat/moisture content. Explain steps in continuous khoa making process. State the reasons for burnt and oxidized flavor in khoa and khoa based sweets.
3. What are the legal standards for spray dried milk? Define atomization. Enlist types of atomizers. Give a schematic representation of a spray drier with cyclone separator and its purpose.
4. Define: Pitching the curd, Striking the batch, and Cheddaring. What are the legal standards for cheese as per FSSAI? Mention permitted additives and their levels during cheese manufacture. Give a flow sheet for the manufacture of cottage cheese.

Section C (5x6=30 marks)

(Attempt any one internal choice, i.e. either a) or b) from all the Questions 1, 2, 3, 4, and 5 of Section C; 6 marks for each question)

Ques 1 (a) Explain various cleaning agents and methods used in a dairy plant.

OR

(b) Explain platform tests performed in the laboratory to assess the quality of raw milk.

Ques 2 (a) Write FSSAI standards for full cream milk, toned milk and double toned milk. Define and state benefits of reconstituted and recombined milk.

OR

(b) Enlist the functions and examples of various stabilizers, emulsifiers and sweetening agents used in ice-cream preparation.

Ques 3 (a) When warm cream from the separator is held in a tightly sealed can, it often acquires a peculiar smothered musty flavor and odor which may follow it into the butter. Suggest causes and preventive measures.

OR

(b) State merits and demerits of metal butter churns. Why is neutralization required during butter manufacture?

Ques 4 (a) Explain the design of a homogenizer and state theories/principles for homogenization of milk.

OR

(b) Draw a line diagram for an HTST pasteurizer. Explain the working principle and applications of PHE.

Ques 5: (a) Differentiate between *chhana* and paneer. State processing of any one *chhana* based sweet along with associated defects.

OR

(b) Give a brief account on the process technology involved in manufacture of processed cheese. State two relevant defects and preventative measures.

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BTL, CO and PO mapping of the questions:

Section A	Mapping	Section B	Mapping	Section C	Mapping
1	BTL 2; CO2; PO4	1	BTL4; CO2; PO1,3	1 a)	BTL 2; CO2; PO1
2	BTL 1; CO3; PO3	2	BTL4; CO1; PO1,2,4	1 b)	BTL3; CO1; PO3
3	BTL 4; CO2; PO1	3	BTL4; CO1; PO1,4	2 a)	BTL3; CO1; PO1,4
4	BTL 1; CO1; PO5	4	BTL3; CO4; PO1,3,4	2 b)	BTL2; CO2; PO1,4
5	BTL 1; CO3; PO3			3 a)	BTL4; CO3; PO3,4
6	BTL 2; CO2; PO4			3 b)	BTL2; CO2; PO1,6
7	BTL 1; CO2; PO1			4 a)	BTL4; CO2; PO2,4
8	BTL 4; CO4; PO3			4 b)	BTL3; CO2; PO2,4
9	BTL 1; CO2; PO4			5 a)	BTL4; CO3; PO3,4
10	BTL 3; CO1; PO8			5 b)	BTL4; CO4; CO2,4