**BVFPS103T: LIQUID MILK PROCESSING TECHNOLOGY**

**UNIT-1:**

**Syllabus:**

Milk Production Management - Distinguishing characteristics of Indian and exotic breeds of dairy animals and their performance; feed resources for milk production and their nutritive values; structure and function of mammary system; milk secretion and milk let-down; milking procedure and practices for quality milk production (clean milk production)

**Questions:**

1. Write distinguishing characteristic of Indian cows and buffalos. (3)

2. Write feed sources for milk production and their nutritive value. (6)

3. Write structure and function of mammary system. (6)

4. How milk is secreted and laid down? (4)

5. Write different milking procedures. (5)

6. Write on clean milk production. (5)

**UNIT-2:**

**Syllabus:**

History and status of dairy in India, Annual milk production and per capita availability, Five year plans and dairy development, public sector milk supply schemes, co-operative dairy organizations, Anand pattern and perspectives, milk products manufacture in private sector, National Dairy Development Board - aim and objectives, Operation Flood, Dairy problems and policies. Contribution of VergheseKurien in Indian dairy.

**Questions:**

1. Write history and status of Indian dairy. (5)

2. Write annual milk production and per capita availability. (1+1)

3. Write on co-operative dairy organization. (3)

4. What is Anand pattern? Write it’s advantages. (3+2)

5. What are the objectives of NDDB? (3)

6. How operation flood conducted in India? (8)

7. Write contribution of Verghese Kurien in Indian dairy. (3)

**UNIT-3**

**Syllabus:**

Milk - Definition, Composition, factors affecting composition of milk, nutritive value, Physico-chemical properties of milk constituents, Physico-chemical properties of milk, microbiology of milk.

**Questions:**

1. Define milk. (2)
2. Write composition of cow milk and human milk. (1+1)
3. Which factors effect composition of milk. (5)
4. Write composition of jersey cow milk. (1)
5. Write energy value of milk fat, milk protein and milk sugar. (1.5)
6. What is the calorific value of cow milk and buffalo milk? (1)
7. One molecule of beta carotene yields \_\_ molecule of vitamin A, where alpha carotene yields only \_\_\_. (1)
8. What is the carotenoid content of buffalo milk and cow milk? (1)
9. What is the reason of green color of whey? (1)
10. Write the acidity of cow and buffalo milk. (1)
11. What is natural or apparent acidity? (1)
12. What is developed or real acidity? (1)
13. Write pH of cow and buffalo milk. (1)
14. Write the formula to find out TS/SNF in milk. (1)
15. What is the freezing point of cow and buffalo milk? (1)
16. Which factors effect to increase or decrease of milk? (2)
17. What are pathogenic bacteria? (1)
18. Write the size range of bacteria. (1)
19. What are spores? (2)
20. Write stages of growth of bacteria. (2)
21. Which factors influence growth of bacteria. (2)
22. Classify bacteria according to optimum growth temperature. (3)

Or, What is psychotropic , mesophilic and thermophilic bacteria? (3)

**UNIT-4**

**Syllabus:**

Importance of market milk, Collection and transportation of milk-Organization of milk collection routes, Practices for collection of milk, preservation at farm, refrigeration, natural microbial inhibitors, lactoperoxidase system., Adulterations in milk and its detection, processing, packaging and storage. UHT sterilization, Aseptic packaging, Judging and grading of milk, Flavour defects in milk, their causes and prevention, Effect of thermal treatment on milk constituents.

**Questions:**

1. Why market milk is needed? [3]
2. Write standard of PFA-
3. Full cream milk,
4. Cow milk,
5. Goat milk,
6. Sheep milk,
7. Standardized milk,
8. Recombined milk,
9. Reconstituted milk or Rehydrated milk,
10. Toned milk,
11. DTM,
12. Skim milk. [ 1×10]

**3.** On which basis payment for milk selling is done?[2]

**4.** What are the common systems for milk collections? [3]

**5.** Write short note on milk centre. [3]

OR/ List out major equipments in milk chilling centre. [2]

**6.** Write different methods for milk cooling system. [4]

1. Write modes of milk transportation in India. [3]
2. Write the Cr and Ni percentage 18:8 stainless-steel. [3]
3. Write on the following-
4. Filtration[3],
5. Clarification[3],
6. Pasteurization[5],
7. FCPT[2],
8. PBVV[2],
9. Regeneration in Pasteurization[2].
10. What are platform tests in milk reception doc? [3]
11. Write flow diagram for market milk preparation. [3]
12. Write advantages of filtration. [2]
13. What is bactofugation? [2]
14. How many kg each of 28% cream and 3% milk will be required to make 500 kg of mixture testing 4% fat? [3]
15. Write objects (purpose) and objections of pasteurization. [2+3]
16. Write index micro-organism for pasteurization .[1]
17. Which enzyme test is used to detect pasteurization?[1]
18. Write advantages of HTST pasteurization.[3]
19. Write pressures maintain for pasteurized milk, raw milk, heating –cooling medium. [3]
20. What is UHT- sterilization? [2]
21. Write procedure for direct and indirect UHT treatment with diagram. [8+8]
22. Why aseptic homogenizer is required in direct UHT treatment?[2]
23. Differentiate injection and infusion method of UHT sterilization. [3]
24. Describe aseptic packaging with flow diagram.[4+3]
25. Write relative advantages and disadvantages of paper/film packaging of milk over bottling. [2+2]
26. Write causes and prevention of following defects-Barny, Bitter, Cooked, Feed, Foreign, Heat-acid/ sour, malty, Rancid, (Oxidized, Oily, Metallic, Tallow), Salty, Weed. [ (1+1)×11]
27. Write lacto-peroxide system for raw milk preservation? [3]
28. How judging and grading of milk is done? [3]
29. What are the adulterants in milk? How they can be detected? [2+8]

**UNIT-5**

**Syllabus:**

Special milk: manufacture, packaging, storage of sterilized milk, homogenized milk, soft-curd milk, flavoured milk, vitaminized milk, frozen concentrated milk, fermented milk (natural butter milk, cultured butter milk, acidophilus milk, bulgarian butter milk, Kumiss, Kefir, yoghurt), standardized milk, reconstituted milk, recombined milk, toned milk, double tonned milk, humanized milk, filled milk, imitation milk, vegetable tonned milk, soya milk

**Questions:**

1. What are the advantages and disadvantages of sterilized milk? (2)
2. What is the shelf pack of sterilized milk? (1)
3. Write flow diagram of sterilized milk manufacture. (2)
4. Which test done for to detected milk sterilization? (1)
5. Write merits and demerits of homogenized milk. (1)
6. By homogenization milk fat globule are sub-divided to \_\_\_\_\_\_microns or less diameter. (1)
7. Describe homogenizer with diagram. (3+2)
8. What is viscolizer? (1)
9. What is clarifixator? (1)
10. What is soft curd milk? (2)
11. What are the purpose of flavoured milk? (1)
12. Write flow diagram for manufacture of chocolate milk /drink, fruit flavoured milk/drink, sterilize flavoured milk. (3)
13. What is the cocoa powder percentage in cocholate milk for drink? **(**1)
14. What is mother starter/culture and bulk starter/culture? (2)
15. Write flow diagram of buttermilk manufacture. (3)
16. Write flow diagram of acidophilus milk manufacture. (3)
17. Write short note on Bulgarian buttermilk**,** Kumiss, Kafir. (2)
18. What are the flavour of dahi and Yoghurt? (2)
19. Write microorganisms present in yoghurt. (2)
20. Write difference between dahi and yoghurt. (3)
21. Write flow diagram of yoghurt manufacture. (3)

**UNIT-6**

**Syllabus:**

Liquid milk collection, processing, packaging and storage systems and equipment - bulk milk coolers, milk chilling units, milk reception equipment, milk tanks/silos, centrifuges, clarifiers, filtration units, cream separator, homogenizers, pasteurizers, sterilizers, packaging and filling machines

**Questions:**

1. Write a short note on milk tank or silos (RMST, PMST) [3]
2. Describe the operating process of –
   1. Clarifiers [3]
   2. Homogenizers [3]
   3. Pasteurizers [5]
   4. Milk pouch packing mechine [5]
   5. Bottle filling machine [3]
3. What is the milk cooler?[3]
4. Describe the beneficiaries of bulk milk cooler.[4]
5. In which temperature milk is cooled? [1]
6. Why milk is cooled at 4°C? [2]
7. Write the difference between cooling and chilling of milk. [4]
8. which equipment are used for reception of milk? [3]
9. What is Gerber centrifuge?[2]
10. What is the principle of clarifiers?[3]
11. What is the speed of clarifier? [2]
12. Write the merits and demerits of filtration. [4]
13. What is the object of filtration?[2]
14. Write the principle of cream separator. [2]
15. How cream is removed from whole milk in cream separator? [2]

**UNIT-7**

**Syllabus:**

Cleaning and sanitization of dairy equipments, CIP units, etc.; Hygienic design concepts, sanitary pipes and fittings, corrosion process and their control.

**Questions:**

1. Write difference between cleaning and sanitization? (2)

2. What is milk soil? (2)

3. What is milk stone? (2)

4. Write desirable properties of detergent. (3)

5. Classify dairy detergent. (4)

6. How hand washing of dairy equipment is done in organized dairy? (3)

7. Write mechanical washing for cane or bottle washing? (3)

8. What is CIP? Write its merits. (1+2)

9. Write types of CIP system? (2)

10. Write process for CIP of HTST pasteurizer, milk storage tank? (3+3)

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