

**MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR**  
**SEMESTER END THEORY EXAMINATION, B. Tech. (DT)**

Semester	: V (V Dean)	Academic Year	: 2024-2025
Course No.	: DT-507	Course Title	: By-Products Technology
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Thursday, 24/04/2025	Time	: 2.00 hrs.

- Note :**
- 1) All questions from **Section 'A'** are compulsory.
  - 2) Solve **Any Three** questions from **Section 'B'**.
  - 3) Draw a neat and well-labeled diagrams wherever necessary.

**SECTION – 'A'**

- Q. 1 A) Define the following. (05)
- i) Reverse Osmosis
  - ii) Ultrafiltration
  - iii) Ghee residue
  - iv) Edible casein
  - v) Co-precipitate
- B) Answer in one line. (05)
- i) What is byproduct?
  - ii) During casein production, why pH of wash water should be about 4.6 for the first two washings?
  - iii) Name the process used for clarification of whey.
  - iv) Specify the utilization of co-precipitates.
  - v) What are the various grades of lactose?
- Q. 2 A) Give the reasons for the following. (05)
- i) Fresh acid casein curd is preferred over dried casein during the production of caseinates.
  - ii) Unfermented whey is preferred for manufacturing lactose.
  - iii) WPC-34 is commonly used as a stabilizer in yoghurt, bakery mixes, and confections.
  - iv) The edible rennet casein is used in the production of processed cheese.
  - v) Sodium caseinate is used in ice cream substitutes and other frozen desserts.
- B) Choose the most appropriate answer from the options given below. (05)
- i) The iso-electric point of casein is .....
    - a) 5.1
    - b) 5.3
    - c) 5.6
    - d) None of these
  - ii) Demineralization of whey can be done by .....
    - a) Ultrafiltration
    - b) Microfiltration
    - c) Electrodialysis
    - d) All of these
  - iii) As compared to skim milk, buttermilk is a rich source of .....
    - a) Lactose
    - b) Protein
    - c) Phospholipids
    - d) All of these

(P.T.O.)



- iv) The average yield of ghee residue in the direct creamery method is ..... percent.
- |        |         |
|--------|---------|
| a) 3.7 | b) 4.8  |
| c) 7.9 | d) 12.0 |
- v) Rivella is prepared from .....
- |                 |               |
|-----------------|---------------|
| a) Whey         | b) Skim milk  |
| c) Ghee residue | d) Buttermilk |

**SECTION - 'B'**

- Q. 3 A) How membrane technology can be explored for improved whey utilization? (05)  
B) Discuss manufacture of refined lactose. (05)
- Q. 4 A) With the help of a flow diagram explain the process of sodium caseinate. (05)  
B) Discuss the Enzymatic hydrolysis of casein in brief. (05)
- Q. 5 A) State the classification and specification of various types of co-precipitates concerning calcium content as per Muller and Kozhev *et al.* (03)  
B) Write a short note on nutritional characteristics of ghee residue and buttermilk. (03)  
C) Summarize various functional properties of whey protein concentrate in detail. (04)
- Q. 6 A) How demineralized whey is manufactured? (03)  
B) Explain the protocol for the preparation of whey-based fermented beverages. (03)  
C) Write a short note on. (04)  
1. Vistec process  
2. Spherosil process
- Q. 7 Write down the manufacturing process of acid casein. Draw its flow chart with all specifications including FSSAI standards and discuss its application. (10)

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