

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, *B.Tech. Dairy Technology* 2018-19

Semester	: IV (V Dean)	Academic Year	: 2018-2019
Course No.	: DE-410	Course Title	: Dairy Process Engineering
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Tuesday, 25.06.2019	Time	: 15.00 to 17.00 Hrs.

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

SECTION –‘A’

Q.1 A) Choose the most appropriate answer from the options given below. (05)

- i) Reverse osmosis is used for
 - a) Sublimation
 - b) Fractionation
 - c) Concentration
 - d) None of these
- ii) The feeding arrangement in twin roller drier in which feed is supplied at top of roller is known as
 - a) Nip feeding
 - b) Trough feeding
 - c) Splash feeding
 - d) None of these
- iii) In case of membrane processing the most common membrane material used is.....
 - a) Cellulose
 - b) Cellulose acetate
 - c) Zirconium oxide
 - d) Synthetic polymers
- iv) Water activity (a_w) of evaporated milk is.....
 - a) 0.80
 - b) 0.92
 - c) 0.98
 - d) 1.0
- v) The falling film evaporator offers gentle heat treatment due to
 - a) Single pass operation
 - b) Short holding time
 - c) Lower temperature
 - d) All of these

B) State the function of following (05)

- i) Fluidized bed dryer
- ii) TVR
- iii) MVR
- iv) Multiple effect evaporator
- v) Reverse osmosis

Q.2 A) Define the following (05)

- i) Steam economy of an evaporator
- ii) Atomization
- iii) Critical moisture content
- iv) Agglomeration
- v) Flux

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- Drum drying is one of the best methods for drying of food materials.
 - Air is heated to about 150 to 250°C for drying of milk products.
 - A pump that takes suction at lower pressure below atmospheric and discharges against atmospheric pressure is called vacuum pump.
 - Nozzles are made of hardened Stainless steel or Tungsten carbide.
 - To obtain maximum capacity from drum dryer, it is desirable to use concentrated products.

SECTION –‘B’

- Q. 3 A) Discuss the feeding arrangements in multiple effect evaporator with neat sketches. (05)
- B) What do you mean by spray drying? Explain the working of single stage spray dryer with neat sketch. (05)
- Q. 4. A) Distinguish between fluidized bed drying and spray drying. (05)
- B) Explain double effect falling film evaporator with neat and clean diagram. (05)
- Q. 5 A) Explain evaporation mechanism inside a spray dryer with a diagram. (03)
- B) Write down the difference between TVR and MVR. (03)
- C) Enlist the different types of atomizer and explain any two with neat diagram. (04)
- Q. 6 A) What are the various types of equipment used in manufacture of indigenous dairy products? (03)
- B) What is climbing film evaporator? Discuss the importance of falling film evaporator on climbing film evaporator in dairy industry. (03)
- C) Explain Osmosis and reverse osmosis process with suitable examples. (04)
- Q. 7 A triple effect evaporator uses steam to the first effect at 111°C; the boiling point of liquid in the last effect is 55°C. The overall co-efficient, in kcal/h-m²°C, are 2800 in the first effect, 1900 in the second effect and 900 in the third effect. At what temperature will the liquid boil in the first and second effect? Each effect is having same area. (10)
