

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

Semester	: III (V Dean)	Academic Year	: 2023-2024
Course No.	: DE-309	Course Title	: Dairy Engineering
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Thursday, 09/05/2024	Time	: 2.00 hrs.

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

SECTION - 'A'

- Q. 1 A) Define the following. (05)
- Sanitation
 - Aseptic Packaging
 - Skimming efficiency
 - Cavitation
 - Fouling
- B) State the scientific reason for the following. (05)
- Homogenizer pressure gauge is filled with glycerin.
 - In HTST pasteurizer, the pressure in milk line is higher than the pressure in water line.
 - AISI-304 SS is not recommended for inside surface of the tank.
 - Centripetal pumps are fitted in semi-open cream separator.
 - During membrane filtration process, the flux decreases with time.
- Q. 2 A) State whether True or False. If false, rewrite the statement after making necessary corrections in the underlined word. (05)
- Homogenizer valve is made up of stellite material.
 - The plates of HTST pasteurizer are made of cast iron.
 - Bactofugation is non-thermal process.
 - Vertical tanks require more floor space than horizontal tank.
 - Pressure difference plays important role in centrifugal separation
- B) Choose the most appropriate answer from the options given below. (05)
- The pump is used for transport of cream from cream tank to churn for butter making
 - centrifugal
 - peristaltic
 - screw
 - diaphragm
 - Road milk tanker is
 - jacketed
 - jacketed and insulated
 - insulated
 - none of these
 - The is more dominant in mechanical cleaning of soiled surface.
 - tensile force
 - compact force
 - shear force
 - none of these

(P.T.O.)

- iv) The angle of inclination of the disc to the horizontal in disc bowl centrifuges is
- | | |
|-------------|--------------|
| a) 5 to 10° | b) 10 to 15 |
| c) 20-25° | d) 45 to 60° |
- v) The number is related to pressure differences during the process of homogenization
- | | |
|------------|------------|
| a) Nusselt | b) Thoma |
| c) Peclet | d) Stanton |

SECTION – 'B'

- Q. 3 A) Explain flow passages of milk, hot and cold water in a HTST milk pasteurizer. (05)
B) A HTST milk pasteurizer processes 26000 LPH of milk with regeneration efficiency of 96% for heating and 86% for cooling. Calculate the amount of heating and cooling energy required in heating and chilling section, respectively. consider raw milk temperature as 6°C, pasteurization temperature as 73°C, final chilled milk temperature as 4.6°C, density of milk as 1030 kg/m³ and specific heat of milk as 3.89 kJ/kg°C. (05)
- Q. 4 A) With neat sketch describe the working of homogenizer valve. (05)
B) Describe the construction and working principle of self-deslugging centrifuge. (05)
- Q. 5 A) Calculate the power consumption of a homogenizer having capacity 10,000 LPH, operated at 250 bar pressure. (03)
B) How regeneration conserves energy in HTST pasteurizer? (03)
C) Explain the construction and working of Flow Diversion Valve in pasteurizer. (04)
- Q. 6 A) Describe different types of stirrers, paddles and agitators. (03)
B) Explain the sequence of operation in automatic pouch filling machine. (03)
C) With neat sketch explain the time temperature relationship during direct heating in milk sterilization process. (04)
- Q. 7 Explain in detail the materials and sanitary features of dairy equipment. (10)
