

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B. Tech. Dairy Technology 2019-20

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| Semester : III (V Dean) | Academic Year : 2019-2020 |
| Course No. : DE- 309 | Course Title : Dairy Engineering |
| Credits : 2+1=3 | Total Marks : 50 |
| Day & Date : Monday, 13.01.2020 | 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 labelled diagram wherever necessary.

SECTION - 'A'

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

- i) The AISI 304 and AISI 316 are types of steel.
 - a) Ferritic
 - b) Austenitic
 - c) Ferritic-martensitic
 - d) Ferritic-austenitic
- ii) Material among the following that has higher temperature resistance
 - a) PVC
 - b) Polystyrene
 - c) Polyethene
 - d) PTFE
- iii) The slope of the floor in Vertical Storage Tank is about
 - a) 1:10
 - b) 1:25
 - c) 1:50
 - d) 1:100
- iv) The velocity in the narrowest slit in a Homogenizer valve can be
 - a) 100 to 200 m/s
 - b) 2500 to 3000 m/s
 - c) 2.5 to 3.0 m/s
 - d) 25 to 30 m/s
- v) The flow pattern of flow and passes of 4 x 2/ 2x4 is preferred in a HTST
 - a) Regeneration section
 - b) Heating Section
 - c) Heating with direct steam
 - d) None of these

B) Define the following (05)

- i) Stainless Steel
- ii) Triprocess machine
- iii) UHT processing
- iv) Mixing
- v) Regeneration efficiency

Q. 2 A) Give the formulae for the following. (05)

- i) Stoke's law for gravitational separation
- ii) Time taken for heating in Batch pasteurization
- iii) LMTD
- iv) Temperature rise in homogenization
- v) Reynolds' Number

(P.T.O.)

- B) State whether the following statement are True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) In a Self- desludging cream separator, the upper bowl moves to open the vents to eject the sludge.
 - ii) The objective for second stage of the homogenizer is further sub division of fat globules.
 - iii) Typical time – temperature combinations for in-container sterilization processes are 135 – 150 ° C.
 - iv) Dye penetration test is to test the welding efficiency.
 - v) The operative pressures in UHT plant is 3 to 4 bar.

SECTION – 'B'

- Q. 3. A) Write about the composition and properties of AISI 304 and AISI 316 stainless steel and their usage in dairy industry. (05)
- B) Write down the sanitary features of dairy equipment. (05)
- Q. 4. A) Find the capacity of the Cream separator, for the data given: (05)
- No. of discs : 105; Disc angle: 55 ° ; Outer radius $R_0=0.13$ m;
Inner radius $R_n = 0.075$ m; Limiting dia of fat globule, $d= 1.6$ μ m
Number of revolutions, n : 100/s ; Density difference of milk and fat globules, $\Delta\rho= 116$ kg/ cu.m; Absolute viscosity, η : 1.04×10^{-3} Pa.S.
Correction factor, C : 0.6 Make suitable assumptions if necessary.
- B) Explain the drive mechanisms of Hermetic and Self- desludging cream separators. (05)
- Q. 5. A) Explain with help of drawing, the flows and passes in a HTST pasteurizer. (03)
- B) Write a short note on gasket material and gasket arrangement in HTST pasteurizer. (03)
- C) Discuss the controls in HTST pasteurizer. (04)
- Q. 6. A) Enlist the various methods of sterilization. (03)
- B) Methods for prevention of vortex formation during agitation. (03)
- C) CIP system controls. (04)
- Q. 7. A) With the help of neat and well labeled diagram explain the direct sterilization by steam injection. (05)
- B) Write down design and constructional features of milk silo. (05)
