

PARUL UNIVERSITY
FACULTY OF AGRICULTURE
B.Tech. (Dairy Technology) Winter 2019-20 Examination

Semester: 3
Subject Code: 20104206
Subject Name: Dairy Engineering

Date: 02/12/2019
Time: 10.30 am To 12.30 pm
Total Marks : 50

- Note:**
1. All questions are compulsory.
 2. Figures to the right indicate full marks.
 3. Make suitable assumptions wherever necessary.
 4. Start answer of new question on new page.
 5. Use properties table/chart, if necessary.

Q.1 A) Fill in the blanks (Each of 0.5 Mark) (05)

- i) The full form of CIP is
- ii) Higher temperature (increases/decreases) the effectiveness of CIP
- iii) The average velocity of CIP solutions in the pipe circuits should be \geq
- iv) Commonly, AISI..... Grade of stainless steel is used for fabrication of dairy equipment.
- v) The average fat globule size in homogenized milk should be less than.....
- vi) The time-temperature combination for HTST milk pasteurization is
- vii) The UHT stands for
- viii) In olden days when the retail milk was packaged in bottles and the bottles were collected the next day, the bottle washing was done in
- xi) The full form of LTLT is
- x) In direct sterilization, the flash vessel is important to remove the steam

B) Choose the correct answer from the alternatives given (Each of 0.5 Mark) (10)

- i) As per the sanitary principles of dairy equipment, the following should be avoided in design of dairy equipment and pipelines
 - a. sharp corners
 - b. dead zones of velocity
 - c. U-turns
 - d. all of these
- ii) The velocity of cleaning solutions in the pipelines is
 - a. always more than that of milk
 - b. always less than that of milk
 - c. equal to that of milk
 - d. Equal to 1 m/s

- iii) Which of the following materials can be used for milk pipelines?
- copper
 - iron
 - stainless steel
 - none of these
- iv) Which are the types of can washers used in dairy industry?
- rotary can washer
 - straight through can washer
 - both a and b
 - none of these
- v) Cream separator works on the principle of difference of
- density
 - size
 - both a and b
 - none of these
- vi) Which of the following does not use centrifugal force in its operation ?
- Self-desludging cream separator
 - bactofuge
 - cyclone separator
 - none of these
- vii) The efficiency of cold separators is the efficiency of warm separator
- less than
 - equal to
 - more than
 - independent of
- viii) The gaskets used in dairy and food processing equipment can made of
- Nitrile rubber
 - Butyl rubber
 - Ethelene propylene
 - Any of the above
- ix) The online standardization systems in dairy industry use
- densitometer
 - calorimeter
 - conductivity meter
 - all of these

- x) For low temperature insulation such as in milk tanks,is used.
- Thermocol
 - PUF
 - Glass wool
 - Both a and b
- xi) Railway tankers are used for transportingquantity of milk overdistance.
- large, short
 - small, short
 - small, long
 - large, long
- xii) Which of the following tanks have jacket for circulation of cooling medium?
- Milk storage tank
 - Cream storage tank
 - Ghee settling tank
 - Both b and c
- xiii) The regeneration section in the HTST pasteurizer
- decreases the energy requirement in heating section
 - increases the energy requirement in chilling section
 - increases the energy requirement in heating section
 - increases the energy requirement in chilling section
- xiv) Sterilization is the process to destroy all the microorganisms i.e.....
- only vegetative cells
 - only spores
 - both vegetative cells and spores
 - none of these
- xv) Hydrolock sterilizers arethan hydrostatic sterilizers
- compact and cheaper
 - compact and costlier
 - larger and cheaper
 - larger and costlier
- xvi) The thickness of the plate of a PHE ranges frommm
- 0.05 to 0.1
 - 0.5 to 1.25
 - 1.5 to 2.5
 - 5 to 25
- xvii) In LTLT milk pasteurization, the milk is heated at
- 63 °C for 15 min

- b. 72°C for 15 min
- c. 63°C for 30 min
- d. 72°C for 30 sec

xviii) Which of the following is related to homogenization?

- a. Reynolds number
- b. Laplace number
- c. Weber number
- d. Mach number

xix) Which of the following is not a method of milk pasteurization?

- a. LTLT
- b. Bactofugation
- c. HTST
- d. Vacreation

xx) The most widely used type of dust collection equipment is the

- a. bag filter
- b. cyclone separator
- c. electrostatic precipitator
- d. wet scrubber

Q.2 A Define the following (Any five)

(05)

- | | |
|--------------------|-------------------------|
| (1) Sterilization | (5) Sanitization |
| (2) Homogenization | (6) Skimming efficiency |
| (3) Pasteurization | (7) Agitation |
| (4) Fouling | |

B Answer the following (Any five)

(05)

- (1) What is the rotational speed maintained in bactofuge?
- (2) Estimate the regeneration efficiency of a pasteurizer if the milk enters the regeneration section at 7°C and leaves at 72°C with pasteurization temperature set at 77°C.
- (3) State the function of flow diversion valve in milk pasteurization.
- (4) Why the air vessels are attached to the homogenizer?
- (5) What should be the material of construction for inner shell of milk tank?
- (6) Which types of pumps are preferred in milk lines?
- (7) What is the function of milk clarifier?

Q.3 Write short notes on the following (Any five)

(10)

- (1) Advantage of regeneration section in milk pasteurization

- (2) Efficiency of homogenization
- (3) Flow diversion valve
- (4) Milk pump
- (5) Advantages of bactofugation
- (6) Regeneration efficiency

Q.4 Answer the following in detail (Any three)

(15)

- (1) Explain the construction and working of cream separator.
- (2) Give a block diagram indicating milk flow through various sections of HTST milk pasteurizer.
- (3) Enlist different parts of homogenizer along with their functions.
- (4) Describe any one type of continuous sterilizer
- (5) What is the importance of hygiene in milk processing?