

**MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR**  
**SEMESTER END THEORY EXAMINATION, B. TECH. (D.T.) DEGREE COURSE 2018-19**

Semester	: III (V Dean)	Academic Year	: 2018-2019
Course No.	: DE-309	Course Title	: Dairy Engineering
Credits	: 2+1 3	Total Marks	: 50
Day & Date	: Saturday, 12/01/2019	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) Water requirement for straight through can washer per can is .....
  - a) 4.0-4.5 litres
  - b) 8.0- 8.5 litres
  - c) 10-10.2 litres
  - d) 2.0-2.2 litres
- ii) The PVC gaskets used in pipe fittings can withstand maximum temperature of .....°C.
  - a) 110
  - b) 80
  - c) 50
  - d) 100
- iii) HTST pasteurization involves heating of milk at .....temperature and for ..... time period.
  - a) 63°C for 30 minutes
  - b) 72°C for 15 seconds
  - c) 150°C for 1 second
  - d) None of these
- iv) Milk homogenizer reduces the mean diameter of fat globule by a factor of .....
  - a) 10
  - b) 20
  - c) 30
  - d) 40
- v) In case of cream separator, the angle of disc is .....°.
  - a) 20-25
  - b) 30-40
  - c) 45-60
  - d) 65-90

B) Define the following terms: (05)

- i) Sterilization
- ii) Sanitization
- iii) Bactofugation
- iv) Clarification
- v) Aseptic filling

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

- i) Vortex formation should be avoided during agitation.
- ii) Clarification should be done before bactofugation.
- iii) Glycol fluid is used in pressure gauge.
- iv) Under size piping should never be used in dairy industry.
- v) When nitric acid is used temperature should be raised above 80°C for water.

(P.T.O.)

- B) State whether True or False. If false, rewrite the statement after making necessary corrections. (05)
- i) Nitrile rubber can withstand temperature upto  $50^{\circ}\text{C}$ .
  - ii) Milk silos are horizontal tanks for milk storage.
  - iii) The purpose of second stage homogenization is to reduce the size of fat globules.
  - iv) Cyclone separators are used to separate milk powder particles from air.
  - v) Helical ribbon agitators are used for viscous products.

### SECTION - 'B'

- Q. 3. A) Explain about various fittings used in pipe system in dairy plant. (05)  
B) Discuss the process of Bactofugation. (05)
- Q. 4. A) Explain the working and constructional features of homogenizer. (05)  
B) Milk is pasteurized in HTST unit @ 15,000 kg per hour having counter flow. The raw milk temperature is  $5^{\circ}\text{C}$  and pasteurization temperature is  $73^{\circ}\text{C}$ . If the upstream regeneration efficiency is 92%. Calculate. (05)  
i) Heating load on heating section.  
ii) Heat transfer area in heating section, if  $U = 1200 \text{ W/m}^2\text{C}$  and hot water inlet and outlet temperature are  $80^{\circ}\text{C}$  and  $72^{\circ}\text{C}$  respectively.
- Q. 5. A) Explain the constructional difference between paddle, propeller and turbine agitator. (03)  
B) Define the principle of centrifugal separation. (03)  
C) Explain the construction of a cream separator along with a labeled diagram. (04)
- Q. 6. A) Discuss the direct milk sterilization process in brief. (03)  
B) What is CIP? Explain points to be considered in formation of a CIP circuit. (03)  
C) Explain CIP procedure followed in cleaning of tanks and pasteurizer. (04)
- Q. 7. Explain about steps in cleaning procedure of can washing. Explain difference in steps of manual can washing and mechanical can washing. Explain about points to be considered in maintenance of can washers. (10)

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