

Code No: 126DP**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, May - 2016****DAIRY AND FOOD ENGINEERING****(Agriculture Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b and c as sub questions.

PART - A (25 Marks)

- 1.a) Write the effect of pH on the milk quality. [2]
- b) Write about the status of dairy development in India. [3]
- c) Describe the procedure of quality evaluation of milk before processing. [2]
- d) Give in brief, the purpose/desirable objective of milk pasteurization. [3]
- e) Write the importance of emulsifier in butter manufacturing. [2]
- f) Give the principles of food preservation. [3]
- g) Discuss the hysteresis effect during drying. [2]
- h) What is Evaporation? Write their application in dairy engineering [3]
- i) What is reaction kinetics? Write their application in food engineering. [2]
- j) Write Mechanism of Ultra-filtration. [3]

PART - B (50Marks)

- 2.a) Explain the various types of coagulated milk products.
 - b) What is Rheology? Discuss various types of rheological models. [5+5]
- OR**
- 3.a) Discuss the procedure of ice cream manufacturing.
 - b) What is centrifugation? Explain their principles. [5+5]
- 4.a) Discuss the working procedure of LTLT pasteurization.
 - b) Explain the working principle and mode of operation of Vat. [5+5]
- OR**
- 5.a) Discuss the effect of high temperature on nutritive value of milk.
 - b) Discuss the UHT process of milk and their effect of milk quality. [5+5]
- 6.a) Discuss the causes of milk and milk product spoilage.
 - b) A bowl centrifuge is used to break the oil in water emulsion. Determine the radius of the neutral zone in order to position the feed pipe correctly. (Assume that density of the continuous phase is 1000kg/m^3 and density of oil is 870kg/m^3 . The outer radii from the centrifuge are 3.0 and 4.5 cm. [5+5]
- OR**
- 7.a) Discuss the effect of water activity (a_w) on milk products.
 - b) Define chemical preservatives. Write about various chemical preservative with their effect on product quality. [5+5]

- 8.a) 2000 kg of paddy with 22% moisture on wet basis are to be dried to 13 % moisture content (wet basis). Calculate the weight of bone dry products and water evaporated.
- b) Milk containing 3.7% fat and 12.8% total solids is to be evaporated to a produce a product containing 7.9% fat. What is the yield of product from 100 kg of milk and what is the total solids concentration in the final product, assuming that there are no losses during process? [5+5]

OR

- 9.a) Explain in details the spray drying of liquid food products. Discuss Instantization process to make dry powder instant soluble.
- b) Discuss the working principles of fluidized bed drying. [5+5]
- 10.a) Five centimeter potato cubes are individually quick frozen (IQF) in a blast freezer operating at -40°C and with a surface heat transfer coefficient of $30 \text{ W/m}^2 \text{ K}$. If the freezing point of the potato is measured as -1.0°C and the density is 1180 kg/m^3 , calculate the expected freezing time for each cube. If the cubes are then packed into a card board carton measuring $20\text{cm} \times 10\text{cm} \times 10\text{cm}$, calculate the freezing time. Also calculate the freezing time for IQF freezing of 2.5 cm cubes. (Additional data: the thickness of cardboard is 1.5 mm, the thermal conductivity of the card is 0.07 W/mK , the thermal conductivity of potato is 2.5 W/mK and the latent heat of crystallization is $2.74 \times 10^5 \text{ J/kg}$.)
- b) What is filtration? Discuss the Filtration theory with neat diagram. [5+5]

OR

- 11.a) What is Juice extraction? Discuss the continuous extractor with working principles.
- b) Discuss the Plant utilities requirements. [5+5]

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