B.FTBE 4TH YEAR 1ST SEMESTER EXAMINATION- 2019

FOOD PROCESS TECHNOLOGY IV   Time: 3hrs   Full Marks: 100

Use Separate Answer Script for each Part

(50 marks for each part)

PART- I

Answer question 1 and any two from the rest

1. Explain the following   4X 5
   a) Grade of milk
   b) Function of stabilizer and emulsifier for manufacture of ice cream
   c) disadvantages of condensed milk.
   d) Important factors for spray drying of milk

2. Discuss about malted milk, toned milk and soft curd milk.   15

3a) What is meant by homogenization? What is homogenization degree?

b)762 L of sweetened condensed milk contains 9.2% milk fat, 31.2% total milk solids and 40.5% cane sugar. Calculate the Sp.gr. of this product at 15^0C.

c) Whole milk powder contains 39.4% fat and 56.9 % SNF and water. Calculate the required amount of water for 6870 kg of reconstituted whole milk of 6 % fat.   5+4+6

4.Write short notes on (any 3):   3 X 5
 a) advantages of HTST pasteurization
 b) Over run and shrinkage of ice cream
 c) body and texture defects of icecream
 d) Major and minor components of milk

B.E (FTBE) FOURTH YEAR, FIRST SEMESTER EXAMINATION 2019

FOOD PROCESS TECHNOLOGY - IV   TIME: 3 H   FULL MARKS = 100

PART- II (50 MARKS)

USE SEPARATE ANSWER SCRIPT FOR EACH PART

Q1. Answer either (a) or (b) in this block.

(a) Describe the following (any 1): $2 \times 2.5 = 5$

   I.   Carbonation of soft drinks
   II.   Development of trans-free consumer margarine

(b) Define the following: $5 \times 1 = 5$

   I.   SFI
   II.   Flavor reversion (in fats and oils)
   III. 'g' w.r.t. retort sterilization
   IV. Mayonnaise
   V.   Sweetness probe in protein sweeteners

Q2. Differentiate between (any 2): $2 \times 5 = 10$

   a. Dry bag, indirect compression' HPP vs. 'Wet bag, direct compression' HPP (with the aid of diagram)
   b. Dry processing vs. Wet processing of Coffee beans at origin
   c. Continuous vs. Batch process of manufacture of Mayonnaise
   d. Saccharin vs. Aspartame w.r.t chemistry of action *in vivo* and technological properties

Q3. Answer any two from (a), (b) and (c) in this block.   **5 + 5 = 10**

(a) Enumerate the properties of emulsifiers you need to know to formulate a stable emulsion containing multiple emulsifiers. Why are non-ionic emulsifiers preferred over ionic ones in the food industry?

(b) How does HPP find use in food freezing? Explain the effects of HPP on eggs and potatoes.

(c) In development of high stability oil, enumerate the roles of the three product development methods: 'application development', 'analytical development' and 'triglyceride replication'. Why are PUFA-rich oils not preferred as high stability oils?

Q4. Answer any one from (a) and (b) in this block.   **5**

(a) Illustrate production of instant coffee using wet processed (at origin without finishing) coffee providing all details of processing conditions.

(b) Illustrate the process of production of minimally processed cabbage slaw (starting material for sauerkraut production).

Q5. Answer any two from (a), (b) and (c) in this block.   **10 + 10 = 20**

(a) Heat penetration curve is plotted for a canned green beans processed in a retort at 240°F. It took 5 min from the introduction of steam to the time the retort reached 240°F. If the initial product temperature was 140°F and steam was introduced into the retort for 30 min, determine the F_0 value by Stumbo's procedure taking data from relevant tables and graphs (consider simple heating curve). Given: heating and cooling curves parameters $f_h = f_c = 22$ min; $J_h = 1.2$ and $J_c = 1.6$. Consider z value for *Clostridium botulinum* type A. Graphically represent the process showing J_h, J_c and other relevant details of the retort heating curve (consider simple heating curve).

(b) An ice cream mix having viscosity of 70 cP and density of 1015 kg/m^3 is being canned aseptically in a system which uses a 100 ft long 1.0 inch sanitary pipe for a holding tube. The flow rate through the system is 5 gal/min. The fluid temperature at the exit from the holding tube is 285°F. Calculate:

(i) the sterilizing value of this process based on maximum velocity

(ii) integrated sterilizing value ($D_o = 1.83$ min; z = 24°F).

Take remaining data from relevant tables and graphs.

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(c) What are the five types of microbial inactivation curves obtained during commercial sterilization of foods? The figure below shows data on inactivation of spores in a canned food. When 6×10^6 spores were inoculated into a can containing 400 g of food product and processed at 121.1°C, the processed product contained 20 spores per g of the food product. Calculate equivalent heating time (equivalent lethality of the process) at 121.1°C to which the food product was subjected.