53 (FPT 502) FPTC-III

2018

FOOD PRODUCT TECHNOLOGY–III

Paper : FPT 502

(Milk and Milk Products)

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions.*

1. *(a)* Provide MF (%), SNF (%) and energy values for the following milk types : 3×3=9

   (i) Standardized milk

   (ii) Toned milk

   (iii) Skimmed milk.

   (b) List out *any four* factors affecting the composition of milk. 4

(c) Detail the following physicochemical properties of milk : 3+4=7

(i) Milk fat

(ii) Milk protein.

2. (a) Explain *any two* cooling methods for the safer transportation of milk. 6

(b) Define — Platform test. Write about *any two* platform tests. 2+4=6

(c) Match the following : 3×1=3

Agents	Chemicals
(i) Chelating agent	(a) Chlorine compounds
(ii) Wetting agent	(b) Tetraphosphate
(iii) Sanitizer	(c) Teepol

(d) Provide the schematic representation of centrifugal milk separator. 5

3. (a) Explain the homogenization process of milk with proper diagrams. 10

(b) Given 2000 *kg* of cream testing 50% fat. How much skim milk testing 1% fat must be added to obtain 20% fat in the standardized cream ? Use Pearson's square method for the calculation. 4

(c) Find the temperature to which milk should be cooled at a rate of 400 *kg* per *h*, the initial temperature 40°*C*, by a counter flow surface cooler with $1m^2$ of surface, supplied with chilled water at 4°*C*, at four times the milk rate. A thermal conductance of $400 kcal/m^2 h\,°C$ is expected. The specific heat of milk is 0·93 *kcal/kg*°*C*. 6

4. (a) What is the time necessary to heat the milk from 5°*C* to 90°*C* with steam at 100°*C*, if given that, volume of milk = $2m^3$; heated surface $A = 7{\cdot}5m^2$; heat transfer value at the steam side $h_v = 3{,}000 kcal/m^2 h\,°C$ and at the milk side $h_m = 740 kcal/m^2 h\,°C$ wall thickness of the vat = 0·005*m*; heat conductivity of the wall of the vat $k = 15 kcal/mh\,°C$; density of the milk $\rho_m = 1030 kg/m^3$; specific heat of milk = 0·93 *kcal/kg*°*C* ? 6

(b) Calculate the flow rate of milk through a centrifugal milk separator, if number of discs = 100 ; discs angle of inclination = 45° ; outer radius $R_o = 0{\cdot}15m$; inner radius $R_n = 0{\cdot}055m$; limiting diameter of fat globules $d = 1{\cdot}4\mu m$, rpm $n = 3000 = 50/s$, density difference of milk and fat globules $\Delta\rho = 114 kg/m^3$; absolute viscosity $\mu = 1{\cdot}24 \times 10^{-3}\, kg/m.s$, correction factor $c = 0{\cdot}8$. 6

(c) Give the general procedure for the cleaning and sanitization of dairy equipment. 4

(d) Write about the types of CIP. 4

5. (a) Explain the manufacturing process of Reconstituted milk. 6

(b) Compare the characteristics of gravity and centrifugal creaming methods. 8

(c) Give the flow diagram for the manufacture of butter. 6

6. (a) Explain the manufacturing process of evaporated milk with proper flow diagram. 10

(b) Write down the classification of milk drying systems and explain the film, roller or drum drying method shortly. 2+8=10

7. (a) Explain *any two* flavours and texture defects and their preventive measures in the production of ice cream. 4

(b) Explain the manufacturing process of sweet/sour dahi (curd) making. 10

(c) Detail the curing process during cheese production. 6
