Agricultural & Food Engineering Department, IIT, Kharagpur

Mid Spring Semester Examination 2012-2013

Degree: M Tech (FPE) & RS *Date: --02-2013*

Subject: AG60010 Food Process and Products Technology *Time: 2 Hrs*

Number of students: 25+3 = 28 *Marks: 30*

Instruction: Use separate answer script for Part A and Part B

Part – A

Q1. What are the factors that affect microbial ecology in foods? List major food processing & preservation technologies according to their objectives and principles & mode of operation. [1.5+2.5=4.0]

Q2. Draw Survivor curve, TDT curve, TR Curve and define D, F & Z-values?
Ten g strained pea contaminated with 10,000 spores of PA3679 was heat treated in a TDT can at 115.5°C. Calculate the time of heating required to reduce the level of contamination to 2 spores. Lethal rate of PA3679 at 115.5°C is 0.206 per min. [3+2=5.0]

Q3. (a) Discuss current and likely future trends in food processing. [1.5]

(b) How can you determine thermal resistance of a bacteria in a laboratory? [1.5]

(c) With the help of a neatly drawn sequential process flow chart discuss conventional canning process. What is aseptic processing & packaging? [2+1 = 3.0]

Part B

Q4. What is Basal Metabolic (BMR) rate? Calculate your BMR. Name the nutrients available from food. If you are fed with milk and bread only, how much milk and bread will you require to meet up your BMR per day? Given the nutrient content of milk and bread as follows: [1+2+2]

Food (100 g)	Water (g)	Carbohydrate (g)	Fat (g)	Protein (g)	Vitamin & Mineral (g)
Milk	88	3.5	5	3.4	0.1
Bread	40	52	3	4	1

Q5.How does sugar syrup act as preservative?Explain the ideal and real freezing curves. What do you mean by nucleation, crystallization, and initial freezing point? Define freezing rates. Pictorially distinguish between slow and rapid freezing. [.5+1.5+1.5+.5+1]

Q6. What is the use of colostrums? Discuss the physical state of milk with respect to the size of the constituents. Though perfectly fresh milk contains no lactic acid, then why is milk still acidic? Milk appears entirely opaque while in thin layers it is slightly transparent – why? A defatted milk has yellow colour – why? Size of a fat globule is 5 μm. At what speed the fat will try to float in milk having a viscosity of 3.8×10^{-3} PA.s and a density difference of 50 kg m^{-3}? [.5+.5+.5+.5+.5+2.5]