Indian Institute of Technology Kharagpur
Mid Spring Semester Examination 2022-2023

Degree: B. Tech (AgFE) & Dual Degree
Subject: AG31006 Food Science & Technology
Number of students: 68

Date: -02-2023
Time: 2 Hrs
Marks: 30

Note: Write Part-A & Part-B separately in the same answer script.

Part - A

Q1. Explain for the following and give suitable example to justify your answers. [1x5=5.0]

i) Commercial sterility of canned foods has no meaning in tropical countries.
ii) Canned low acid foods should be heated before consumption.
iii) Vegetables must be blanched prior to freezing.
iv) Food materials taken out of the cold store should be consumed as quickly as possible.
v) HTST processes result in better nutrient retention than LTLT processes.

Q2. Draw a generalized growth curve for a bacterial culture and give its kinetic model. What do you mean by a bacterial spore? Why spores have higher heat resistance than vegetative cells? A bacterium with mean doubling time of 20 min produces a cell mass of 2.2×10^{31} g after 48 h of exponential growth. Calculate mass of the (i) bacterium, and (ii) cell mass produced after 15 h. [1+1+1+2=5]

Q3. What do you mean by 'Commercial Sterilization'? Define D-value & z-value? What is 12 D concept in thermal processing of foods?
Hundred g strained pea contaminated with 100 spores of PA3679 per g was heated in a can at 115.5 °C. Calculate the time of heating required to reduce the level of contamination in the can to 2 spores. Lethal rate of PA3679 at 115.5°C is 0.206 per min. [1+1+1+2 = 5.0]

Part - B

10 X 0.25 = 2.5

Q4 (A) Answer the following

i. Browning of apple is due to
(A) Oxidation, (B) Enzymatic inactivation, (C) Preservation, (D) Contamination

ii. Temperature coefficient represents the factor by which the rate of a reaction increases for every
(A) 10 min rise in time, (B) 10 °C in temperature, (C) 10 sec rise in time
(D) 5 °C rise in temperature

iii. What is the typical temperature coefficient for photosynthesis?
(A) 1.5, (B) 1.5 to 1.8, (C) 2.1 to 2, (D) 2 to 3

iv. The food processing helps in improving the
(A) Physico-chemical of food only, (B) Sensory of food only,
(C) Aesthetic of food only, (D) All of the above

Your Exam Time Schedule and Sitting					
Subject Name	CNT/DEPT	Date	Room		
				02:30 PM 05:00 PM	G

v. Examples of perishable foods includes
(A) Egg, root vegetables, (B) Meat, fish, fruits, (C) Cereals, grains, nuts,
(D) None of the above

vi. Foods that contain natural inhibitors to spoilage or have received mild preservation treatment to environmental conditions is known as
(A) Semi perishable foods, (B) Perishable foods, (C) Shelf stable foods,
(D) Refrigerated foods

vii. The storage conditions for dry storage includes
(A) 12 °C and 45% RH, (B) 20 °C and 50% RH, (C) 25 °C and 75% RH,
(D) 25 °C and 80% RH

viii. At what temperature do foods freeze?
(A) At 0 °C, (B) At 0 to 2 °C, (C) Less than 0 °C, (D) None of the above

ix. The pretreatment given to foods prior to food preservation is known as
(A) Blanching, (B) Drying, (C) Canning, (D) Freezing

x. The process where the organisms that survive are non-pathogenic, not capable of developing within the products under normal storage conditions is called as
(A) Pasteurization, (B) Sterilization, (C) Canning, (D) Appertization

10 X 0.25 = 2.5

Q4 (B) Match the following:

6	(a) Milk, vegetable juice	(i) Rotary drier
2	(b) Fruit juice concentrates	(ii) Kiln drier
3	(c) Vegetables	(iii) Freeze drier
1	(d) Juices	(iv) Foam mat drier
	(e) Meat products, coffee	(v) Fluidized drier
	(f) Milk, whole egg, egg yolk	(vi) Cabinet drier
	(g) Fruits and vegetables	(vii) Spray drier
	(h) Apples	(viii) Vacuum drier
	(i) Fruits and vegetables	(ix) Tunnel drier
	(j) Some meat products	(x) Drum drier

Q5. Define with an example fatty acid, saturated fatty acid, poly unsaturated fatty acid, and essential fatty acid. Define Smoke, Flash and Fire Points. What is saponification number and how is it determined? 2+2+1 = 5

Q6. Define enantiomer, isomer, glycoside, epimer. Explain why glucose reacts slowly with Seliwanoff's reagent. Explain gelatinization. Explain browning reactions. 1+1+1+2 = 5

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