

Part A

1. How does the pH value of food affect its flavor, shelf life, and microbial growth? (8%)
2. Describe the mechanism of lipid oxidation and explain how to reduce its occurrence during food processing. (8%)
3. What is protein denaturation? Provide examples to illustrate its applications and effects in food processing. (8%)
4. Plot and explain the titration curve of 0.1M glutamic acid solution using 0.01N NaOH, with pH on the vertical axis and titrant volume on the horizontal axis. (8%)
5. Explain the key differences between pasteurization and high-temperature short-time (HTST) processing, including their respective applications. (8%)
6. Plot the chemical structures of the compounds listed below. (2% each)
(1) lactic acid (2) linoleic acid (3) glycerol (4) alanine (5) tyrosine

Part B

1. Please answer the following questions about wheat milling and wheat products. (5% each, total in 20%)
 - (a) How to obtain the white wheat flour from wheat kernels by modern roller milling practice? (5%)
 - (b) How to make "whole wheat flour" to meet the TFDA definition of "whole grain ingredient"? (5%)
 - (c) When using "whole wheat flour" to make whole wheat bread, what should be modified, in point of view formulation and processing? Why? (5%)
 - (d) What are the health benefits of increasing consumption of whole wheat bread instead of white bread? Why? (5%)
2. Please answer the following questions about carbohydrates. (5% each, total in 20%)
 - (a) Please provide the chemical formulas and draw the chemical structures of sucrose and sucralose. (5%)
 - (b) Please draw the structures of amylose and amylopectin. How do they affect the pasting properties and storage quality of starch gels? (5%)
 - (c) Please draw the structures of high methoxyl pectin (HMP) and low methoxyl pectin (LMP). What are the differences in their gelling mechanisms? (5%)
 - (d) Compare the compositions of invert sugar and high fructose corn syrup. Please explain the reactions used in the formation of the two products. (5%)
3. Please answer the following questions about pigments. (5% each, total in 10%)
 - (a) Why does the surface color of meat change from purple-red to bright red, and again to brown, if it is placed at room temperature for a long time? (5%)
 - (b) Please explain the reaction of chlorophyll under enzyme (chlorophyllase), acid and heat conditions on the changes of color? (5%)

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