

[Part A] 50%

- (a) Amylose and amylopectin are two major molecules that constitute the starch granules. Please draw their chemical structures and indicate their differences in the linkages of glucose units. (4%)
(b) The starch paste or gel will be formed after gelatinization, and then the retrogradation may occur during storage. What is starch gelatinization and the roles of amylose and amylopectin on the short- and long-term retrogradation processes of starch? (6%)
(c) Please give 3 ways to lower down the GI (glycemic index) of starch-based foods. (6%)
- Many carbohydrate derivatives are modified from saccharides and used for food processing. Please draw the chemical structures of following compounds and describe their characteristics and applications. (12%, 3% for each)
 - sucralose (4,1',6'-trichlorogalactosucrose)
 - sorbitol
 - β -cyclodextrin
 - methocel (methyl cellulose)
- Please compare the differences in the principle and processes of dry corn milling and wet corn milling. What types of final products could be obtained from these two processes. (8%)
- What is gluten? Please describe the characteristic amino acids in wheat gluten and their effects on the gluten forming and quality of yeast-leavened breads? (8%)
- Please define the following machines used for wheat flour milling. (6%, 2% for each)
 - Disc separator
 - Breaking roller
 - Purifier

[Part B] 50%

- List some desirable functions of following enzymes in the food industry. (12%, 3% for each)
 - Papain
 - α -Amylase
 - Lipoxygenase
 - β -Galactosidase
- Please describe the principles and applications for (A) Blanching and (B) Pasteurization. (10%)
- What is enzymatic browning and how does it affect food products? (6%)
- How can enzymatic browning be stopped or slowed down? (4%)
- Please describe the principle and application of high-hydrostatic pressure treatment in food processing. (6%)
- Please describe the principles for the following methods. (12%, 3% for each)
 - Biuret method
 - Western blotting
 - Ammonium sulfate precipitation
 - Urea as the protein denature agent