

[Part A] 50%

1. Please answer the following questions related to food dehydration. **(14% in Total)**
 - (a) Please define the constant rate period (CRP) and the falling rate period (FRP) of a drying curve. (4%)
 - (b) What effects of temperature, air velocity and relative humidity on both CRP and FRP? (6%)
 - (c) If you are going to dry grapes and fresh mushroom, will you choose the co-current or counter-current dryer? Why? (4%)
2. Invert sugar syrup (轉化糖漿) are commonly used for confectionary making. Please answer the following questions. **(12% in Total)**
 - (a) What is invert sugar and how to make it? (4%)
 - (b) Please draw the chemical structures of invert sugar. (4%)
 - (c) Please give two food examples to show the benefits (reasons) of using invert sugar. (4%)
3. A fruit drink was analyzed by using high performance anion exchange chromatography (HPAEC)-pulsed amperometric detector (PAD) with isocratic mode to obtain its sugar profile. What are the separation and detection principles of this instrument? **(8%)**
4. Please briefly define/compare the differences between the following items. **(16% in total, 4% each)**
 - (a) Heat-moisture treatment vs. Annealing treatment of starch
 - (b) Modified atmosphere packaging vs. Active packaging
 - (c) Locust bean gum vs. Guar gum
 - (d) Restructured meat vs. Textured vegetable protein

[Part B] 50%

1. What is a coupled reaction, and what are the concerns in using coupled reactions to measure enzyme activities? Give a specific example if possible. **(10%)**
2. Explain how edible oil stability can be determined using Rancimat method. **(10%)**
3. What is food irradiation process? Explain how irradiation can affect shelf-life of a food. **(10%)**
4. Wasabi is a plant of the Brassicaceae family, which includes cabbages, horseradish, and mustard. It is generally used as a sauce that makes sushi or other foods more flavorful by adding spice. The unique flavor of wasabi is a result of complex chemical mixtures from the broken cells of the plant. Please indicate this specific reaction of the unique flavor generation. **(10%)**
5. Draw the chemical structure that is listed below **(10% in total)**
 - (a) potassium hydrogen phthalate (3%)
 - (b) succinate (3%)
 - (c) epigallocatechin gallate (4%)

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