※ 注意：請於答案卷上標明題號，並依序作答。

1. Describe the scheme for the isolation of basic organic compounds from an organic mixture by pH fractionation. (10%)
2. Describe: (10%)
   (1) the procedure for GC analysis of fatty acid composition of a fat, and
   (2) the calculation equation for the quantitative determination of each fatty acid content in the fat.
3. Crude protein is usually expressed as " Nitrogen content (%) × 6.25 ". Explain why? (5%)
4. Draw the device of Soxhlet extractor for lipid extraction, and briefly explain the principle. (5%)
5. Draw the chemical structures of the following compounds. (20%)
   (1)fructose (2)BHT (3)glycerol (4)linoleic acid
   (5)sorbic acid (6)lysine (7)tyrosine (8)cystein
   (9)ethyl paraben (10)TBHQ

6. Corn starch is a starch commonly used as a food or nonfood raw material. It is practically inert to chemical reaction unless it is pretreated to activate them. Please answer the following two questions: (10%)
   (1) When corn starch is treated with α-amylase and β-amylase. Which of the following results are (multi choice)
   (a) maltose units are formed.
   (b) maltose and glucose units are formed.
   (c) complete degradation of the starch.
   (d) incomplete degradation of the starch.
   (e) complete degradation of the amylose but incomplete degradation of amylopectin.
   (2) Please draw the chemical structures of the products when corn starch was enzyme treated as described as above.

7. On April 24, 2002, researchers at the Swedish National Food Administration and Stockholm University reported finding the chemical acrylamide in a variety of fried and oven-baked foods. Since acrylamide appears to be a result of traditional cooking methods and is believed to have been present in cooked foods for thousands of years, many projects of the formation of acrylamide in foods are progress. Please answer the following questions about this issue. (10%)
   (a) What is acrylamide?
   (b) What is the possible mechanisms that acrylamide formed in food?
   (c) Are acrylamide levels in organic foods different from levels in other foods? Why or why not?

8. There are four types of browning reactions in foods: Maillard, caramelization, ascorbic acid oxidation and phenolase browning. (10%)
   (a) Please simply describe Maillard reactions.
   (b) How is water activity, pH or temperature affecting the Maillard reactions?
   (c) What is the caramelization?
   (d) What is enzymatic browning and how does it affect the foods commercial significance?

接背面

9. Give the following data on dry matter (88.62, 88.74, 89.20, 82.20, 88.33), determine the mean, standard deviation, and coefficient of variation. Can you reject the value 82.20 since it seems to be different than the others? If the true value for dry matter is 89.40, what is the % relative error? (10%)
Note: Q-values of Rejection=0.64 (at 90% level) when No. of observation=5.

10. Below are four values for the fiber content (percent dry bases) of wheat bran analyzed by the methods of determinations of crude fiber, acid detergent fiber, neutral detergent fiber (with amylase), and the AOAC method for total dietary fiber. Please indicate which method most likely fits with each of the four values below. Justify your answer by listing the constituents measured by each method. (10%)

Percent Fiber	Methods	Constituents Measured
46.0		
8.9		
40.2		
11.9		