※ 請依序作答，並標明作答之部份及其題號。

Part A (50%)

1. Define the following terms and tell their differences. (15%)
   (a) α-Lactose *vs.* β-Lactose *(Answered by drawing their chemical structures)*
   (b) Locus bean gum *vs.* Guar gum *(Answered by drawing their chemical structures)*
   (c) Caramelization *vs.* Maillard reaction
   (d) Single *vs.* Double acting baking powder
   (e) Pale, Soft, Exudative (PSE) *vs.* Dark, Firm, and Dry (DFD) meat

2. Briefly define/explain the meaning of the following terms and give an food example. (8%)
   (a) Retrograded starch
   (b) Tempering of wheat
   (c) Colloid
   (d) Foam

3. What is glass transition temperature (T_g)? How does water or solutes (e.g. sugars, polyols) affecting T_g? Please give two examples of the importance of glass transitions in food products? (8%)

4. Starch is one of the important food ingredients and the cooked starches are usually used. What are the two components of starch (please draw their chemical structures)? Please draw a typical Rapid Visoamylograph (with the appropriate axis labels) for a starch and describe what is happening at each stage. (10%)

5. What type of packaging (e.g. MAP, CAP, active or intelligent---) and packaging materials will you choice? Please point out the type of spoilage/deterioration, critical storage variables and the reasons why you choice the specific type of packaging and packaging materials. (9%)
   (a) Mangoes from farmer to supermarket
   (b) Potato chips
   (c) Processed cheese

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Part B (50%)

1. What is the hurdle technology in food processing? And specify the situations (a), (b) and (c) in the following figure (10 %).

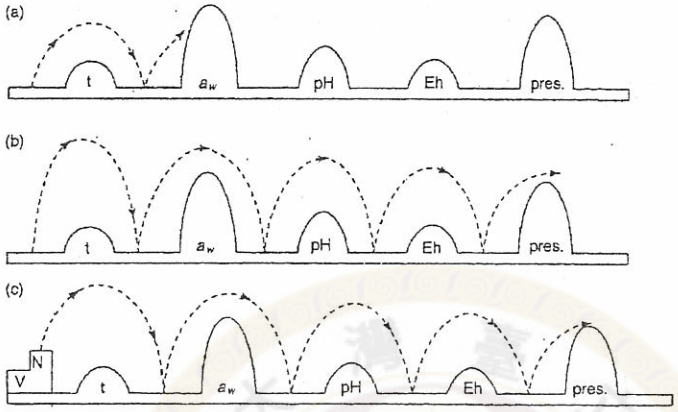
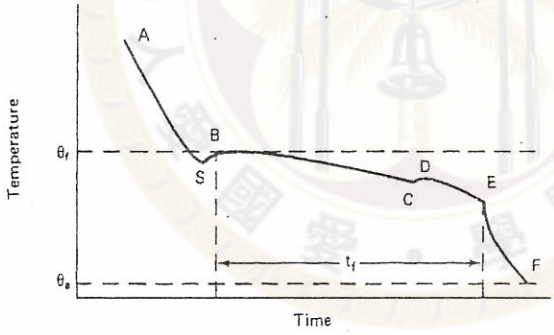


Fig. 1.19 Examples of hurdles in food processing.
(t = chilling, a_w = low water activity, pH = acidification, Eh = low redox potential, pres. = preservatives, V = vitamins, N = nutrients.) (Adapted from Leistner and Gorris (1995).)

2. The following figure is regarding temperature histories in freezing operation of a food. Specify what occur during the stages of A-S, S-B, B-C, C-D, D-E, and E-F (10 %).



3. Anthocyanins are easily altered in color by changes of pH. Describe the characteristic of anthocyanins with regard to their structure and color during pH changes (6 %).

4. How to judge protein quality of a food? List the terms and give the principles regarding the evaluation of protein nutritive value (10 %).

5. The initiation of lipid oxidation starts with the removal of a hydrogen atom from unsaturated triacylglycerols or free fatty acids to form a free radical. List and explain in words the potentially initial mechanisms of lipid oxidation (8 %).

6. Give the chemical formula in the follows: (6% total; 2 % each)
   (a) methionine　(b) oleic acid　(c) pyruvate

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