

Name: _____ Student ID _____

**Prince of Songkla University
Faculty of Engineering**

**Exam: Mid Term, Semester II
Date: December 22, 2008
Subject: 230-560 - Food Unit Operations**

**Academic Year: 2008 – 2009
Time: 1:30 – 4:30 PM
Room: R300**

ทฤษฎีในการสอบโทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทฤษฎี และพักการเรียน 1 ภาคการศึกษา

Instructions: This is a Closed Book exam consisting of 8 pages (not including the cover sheet). The points for each problem are not distributed evenly. Place your name and the student ID number on every page. Students are allowed to use only a pen or pencil and a calculator.

Points Distribution (For Grader Only)		
Part	Points Value	Score
1	20	
2	50	
3	20	
4	15	
5	15	
6	25	
7	25	
8	20	
Total	190	

**Exam prepared by
Ram Yamsaengsung
December 15, 2008**

**PLEASE CHECK TO MAKE SURE THAT
YOU HAVE ALL 8 PAGES OF THE EXAM BEFORE BEGINNING.
GOOD LUCK!**

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I. True and Faults (T/F) (20 points)

- 1. Potato chips are fried to low moisture content and packed in N₂ environment to preserve freshness and increase the shelf-life.
- 2. Pudding can be made by adding cold water to pre-gelatinized starch.
- 3. Whey proteins, gelatin, and soy proteins can be manipulated to form yogurt, cottage cheese, gelatin desserts, and tofu.
- 4. Gel is gas dispersed in a liquid.
- 5. Water activity is the ratio P_s/P_v .
- 6. Gel formation is the result of junction zone formation.
- 7. Fructose is the reference point of sweetness and has a value of 1.0.
- 8. Glucose can be found in sugar beets and sugar cane.
- 9. Proteins provide sensory characteristics of mouth feel, juiciness, and flavor.
- 10. Setback is the process in which water is squeezed from the gel as the starch begins to interact and the junction zone collapses.
- 11. Cornflakes, which have a water activity (a_w) of 0.10, will gain moisture in a 5% RH environment.
- 12. Sucrose can be found in milk and dairy products.
- 13. Corn starch can be converted into sucrose using acid, heat, and enzyme (producing corn syrup).
- 14. Shear thinning is the process in which the viscosity of the gelatinized starch paste is reduced.
- 15. Amylopectin contributes to the high viscosity of the starch paste and amylose contributes to the gelling property.
- 16. Maltose has a sweetness value of 0.3 and lactose has a sweetness value of 0.7.
- 17. Proteins and starches are polymers, which will be in a glassy state above T_g and rubbery state below T_g.
- 18. Starch is found in granules which have amorphous and crystalline regions.
- 19. Amylopectin is in the form of linear chains and amylose is highly branched.
- 20. Enzymes are proteins that catalyze chemical reactions.

II. Fill in the blanks (50 points)

1. The five basic components of food consist of: _____, _____, _____, _____, and _____.
2. Starch gelatinization takes place in the presence of _____, _____, and _____.
3. During the study of starch gelatinization, the products that were studied included _____, _____ and _____.
4. _____ pasteurization (72°C for 16 sec) is used in cheese and milk processing.
5. _____, which is extensible, cohesive, and elastic, provides the key properties of dough for making bread.
6. During the _____ process, the viscosity of the starch paste decreases dramatically as the molecules begin to orient themselves in the direction that the system is being stirred.
7. _____ are used to stabilize oil and fat dispersions.
8. Starches in their natural form provide _____, _____, _____, and _____.
9. A solid dispersed in a liquid is called a _____ and gas dispersed in liquid is called a _____.
10. Plants store their surplus energy in two forms: _____ and _____.
11. _____ forms _____ bond with each other and with other polar molecules in food, such as _____ and _____.
12. _____ and _____ are found in fruits, honey, and fruit juices.
13. Examples of sugar alcohols include _____, _____, and _____.
14. Applesauce, banana puree, and _____ are examples of _____ fluid.
15. Shear-thickening fluid has a _____ greater than 1.
16. Toothpaste and tomato ketchup (paste) are examples of _____ fluids, while milk and honey are examples of _____ fluids.
17. Irreversible thixotropy is called _____.
18. Two examples of artificial sweeteners are _____ and _____.
19. The 2 types of strains are _____ strain and _____ strain.
20. Apparent viscosity is the _____ divided by the _____.
21. The types of fluids that have yield stress are _____ and _____.
22. Fat soluble pigments include: _____ which is found in plants and _____ which are found in carrots, squash, tomatoes, pineapples, oranges, and corn.
23. Water soluble pigments include: _____ which are found in berries, _____, apples, cabbages, and cherries.

III. Give a brief explanation of the following reactions and give one example of a food product in which this reaction takes place. (20 points)

1. Maillard Browning -

2. Caramelization -

3. Gelatinization -

4. Lipid Oxidation -

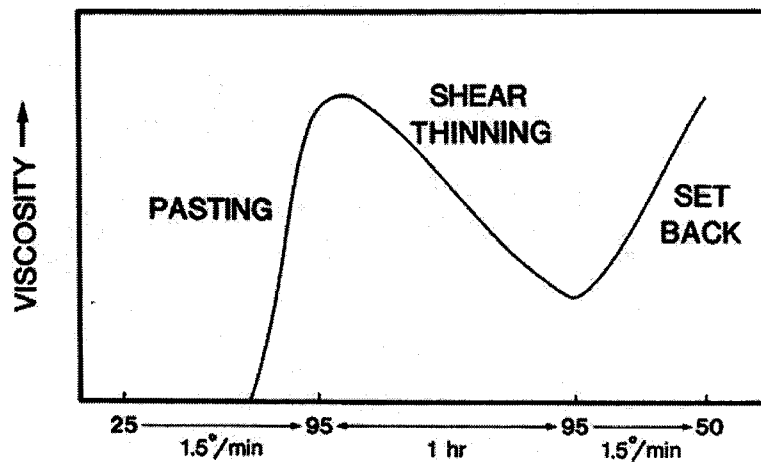
5. Retrogradation –

6. Protein Denaturation –

IV. Answer the following questions related to food chemistry. (15 points)

1. What are enzymes (protein/lipids/carbohydrates)? Name four functions of enzymes. (5 points)

2. Draw a typical starch pasting diagram showing pasting, shear thinning, and setback. (5 points)



3. Answer the following questions on vitamins and minerals. (5 points)

3.1 What are the most heat sensitive vitamins?

3.2 Which fat soluble vitamins can be lost during lipid oxidation?

3.3 Besides from Vitamin A, which other light sensitive vitamin can undergo chemical degradation when exposed to light during shipping and storage?

VI. Answer the following questions based on your trips to Tesco Lotus, Hat Yai. (25 points)

- (1) Name 4 brands of salty snacks. What is the difference between the raw material for Lays and Pringle? **(4 points)**

- (2) Name 2 examples dessert snacks and 2 of its major ingredients. **(2 points)**

- (3) Name 3 brands of ice cream and what is its most important ingredient (the one that makes it more expensive than other brands). **(2 points)**

- (4) Name 5 brands of soft drinks and what makes it sweet (do not use sugar). **(3 points)**

- (5) Name 4 types (plants) of cooking oil. **(2 points)**

- (6) List 6 types of fresh fruits in their English names. **(3 points)**

- (7) Name the 6 sections in which the Lotus Bakery is divided into. What is the top selling bakery product at Lotus? **(7 points)**

- (8) What does DC stand for and where is it located in Thailand? **(2 points)**

**VII. Answer the following questions about the Food Ingredients Presentation.
(25 points)**

- (1) Name 5 products that were presented by you and your classmates in the Food Ingredients Presentation and the MAJOR ingredient in each (not including water).
(5 points)

- (2) Answer the following questions: **(10 points)**

2.1 Which product is consumed 90,000,000 lb per year in the US?

2.2 Which product has 7 flavors and has the slogan “มันทุกรส...”?

2.3 Which product uses gelatin to help give it shape and body?

2.4 Which product is called biscuit and scone is different parts of Europe?

2.5 Which product uses shortening and baking powder?

2.6 What are the 5 different juices found in UNIF: 100% Vegetable Fruit Juice with Beetroot?

- (3) For the ingredients presentation that **your** team gave in class, list the major ingredients and their functions? **(10 points)**

**VIII. Answer the following questions about the Food Processing Presentation.
(20 points)**

1. Match the following information with the article that it was from? **(10 points)**

- | | |
|-------------------------|-----------------------|
| (a) Yoghurt | (d) Soft Drink |
| (b) Cheese | (e) Chocolate |
| (c) Orange Juice | |

- _____ 1. Derived from cocoa beans
- _____ 2. Pasteurized using plate heat exchanger
- _____ 3. Rennet enzymes are added to coagulate the product
- _____ 4. A concentrated “starter” is added to give product taste and flavor
- _____ 5. Require series of filtration
- _____ 6. Requires a conching and tempering step
- _____ 7. Requires incubation.
- _____ 8. A starter culture (bacteria) is added
- _____ 9. The pulp and rind are the byproducts
- _____ 10. The product may be molded

(2) Answer the following questions: **(10 points)**

2.1 What is curd and whey?

2.2 Name the 4 types of yoghurt?

2.3 Describe the packaging of soft drinks? What material is used for the package and how is the package made?

2.4 What are the main purposes Grading and Washing in orange juice processing?

2.5 What method is used to cook cocoa beans and for how long?

End of Exam!