Name: _____ Student ID _____

Prince of Songkla University
Faculty of Engineering

Exam: Mid Term, Semester II   **Academic Year: 2009 – 2010**
Date: December 21, 2009   **Time:** 13:30 – 16:30
Subject: 230-560 - Food Unit Operations   **Room: Robot**

ทุจริตในการสอบโทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา

Instructions: This is a Closed Book exam consisting of 9 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 <u>only</u> a pen or pencil and a calculator.

Points Distribution (For Grader Only)		
Part	Points Value	Score
1	20	
2	35	
3	20	
4	15	
5	25	
6	45	
7	15	
Total	175	

Exam prepared by
Ram Yamsaengsung
December 21, 2009

PLEASE CHECK TO MAKE SURE THAT
YOU HAVE ALL 9 PAGES OF THE EXAM BEFORE BEGINNING.
GOOD LUCK!

Prince of Songkla University
Faculty of Engineering

Exam: Mid Term, Semester II
Date: December 21, 2009
Subject: 230-560 - Food Unit Operations

Academic Year: 2009 – 2010
Time: 9:00 – 12:00 PM
Room: Robot

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

____ 1. Gel formation is the result of junction zone formation.

____ 2. Pudding can be made by adding cold water to pre-gelatinized starch.

____ 3. Maltose has a sweetness value of 0.3 and lactose has a sweetness value of 0.7.

____ 4. Gel is gas dispersed in a liquid.

____ 5. Cereals include beans, peas, and lentils.

____ 6. Glucose can be found in sugar beets and sugar cane.

____ 7. Setback is the process in which water is squeezed from the gel as the starch begins to interact and the junction zone collapses.

____ 8. Water activity is the ratio P_s/P_v.

____ 9. Enzymes are proteins that catalyze chemical reactions.

____ 10. Starch is found in granules which have amorphous and crystalline regions.

____ 11 Cornflakes, which have a water activity (a_w) of 0.10, will gain moisture in a 5% RH environment.

____ 12. Potato chips are fried to low moisture content and packed in N_2 environment to preserve freshness and increase the shelf-life.

____ 13. Corn starch can be converted into fructose using acid, heat, and enzyme (producing corn syrup).

____ 14. Fructose is the reference point of sweetness and has a value of 1.0.

____ 15. Amylopectin contributes to the high viscosity of the starch paste and amylose contributes to the gelling property.

____ 16. Whey proteins, gelatin, and soy proteins can be manipulated to form yogurt, cottage cheese, gelatin desserts, and tofu.

____ 17. Proteins and starches are polymers, which will be in a glassy state above Tg and rubbery state below Tg.

____ 18. Shear thinning is the process in which the viscosity of the gelatinized starch paste is reduced.

____ 19. Amylopectin is in the form of linear chains and amylose is highly branched.

____ 20. Proteins provide sensory characteristics of mouth feel, juiciness, and flavor.

II. Fill in the blanks (35 points)

1. The five basic components of food consist of: _____ , _____ , _____ , _____ , and _____ .

2. _____ pasteurization (72°C for 16 sec) is used in cheese and milk processing.

3. Plants store their surplus energy in two forms: _____ and _____ .

4. Starch gelatinization takes place in the presence of _____ , _____ , and _____ .

5. _____ are used to stabilize oil and fat dispersions.

6. Shear-thickening fluid has a _____ greater than 1.

7. Toothpaste and tomato ketchup (paste) are examples of _____ fluids, while milk and honey are examples of _____ fluids.

8. Applesauce, banana puree, and orange juice are examples of _____ fluid.

9. 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.

10. _____ , which is extensible, cohesive, and elastic, provides the key properties of dough for making bread.

11. The types of fluids that have yield stress are _____ and _____ .

12. A solid dispersed in a liquid is called a _____ and gas dispersed in liquid is called a _____ .

13. The 2 types of strains _____ strain and _____ strain.

14. Starches in their natural form provide _____ , _____ , _____ , and _____ .

15. During the study of starch gelatinization, the products that were studied included _____ , _____ , _____ and _____ .

16. The process in which water seeps (releases) from the gel onto its surface is called _____ or _____ .

17. In order to prevent water from seeping to the surfaces of gels, _____ is added.

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 –

IV. Answer the following questions based on your trips to Tesco Lotus, Hat Yai. (12 points)

(1) Name 4 brands of salty snacks. **(2 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 (expensive) ingredient. **(2 points)**

(4) Name 3 brands of soft drinks and what makes it sweet (do not use sugar). **(2 points)**

(5) Name 6 types (plants) of cooking oil. **(3 points)**

(6) List 8 types of fresh fruits in their English names. **(4 points)**

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

(1) Name the 6 sections in which the Lotus Bakery is divided into. **(6 points)**

(2) What is the top selling product at Lotus Bakery? Name 2 products that were being prepared? What product did we sample (eat)? **(4 points)**

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

(4) What is the average temperature and relative humidity used in making dough rise at the Lotus Bakery? **(2 points)**

(5) What are the temperatures used to bake bread and frying doughnuts at the Lotus Bakery? **(2 points)**

(6) Describe the type of mixer used for bread making. Why does it require this shape? **(4 points)**

(7) Which Lotus Bakery sells the most products in Thailand? About how much does it sell on the average per day? How much does it sell per day during the New Year's period? **(3 points)**

(8) Why must bread be cooled before slicing? Give 2 reasons. **(2 points)**

VI. Answer the following questions about the Food Companies and Food Ingredients Presentations. (45 points)

(1) Name the 7 companies that were presented by you and your classmates and list one major product or franchises by each company. **(7 points)**

(2) Answer the following questions. **(15 points)**

2.1 Which company was founded by a drugstore keeper (pharmacist)?

2.2 Fill in the following slogan. "Aroi Gor Gerd Kern Dai Tah Mee ....."?

2.3 Which company has the slogan, "Adding Vitality to Life"?

2.4 Which company has the slogan, "The Name is Delicious"?

2.5 Which company has the slogan, "Good Food, Good Life"?

2.6 Which company has the slogan, "Kitchen of the World"?

2.7 Which company has the slogan, "Where Quality Meets Global Need"?

2.8 What is the 2009 slogan for Coca-Cola?

2.9 How many cups of "Red Cup" are consumed (drink) every second around the world?

2.10 What is the symbol of Nestle and its meaning?

2.11 Which company owns the restaurants "Golden Dragon" and "Patio"?

2.12 From the answer to number 2.11, what is name of its coffee shop franchise?

2.13 Which company began its business from a food and fertilizer company?

2.14 What is the largest food company in the world?

2.15 What was the largest food company in the world's first product?

(3) Name 5 products that were presented by you and your classmates in the Food Ingredients Presentation and Four MAJOR ingredient in each (not including water). One of the products only has 3 ingredients. **(15 points)**

(4) For the ingredients presentation that your team gave in class, list the major ingredients and their functions? **(8 points)**

**VII. Answer the following questions about the Food Rheology. (15 points)**

1. Write down the equation for shear strain and define γ. **(2 points)**

2. Write down the equation for Hookean's Law and define each term. **(3 points)**

3. Write the shear stress versus shear rate equations for the 5 types of time-independent fluids (Newtonian and Non-Newtonians) and write give the approximate value of its flow behavior index, consistency coefficient, and yield stress. **(5 points)**

4. Draw the shear stress versus shear rate graphs for the 5 types of time-independent fluids (Newtonian and Non-Newtonians). **(5 points)**

Congratulations! End of Exam! Happy New Year's 2010!!!
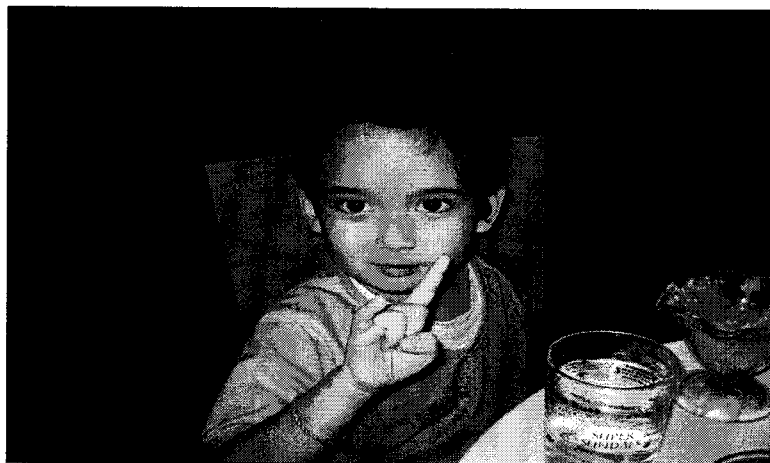
Bonus: What is the name of this restaurant? (2 points)