

Name: \_\_\_\_\_ Student ID \_\_\_\_\_

**Prince of Songkla University  
Faculty of Engineering**

**Exam: Final Exam, Semester II  
Date: December 12, 2014  
Subject: 230-560 Food Unit Operations**

**Academic Year: 2014 – 2015  
Time: 9:00 – 12:00 PM  
Room: 5201**

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ทฤษฎีในการสอบโทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทฤษฎี และพักการเรียน ในภาคการศึกษา

**Instructions: This exam is a Closed Book Exam. 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. Write your English Nickname and your Team Name above.**

<b>Points Distribution (For Grader Only)</b>		
<b>Part</b>	<b>Points Value</b>	<b>Score</b>
<b>I</b>	<b>20</b>	
<b>II</b>	<b>40</b>	
<b>III</b>	<b>50</b>	
<b>IV</b>	<b>40</b>	
<b>V</b>	<b>30</b>	
<b>Total</b>	<b>180</b>	

**Exam prepared by  
Ram Yamsaengsung  
December 4, 2014**

**PLEASE CHECK TO MAKE SURE THAT  
YOU HAVE ALL 13 PAGES OF THE EXAM BEFORE BEGINNING  
(not including the cover sheet).  
GOOD LUCK!**

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**CLOSED BOOK EXAM (180 points)**

**Part I. Answer the following questions about Food Ingredients and Functionalities  
(20 Points)**

1. Select 3 products that were posted by you and your classmates in the Food Ingredients and Functionalities project. List the THREE MAJOR ingredients in each product (not including water, unless specified). Underline the #1 ingredient in each product. **(12 points)**

2. For the **your team's product that you posted in Facebook**, list the major ingredients and their functions? (8 points)

**Part II. Answer the following questions about your Process Presentations. (40 points)**

1. Match the following products with the descriptions below. (10 points)

- (a) Marshmallow Cookies
- (b) Croissant
- (c) Ice Cream Pop
- (d) Ice Cream Cones and Sandwiches
- (e) Orange Juice
- (f) Yogurt

- \_\_\_\_\_ 1. Contains gelatin.
- \_\_\_\_\_ 2. Cut into triangle shapes before rolling.
- \_\_\_\_\_ 3. Has a shell and filling. Shell is made from water.
- \_\_\_\_\_ 4. Uses homogenization process. (2 answers)
- \_\_\_\_\_ 5. Uses pasteurization process. (4 answers)
- \_\_\_\_\_ 6. Requires fermentation. (2 answers)
- \_\_\_\_\_ 7. Requires proofing process.
- \_\_\_\_\_ 8. Requires crushing.
- \_\_\_\_\_ 9. Contains stabilizers. (3 answers)
- \_\_\_\_\_ 10. Uses brine water with calcium added in one of the process.
- \_\_\_\_\_ 11. Requires baking. (3 answers)

2. Select 4 products that were presented by you and your classmates in the Food Processing Presentation. List the THREE MAJOR ingredients in each product (not including water, unless specified). Underline the #1 ingredient in each product. **(12 points)**

3. For the food processing presentation that your team gave in class, list all the processes involved from raw materials to the finished product. Draw a flow diagram. **(18 points)**

**Part III. Shorts Answers (50 points)**

1. Name 2 types of refrigerants that are commonly used in freezing systems. **(2 points)**
2. Name 6 different units or ways that can be used to cook chicken. **(3 points)**
3. Name 5 types of drying equipment. **(5 points)**
4. What is the difference between PSL and HQL? **(4 points)**
5. Draw a typical drying curve (plot between the moisture content and the drying time) for dried bananas. Name 3 major drying parameters that affect the rate of drying of food products? What is the general final moisture content for dried or fried snack food? **(6 points)**

6. Discuss each of the cooking technique below. What is the **heat and mass transfer mechanism** of each? What happens to product in terms of color, texture, product surface, and water content? Give example of **3 products** that you find in restaurants or supermarkets for each cooking type (cannot use cooked chicken by itself). **(15 points)**

7. What is the difference between the crust region and the crumb region of a product? Draw a picture showing these regions and give 2 examples of foods that have both regions. **(5 points)**

8. Discuss the heat and mass transfer processes that take place during the frying of French fries. Draw a diagram and use arrows to show direction of heat and mass transfer. What are some major differences between French fries and potato chips?  
**(10 points)**



**Part IV. Food Processes and Cooking Presentations (40 points)**

1. List the 5 products that were presented by your classmates during the Food Cooking Presentation. Mention how each of the products could be improved.  
**(10 points)**
  
2. For the cooking presentation that you and your teammates presented, write a flow diagram of the production process from raw materials through packaging and transportation if you increase your production to marketable level. Discuss the marketing strategies and slogan for your team's product. Draw you packaging.  
**(30 points)**

**Process (15 points)**

**Marketing and Slogan: 5 P's (10 points)**

**Drawing of Packaging (5 points)**

**Part V. Product Development and Marketing (30 Points)**

You own a large **Fruit Orchard**. You just won the Thailand lottery worth 50,000,000 baht and have inside news that countries in the Middle East, Europe, and China are very interested in Thai desserts and snacks. **CREATE any type of FOOD PRODUCT that you plan to export to Europe, China or the Middle East.**

List the **major ingredients, how to make it, what processes and equipment** will you need, how to **package** it, the **price per unit, the units per package**, etc. Finally, discuss additional **marketing strategies (5 P's)** that could be used to increase profit. Don't forget to **name your product** and give a **slogan. (30 points)**

**You must also CREATE A PACKAGING DESIGN for your product. Draw it the space provided. This drawing will be worth 10 points and counted for this section.**