



B.E. International Program

Faculty of Economics, Thammasat University



Midterm Examination: 1/2017

Subject: EE 481 Industrial Economics

Date: Thursday December 14, 2017

Time: 9:00 - 12:00 hrs.

Seat No.....

ID.No.....

- Please do not turn this page over until you are instructed otherwise
- This exam is out of 105 points and has 3 parts (10 pages in total).

1) Short answer	4 questions	= 40 points
2) Problem set	1 problem set	= 40 points
3) Essay	1 essay	= 25 points
- Write neatly **and show all your work**. Answers without verification will receive no credit.
- If you have spare time, it is wise to go back to your answers and try to improve them. Clearer explanations with examples always receive more points.
- ONE (financial, scientific, or basic) calculator is allowed.

Students:

Please make sure that you do not bring any unpermitted items into the examination room. If you are caught doing so, you will automatically receive an “F” for that course and be suspended for one academic year.

Part 1: Short answers (40 points)

1. (10 points) Suppose an invention of a self-driving car can bring the net social benefit equivalent to 50 billion baht. Suppose that each research lab needs a funding of 2 billion baht. The probability that at least 1 lab will invent a self-driving car $\rho(n)$ depends on the number of labs funded. This probability takes the form $\rho(n) = (1 - \exp^{-0.061n})$, where “n” represents the number of labs funded.

- a) If the government decides to give funding for self-driving car, what should be the optimal number of labs that receive government funding?
- b) If the government decides to give a prize to whoever can invent the self-driving car first, what should the value of the prize, given that there are 9 labs participating in this competition?

This image shows a blank sheet of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Given

n	$(1 - \exp^{-0.061n})$
2	0.1149
3	0.1672
4	0.2165
5	0.2629
6	0.3065
7	0.3475
8	0.3861
9	0.4225
10	0.4566
11	0.4888
12	0.5191

2. (10 points) Referring to our Garment example, suppose there are 3 companies. The first company needs to sew 100,000 buttons, the second company needs to sew 10,000 buttons, the third company needs to sew 1,000 buttons. Suppose buttons are sold in a competitive market at price = mc = 5 cents each. Suppose the labor cost of sewing 1 button is 1 cent each. If a sewing machine can replace labor, answer the following questions:

2.1 How much would each company be willing to pay for a sewing machine?

company 1: _____

company 2: _____

company 3: _____

2.2 Suppose the sewing machine monopoly can do requirement tie-in and sell buttons along with its machine, what should be the price of each sewing machine and the price of each button for the sewing machine monopoly to extract all the willingness to pay from each garment company?

2.3 If the cost of producing 1 sewing machine is 1500 dollars, what should be the price of each sewing machine and the price of each button for the sewing machine monopoly to maximize its profit? How many companies will buy this machine?

3. (10 points) Why do we need to define a correct market definition? What are the methods which we can use to define the definition of a product (or service) market? Briefly explain each of them.

4. (10 points) In several industries, firms engage in *swaps*. For example, a paper firm with a plant in Tokyo and a customer in Osaka swaps one ton of paper with another paper firm with a plant in Osaka but a customer in Tokyo. Provide an efficiency explanation for swaps. Provide an anticompetitive explanation.

Part 2: Problem Set (1 problem)

(40 points) Suppose the production of 1 bottle of green-tea drink requires 1 portion of sugar. The marginal cost of 1 portion of sugar is 10. The green-tea drink firm's own marginal cost of producing 1 bottle of green-tea drink is 5. The demand for green-tea drinks is given by:

$$P(Q) = 800 - Q$$

Suppose the sugar industry is operated by a monopoly and the green-tea drink industry is operated by a monopoly.

- (a) (5 points) Let the price per 1 portion of sugar be " P_s ", find the derived demand for sugar.
- (b) (5 points) According to the derived demand in part a), what would be the price per one portion of sugar charged by the sugar monopoly? What would be the quantity of sugar sold in the market? Find the profit earned by the sugar monopoly.
- (c) (5 points) What would be the price of each green-tea drink? What would be the quantity of green-tea drink sold in the market? Find the profit earned by the green-tea firm.
- (d) (10 points) Suppose there are now 3 identical green-tea firms playing a non-cooperative Cournot game. Each firm's own marginal cost of producing 1 bottle of green-tea drink is still 5. The market demand for green-tea drink is still $P(Q) = 800 - Q$. The sugar industry is still operated by the same sugar monopoly. Find the derived demand for sugar faced by the sugar monopoly.
- (e) (5 points) From the derived demand in part (d), what should be the price and quantity of sugar set by the sugar monopoly? Find the profit earned by the sugar monopoly.
- (f) (5 points) Following from part (d) and (e), calculate the market price of green-tea drinks, the quantity of green-tea drinks produced by each of the green-tea firms. Calculate the profit earned by each green-tea firm.
- (g) (5 points) Compare the profit that the sugar monopoly receives in part (b) and part (e). Under which situation does the sugar monopoly make more profit? Explain why.

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Part 3: Graph and Explanation (25 points) –Your answer should about 1-1.5 page long.

CHOOSE ONE of the below options

Option 1: "Minnie's favorite travel destination is "California". However, the cost of travelling to California is usually beyond her budget. As a result, Minnie usually chooses to travel to cheaper destinations like Japan or Hong Kong. Use a product differentiation model learned in class to illustrate Minnie's situation. Label all the important points on your graph.

Option 2: Phillip Zoom is a teeth-whitening technology. Zoom is sold to dental clinics as a bundle of two products. First, the Phillip Zoom treatment machine. Second, the Phillip Zoom whitening formula. While Phillip clearly has some market power over the machine, the whitening formula can be bought in the competitive market. However, the Phillip company chooses to sell the two products in a bundle anyway. Explain why the Phillip company has chosen to do this.



1) The Phillip Zoom treatment machine

2) The Phillip's whitening formula

Option chosen ☐

Handwriting practice lines consisting of 30 horizontal dashed lines.