

**PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING**

Final Examination: Semester I
Date: October 7, 2010
Subject: 226-401 Product Design

Academic Year: 2010
Time: 9:00 – 12:00
Room: S203, 5&7

Instructions:

1. Write your name and student ID on the exam paper.
2. The exam has 4 parts and total score is 100
3. Answer Part III in an exam book provided.
4. This is an opened-book examination.
5. Carefully read the problems and answer all questions.

**ทุจริตในการสอบ โทษขั้นต่ำ คือ พักการเรียน ภาคการศึกษา และปรับตก
ในรายวิชาที่ทุจริต**

Problem No.	Full Score	Assigned Score
Part I	10	
Part II	30	
Part III	30	
Part IV	30	
Total	100	

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Instructors



Part I

(10 points) Briefly answer the following questions.

1. Explain the relationship between a number of innovations and competitiveness of a country.
2. Name one of Geographical Indications that is not listed in the Powerpoint.
3. List what differentiates Patent from Petty Patent.
4. List at least 3 innovations that can be copyrighted.
5. For how long can one innovation remain copyrighted?



Part II

1. (20 points) Complete the table of a classical model for QFD below and also give the detail according to your term project in each cell.

Matrix	What	How
House of Quality		
Subsystem Design Matrix		



Matrix	What	How
Piece Part Design Matrix		
Process Design Matrix		

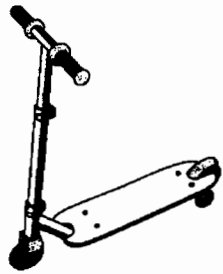
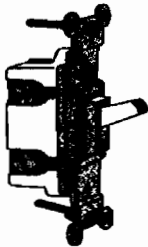



2. (10 points) List 10 reasons why reducing the number of parts in a product might reduce production cost. Also list some reasons why costs might increase.



Part III

1. (10 points) Review the products illustrated in Figure 1.1 – 1.3, and describe your thoughts on
 - a) The materials that could be used, your own selection, and your reasons for it.
 - b) Manufacturing processes and why you would select them.
 - c) Based on your review, any design changes that you would like to recommend.

	 (a) Toggle switch	 (d) Pipe wrench
Figure 1.1 Wheel board	Figure 1.2 Toggle switch	Figure 1.3 Pipe wrench

2. (10 points) Figure 2 shows the shape of a typical tensile-test specimen having a round cross-section. Assuming that the starting material (stock) is a round rod and only one specimen is needed,
 - 2.1) discuss the processes and machinery by which the specimen can be made, including their relative advantages and limitations.
 - 2.2) describe how the process you selected can be changed for economical production as the number of specimens required increases.

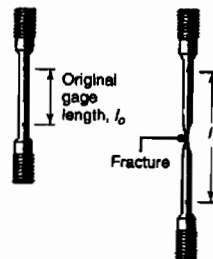


Figure 2 The tensile-test specimen

3. (10 points) Briefly answer the following questions.
 - 3.1 How are packaging design and product design related?
 - 3.2 What are the four primary functions of packaging? Explain.
 - 3.3 Demonstrate at least two cases for industrial packaging.
 - 3.4 Suggest at least one form each for the following packaging material;
 - paper and board
 - timber
 - plastics
 - glass
 - 3.5 What are the three broad categories of regulations (or laws) for which the packaging designers should understand and take into consideration when design the packaging?

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3.6 Explain the concept of protective packaging design (cushioning).

ANSWER IN THE BOOK PROVIDED



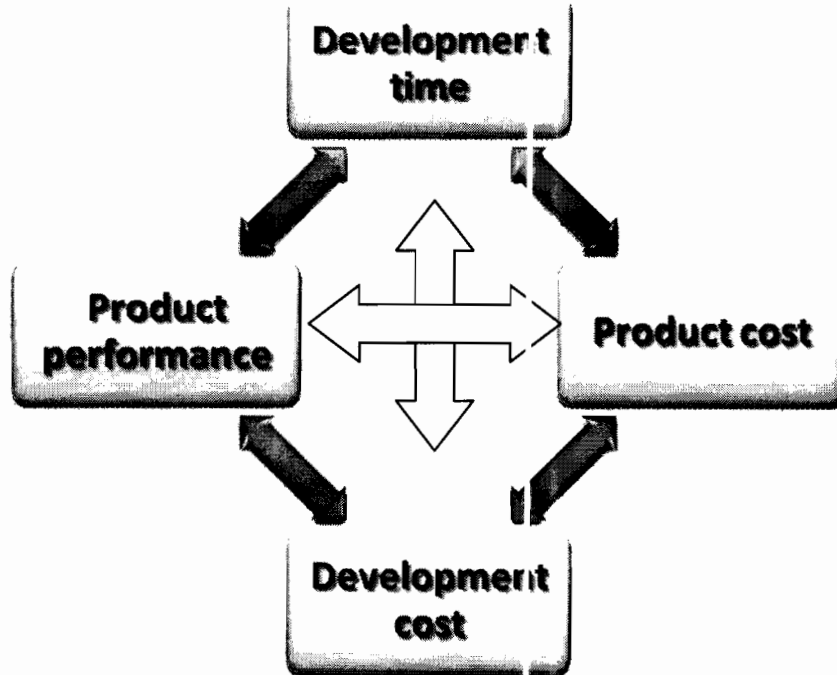
Part IV

1. (15 points) A designer has planned cash inflows and outflows of a product as shown in the following table. What should be filled in the blank from A-G

	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Development cost	1,000	1,250	1,500	1 500				
Ramp-up cost			2,000	1 000				
Marketing & support cost				550	1,000	1,000		
Production cost								
production volume					3,000	5,000	5,000	5,000
unit production cost					5	5	5	5
Sales revenue								
sales volume					3,000	5,000	5,000	5,000
unit price					8	8	8	8
Period Cash flow	A		B		C			
PV Year 1, r=10%		D		E		F		
Project NPV	G							

A =(1) B =(1) C =(1) D =(3)
 E =(3) F =(3) G =(3)

2. (10 points) Explain how the items in each block interact with each other.



Signature

3. (5 points) Give examples of factors we consider in a qualitative analysis. Also explain how those factors affect the product.

