

Prince of Songkla University
Department of Industrial Engineering, Faculty of Engineering

Midterm Examination: Semester 1

Academic Year: 2005

Date: 31 July 2005

Time: 9:00-12:00

Subject: 226-521 Material and Processes Selection

Room: R300

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา

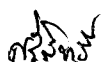
Instruction: Read them carefully

1. You must write your name and your student ID in every page of the test.
2. All materials are allowed.
3. There are 10 problems and total score is 110 points, work all of them and also show your work clearly and legibly.
4. Answer your questions in this test paper only.
5. Problem number 10 is a take home examination, you can take it off, finish it and bring it back on August 10, 2005.

Distribution of Scores

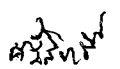
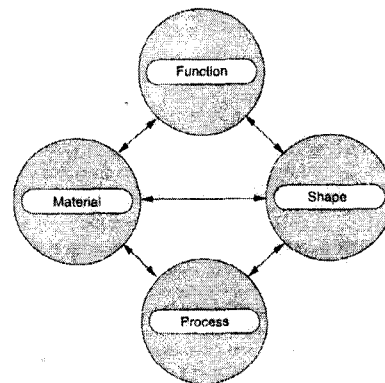
Problem	Points		Problem	Points	
1	10		7	10	
2	10		8	10	
3	10		9 (bonus)	10	
4	10		10	20	
5	10		รวม	110	
6	10				

Tests are arranged by
 Napisorn Memongkol



1. Why material selection is important in the design process? (10 points)

2. Explain the relationship between Function, Shape, Process, and Material and gives an example along with your explanation. (10 points)



3. Do you agree with this sentence? Explain your opinion.

“Good designs work; excellent designs also give pleasure” (10 points)

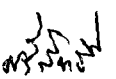
4. The evolution of engineering materials throughout history starts from Stone Age, Bronze Age, and Iron Age until now. What is the material that represents the age of the world today and gives reasons why? (10 points)

5. How many steps in design process? Explain each step: in detail. (10 points)

Handwritten signature or initials.

6. Discuss the advantages and limitations of each type of design? (10 points)

7. The number of the materials available to the engineer is vast: something between 40,000 to 80,000. How do you choose from this vast menu, the material best suited to your product? And what is your selection strategy? (10 points)



8. Give details on Function, Objective, Constraint and Material Indices of the following products (10 points)

Materials for springs

Materials for passive solar heating

Materials to minimize thermal distortion in precision devices

Materials for table legs

Materials for plane wings

product	Function	Objective	Constraint	Material index
Solar heating				
Spring				
Table leg				
Precision device				
Plane wing				

Handwritten signature or initials in the bottom right corner.

9. (bonus 10 points) there are many researches on natural rubber we have read from the newspapers or magazines such as

New glue from para rubber

Traffic tape from natural rubber

Liquid fuel from plastic and rubber

Rubber composite shield

Para rubber cup

There are a lot of products that development from para rubber. (Add value added to para rubber)

Design a new product (differ from we have in the market now) that develop from para rubber or natural rubber. (10 points)

10. (Take home examination, due on August 10, 2005) Design the product that represents the department of industrial engineering (either Industrial engineering major or Manufacturing engineering major) as a souvenir for the factory when the department take students visiting the factories, or a guest of department visit us here.

Your product might be something for exhibition or usable. Use all the procedures that we have learned to finish your product. (Give assumption anywhere necessary). Sketch your product after finish all procedures. (20 points)

