

Name.....Student I.D.....

Department of Mining and Materials Engineering
Faculty of Engineering
Prince of Songkla University

Mid-term Exam for Semester: 1 Academic Year: 2010

Date: August 3, 2010 Time: 9.00-12.00

Subject: 237-405 Materials and Process Selection Room: A201

Instructions

1. There are 3 problem sets. Please do all of them. Write your answers in the space provided.
2. Text books and course notes are not allowed.
3. Dictionary and calculator are allowed.
4. This mid-term exam is accounted for 25 % of total grade of this course.

Asst. Prof. Dr. Thawatchai Plookphol

Problem No.	Full Score (points)	Student's Score (points)
1.	40	
2.	40	
3.	20	
Total	100	

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Problem 1

1.1 According to Ashby’s method, materials selection procedure can be tacked in four steps, **Translation, Screening, Ranking, and Supporting Information**. Please explain the meaning of each step.

1) Translation (5 points)

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2) Screening (5 points)

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3) Ranking (5 points)

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4) Supporting information (5 points)

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1.2 Explain the following terms:

1) Materials performance index, M . (5 points)

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2) Material selection chart or Ashby's chart. (5 points)

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3) Trade-off plot (5 points)

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4) Penalty function (5 points)

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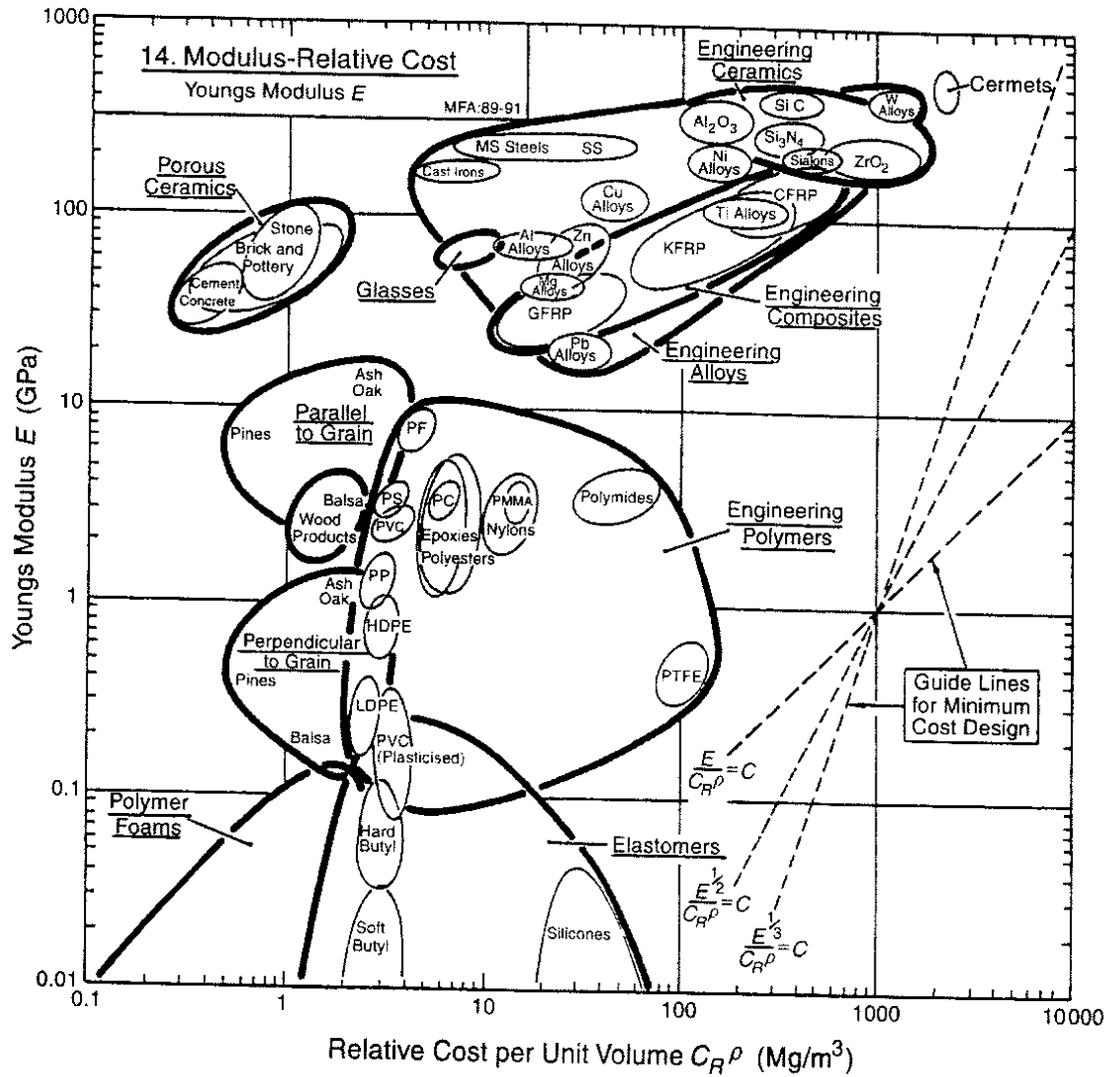
Problem 3 (15 points)

Use the Young's modulus-relative cost chart to identify material with

$$M_1 = E > 100 \text{ GPa}$$

$$M_2 = \frac{C_R \rho}{E^{1/2}} = 1 \frac{\text{Mg/m}^3}{\text{GPa}}$$

- 3.1 Draw the selection line M_1 (5 points)
- 3.2 Find the slope of line M_2 and draw the line (10 points)
- 3.3 Mark the selection region and identify the material (5 points)



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