

**PRINCE OF SONGKLA UNIVERSITY**  
**FACULTY OF ENGINEERING**

Final Examination: Semester 1

Academic Year: 2005

Date: October, 4 2005

Time: 9:00-12:00

Subject: 226-521 Material and Processes Selection

Room: R300

**Instructions**

- Write your name and student ID on every page.
- This is an opened-book examination.
- There are 6 problems and total score is 70.
- Carefully read the problems and answer all questions in each problem.
- Write your answer in this test paper only, show your work clearly and legibly.

ทูลจริตในการสอบ โทษขันต่ำ คือ พักการเรียน 1 ภาคการศึกษา และปรับตทในรายวิชาที่ทูลจริต

Name .....

Student ID .....

Question #	Full Score	Assigned Score
1	15	
2	10	
3	10	
4	10	
5	10	
6	15	
<b>Total</b>	<b>70</b>	

**Good Luck**

**Thanate Ratanawilai**

Name .....

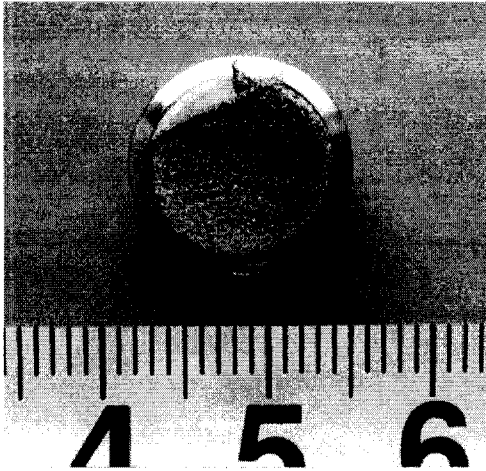
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**Problem 1.** Describe the general processing selection and identify main activities performed in each stage. of the process. **(15 points)**

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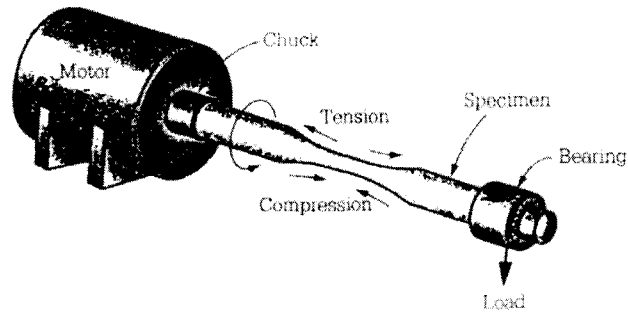
**Problem 2.** Stainless steel fasten bolt was used for flange of rotating shaft. After 1 month, the bolt was broken as shown in figures below. What is the cause of this failure? Explain behavior of this failure. (10 points)



Name .....

Student ID .....

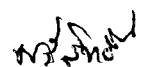
**Problem 3.** What kind of failure is tested in the figure below? Explain how?  
**(10 points)**



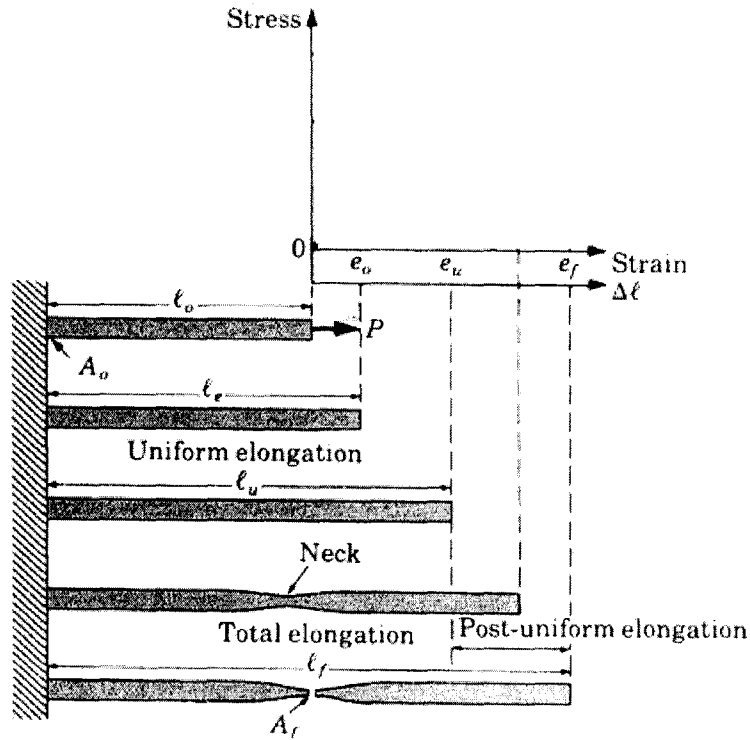
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**Problem 4.** What is “creep”? Which condition does creep have to be concerned for material and processes selection? Give an example as a case study to describe your answer. **(10 points)**



**Problem 5.** The tension test is the most common test for determining the strength-deformation characteristics of materials. Base on the information shown in the figure, draw the line to show your stress-strain curve. Identify and give the definition of the remarkable points on your stress-strain curve. (10 points)



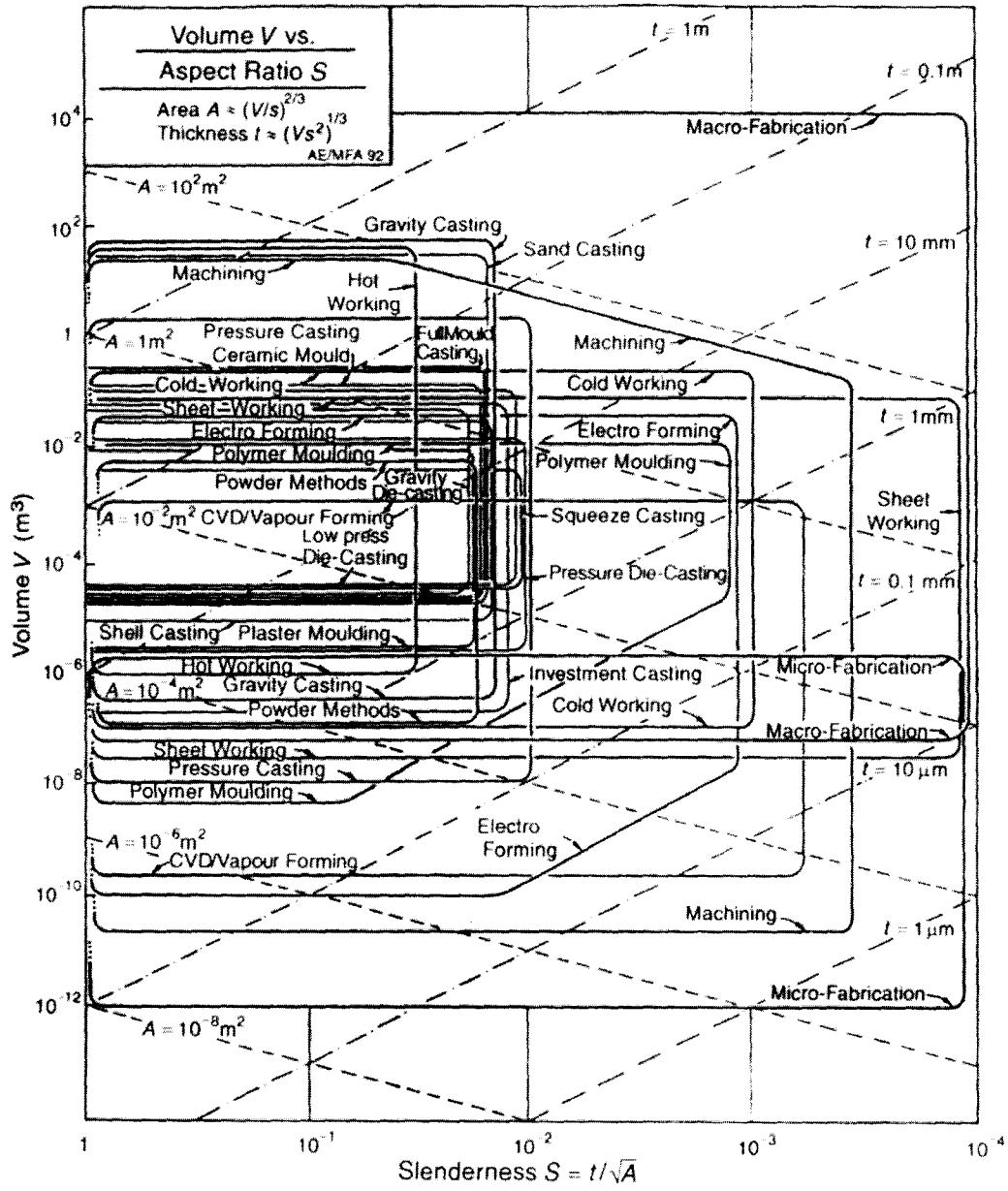
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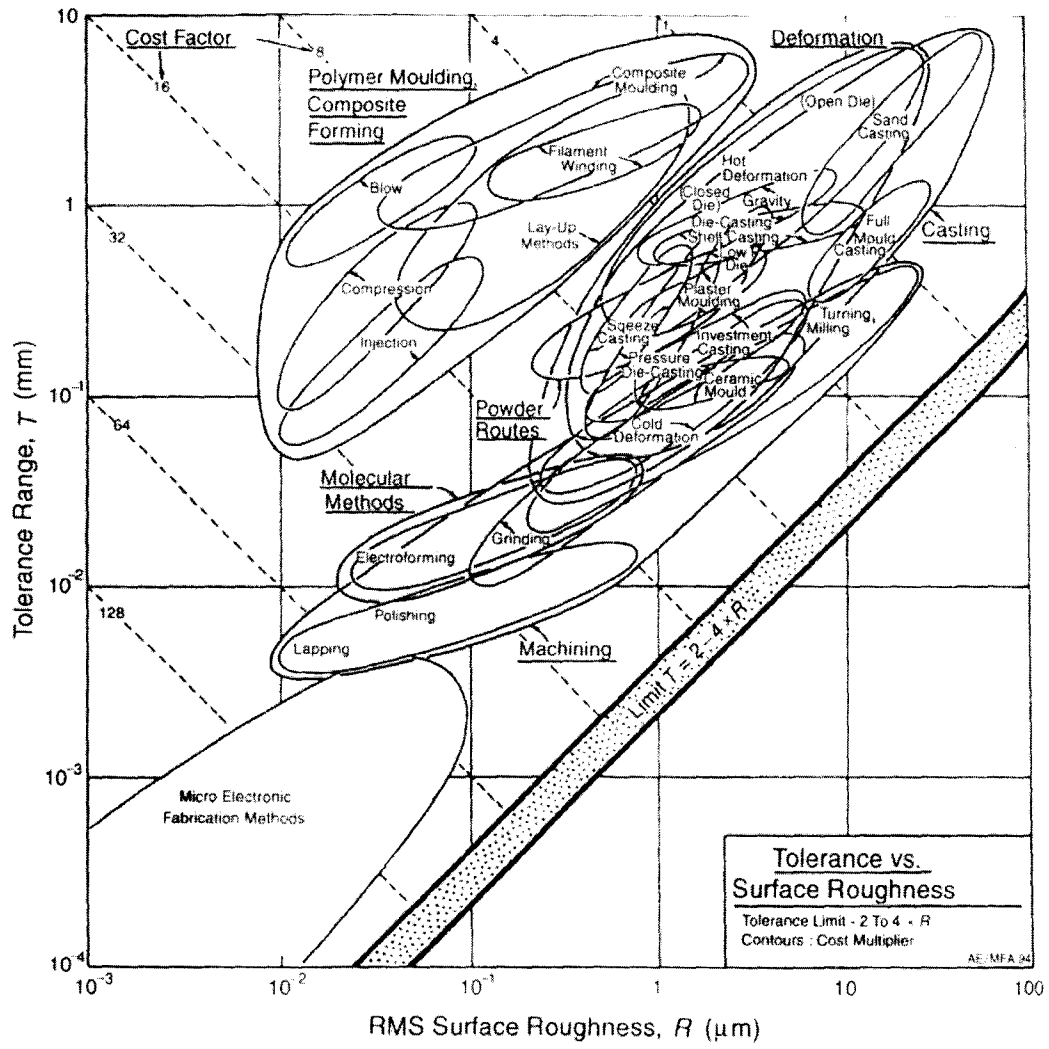
**Problem 6.** Explain a procedure to select the process for making a notebook computer case using the Size/Slenderness chart and the Tolerance/Roughness chart. The design requirements are as follows.

The sales department insists on an A4 footprint, and a thickness no greater than that of a paperback novel. Translated into more rational units, the outer dimensions of the case are  $280 \times 220 \times 20$  mm, with a wall thickness not exceeding 2 mm. It is to be made in two pieces (a base and a lid, each about the same size) from a tough thermoplastic. The tolerance T on the larger dimensions is specified as  $\pm 0.5$  mm; the RMS roughness R must not exceed  $0.1 \mu\text{m}$ . **(15 points)**



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