

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

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

Final Exam for Semester: 2

Date: February 25, 2009

Subject: 237-221 Mechanical Behavior of Materials

Academic Year: 2008

Time: 09.00-12.00

Room: R300

Instructions

1. There are 4 problem sets. Please do all of them. Write your answers in the space provided after each problem set. If you need more space, you can write on the back of the paper.
2. Only two pieces of A4-size note are allowed. You may write on both sides of the note. Please return them with your answers.
3. Dictionary, calculator, and stationery are allowed.
4. Text books, course notes, and other studying materials are not allowed.
5. This final exam is counted for 25% of the total grade.

Asst. Prof. Dr. Thawatchai Plookphol

Problem No.	Full Score (points)	Student's Score (points)
1.	20	
2.	20	
3.	20	
4.	20	
Total	80	

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2. Explain briefly the following terms:

2.1 Fatigue endurance limit (2 points)

2.2 Low cycle fatigue (2 points)

2.3 S-N Curve (2 points)

2.4 Paris' law for fatigue crack growth (2 points)

2.5 Cyclic hardening (2 points)

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2.6 Creep test (2 points)

2.7 Stress rupture test (2 points)

2.8 Inverted primary creep (2 points)

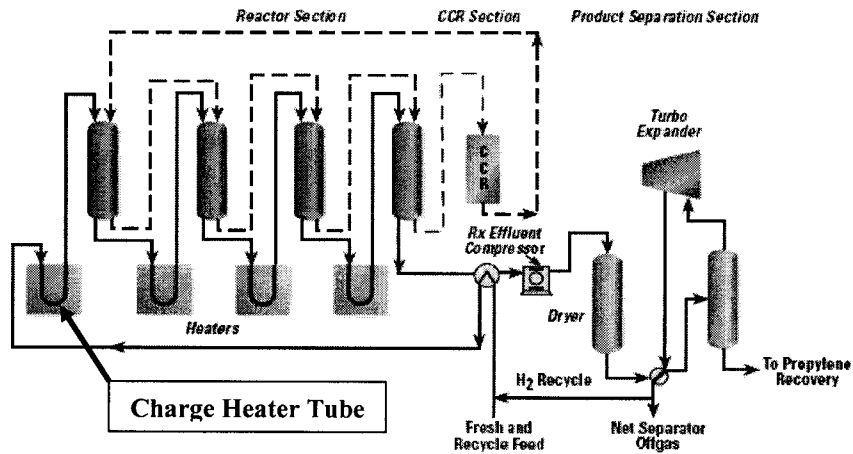
2.9 Dislocation glide-climb mechanism (2 points)

2.10 Nabarro-Herring creep (2 points)

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4. The SS347 alloy is used for charge heater tube in Oleflex petrochemical plant at Maptaput, Rayong, Thailand. The charge heater tube was designed to operate at internal pressure (p) of 550 kPa, $T = 754\text{ }^\circ\text{C}$. The tube has diameter (d) of 73 mm and thickness (t) of 3.05 mm.

C₃ Oleflex Process



A Larson-Miller plot for SS347 alloy is given below. Note that curve 4 is the lower limit and curve 5 is the upper limit for new material.

