

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination : Semester II

Academic Year 2004

Date : February 21, 2005.

Time : 09.00-12.00

Subject : 226-323 Engineering Metallurgy

Room : R300

ทฤษฎีในการสอบโทษขั้นต่ำ คือ ปรับตกในรายวิชาที่ทฤษฎี
และพักการเรียน 1 ภาคการศึกษา

Instructions :

1. Attempt all questions.
2. Write answers in this examination paper.
3. All materials are allowed to the examination room.
4. The points are as follows:

Question No.	1	2	3	4	5	6	7	8	total
Full points score	10	10	10	5	5	10	10	10	70

Boonrueing Manasurakarn

Instructor

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1. What is the effect of sulphur upon the properties of steels? (10 points)

2. Explain by means of phase transformation diagram. What occurs during the slow cooling of a steel containing 1.0 percent carbon. (10 points)

Sulphur

3. From the question No 2, compute the percentage of phase and structural constituents present in this alloy at room temperature. (10 points)

4. What is the proportional limit of material ? (5 points)

Supaporn

5. A piece of copper originally 12 in. long is pulled in tension with a stress of 40,000 psi. If the deformation is entirely elastic, what will be the result percent elongation?
(5 points)

6. A tensile stress is to be applied along the long axis of a cylindrical brass rod that has a diameter of 0.4 in. Determine the magnitude of the load required to produce a 10^{-4} in. change in diameter if the deformation is entirely elastic. Determine the applied stress and applied force when the elastic modulus of brass is 14.6×10^6 psi.
(10 points)

7. A kilogram alloy of 70%Pb and 30% Sn is cooled slowly from 300°C to 184°C above eutectic point. Determine

1. weight of liquid phase.
2. weight of proeutectic α

(10 points)

8. Describe the precipitation strengthening process using aluminium - copper alloy as an example. (10 points)

S. P. P. P. P.