

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester 1

Academic Year: 2005

Date: July 30, 2005

Time: 9:00-12:00

Subject: 226-401 Machining Technology

Room: Robot

Instructions

- This is a **closed-book** examination.
- Calculator and notes are **not** allowed.
- There are 5 questions in 7 pages.
- Total score is 50.

List of Equations

$$\tan \phi = \frac{(a_c / a_0) \cos \gamma_{ne}}{1 - (a_c / a_0) \sin \gamma_{ne}}$$

$$F_s = F_c \cos \phi - F_t \sin \phi$$

$$A_c = A_s \sin \phi$$

ทฤษฎีในการสอบ โทษขั้นต่ำ คือ พักการเรียน 1 ภาคการศึกษา และปรับตกในรายวิชาที่ทฤษฎี

Name

Student ID

Question #	Full Score	Assigned Score
1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

Thanate Ratanawilai, Ph.D



Name

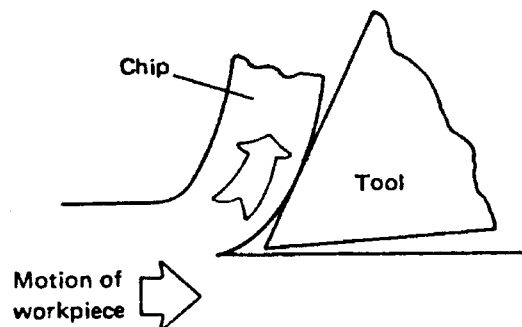
Student ID

Problem 1: How many types of chip, produced during metal cutting? Give the name and describe the characteristic of each type. (10 points)

Problem 2: For an operation of metal cutting; (10 points)

2.1 Explain temperature distributions in metal cutting where the heat was generated and transferred to.

2.2 Draw in the figure below to identify the highest temperature.



Name

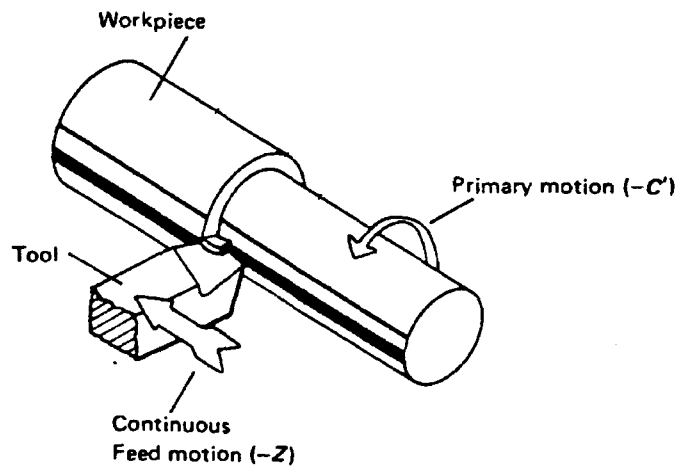
Student ID

Problem 3: 1 inch diameter shaft and 10 inch long is to be produced from a mild steel shaft with 2 inch diameter of 14 inch in length by a turning operation at a feedrate of 0.01 inch per rev and a depth of cut 0.05 inch. Calculate (10 points)

3.1 How many cycles have to be machined?

3.2 If same spindle speed of 250 rpm was used for each cycle in Question 3.1, what is the total machining time?

3.3 Give the name of each surface on the workpiece and identify in the figure below.



Name

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Problem 4: In an orthogonal cutting test on mild steel, the following results were obtained: (10 points)

Width of chip = 2.0 mm, Undeformed chip thickness = 0.50 mm,

Chip thickness = 0.50 mm, Working normal rake = 0° ,

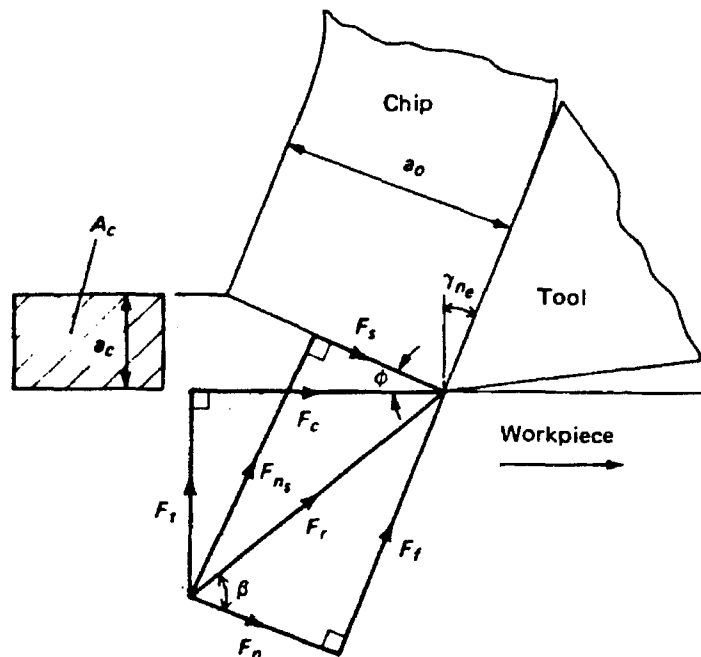
Cutting force = 900 N, Thrust force = 600 N

Calculate

4.1 The shear angle

4.2 The mean angle of friction of the tool face

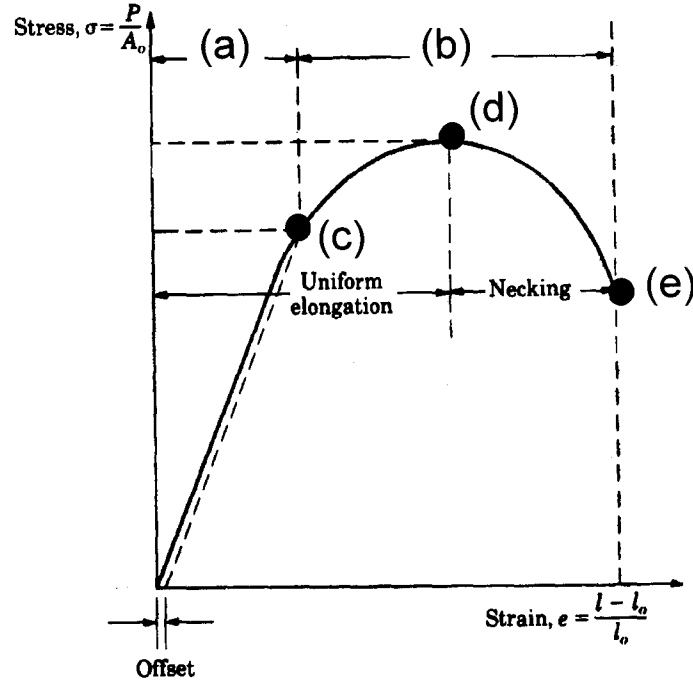
4.3 The mean shear strength of the work material, in meganewtons per square metre (MN/m^2)



Name

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Problem 5: From the stress-strain curve below, give the name and explain the meaning of each point. (10 points)



Region (a) _____

Region (b) _____

Position (c) _____

Position (d) _____

Position (e) _____
