PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester I   Academic Year: 2008
Date: July 31, 2008   Time: 9:00-12:00
Subject: 226-409 Machining Technology   Room: R200

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และ พักการเรียน **1** ภาคการศึกษา

INSTRUCTION:

1) ห้ามใช้โทรศัพท์มือถือ หรือเครื่องมือสื่อสารใดๆ ในห้องสอบ

2) ให้ทำข้อสอบทั้ง 10 ข้อ ในสมุดคำตอบที่แจกมา โดยมีคะแนนเต็ม 80 คะแนน

3) อนุญาตให้นำบันทึกย่อขนาดกระดาษ A4 โดยต้องเขียนด้วยลายมือ ห้ามถ่ายเอกสาร และเครื่องคิดเลขรุ่นที่ไม่สามารถป้อนโปรแกรมได้ เข้าห้องสอบได้

4) <u>ไม่</u>อนุญาตให้นำพจนานุกรมรุ่นใดๆ เข้าห้องสอบ

Question	Full Score	Assigned Score
Q1	5	
Q2	5	
Q3	10	
Q4	5	
Q5	5	
Q6	15	
Q7	15	
Q8	5	
Q9	5	
Q10	10	
Total	**80**	

Assoc. Prof. Somchai Chuchom

Q1 (5 points) Why machining is important? Give some cases to support your answer.

Q2 (5 points) Carbide cutting tools are classified in ISO system as grade P, M and K. Explain what is the condition that each grade is suitable for.

Q3 (10 points) It is accepted that cutting speed, feed, and depth of cut are the main parameters in a turning operation. In relative terms, at what values should those parameters be set for?
    3.1) a finishing operation
    3.2) a roughing operation

Q4 (5 points) Specify the functions of applying cutting fluids in machining operations. Also give your explanation on how it works for the specified function

Q5 (5 points) Identify all forces involved in a cutting operation.

Q6 (15 points) A 8-in. long, 0.5-in. diameter 304 stainless steel rod is being reduced in diameter to 0.480 in. by turning on a lathe. The spindle rotate at 480 rpm and the tool is traveling at an axial speed of 0.8 in./min.
    5.1) Calculate the cutting speed at the outer diameter.
    5.2) What is the material removal rate?
    5.3) Calculate the machining time for only cutting the length of 6-in.

Q7 (15 points) In the orthogonal cutting of a workpiece using a sharp carbide tool with rake angle (α) of $10°$, knowing that shear strength of the workpiece (τ) = 850 MPa, the relationship between Shear angle (Φ) and Friction angle (β) is $\Phi = 45° - (\beta-\alpha)/2$ and the chip length ratio (R_l) = 0.60. Calculate the power force, F_p, the thrust force, F_Q, and the Power (P) required for single edge orthogonal cutting when the chip width is 0.75 mm and the depth is 0.15 mm.

Q8 (5 points) What is the difference between oblique machining and orthogonal machining?

Q9 (5 points) There are three main sources of heat generated in the machining operation process. List the sources in order of their heat-generating capacity. Explain how each source of heat generated affects the cutting tool temperature.

Q10 (10 points) Referring to the profile in Figure Q10, given the numerical values to the vertical distances from the center line as in Table Q10.

10.1) Calculate the R_a, R_q, and R_t values.

10.2) Which one should be applied in practice? Why?

10.3) If the mark of roughness must be completely removed, how deep the surface material must be removed.
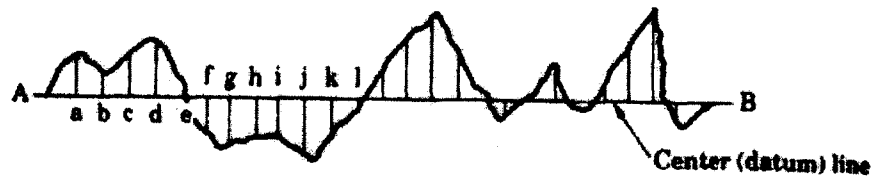

Figure Q10

Table Q10

Position	a	b	c	d	e	f	g	h	i	j	k	l
Distance (μm)	4	2.5	4	5.5	0	3	4	3.5	3.5	6	4	0.5