

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester 2

Academic Year: 2005

Date: March 3rd, 2006

Time: 13:30-16:30

Subject: 226-308 Modern Manufacturing Processes

Room: A401

Instructions

- A short-note of size A4 (both sides) written in your own hand-writing is allowed, and must be submitted with the answer book. (Duplicated note is not allowed)
- Dictionary and calculator are allowed.
- There are 7 parts in 12 pages.
- Answer all questions in the answer book.
- Total score is 45.
- Your answers could be in English or Thai.
- Please check all questions before start working.

Name:	Student ID.....
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Part	Full Score	Assigned Score
I	10	
II	5	
III	5	
IV	5	
V	5	
VI	5	
VII	10	
Total	45	

Mr.Srisit Chianrabutra

ทูลจตุรตในการสอบโทษขันต่ำ คอ พักการเรยน 1 ภาคการศึกษา และปรับตกในรายวิชานั้น

S. Srisit

Part I: Introduction (10 Marks)Key words:

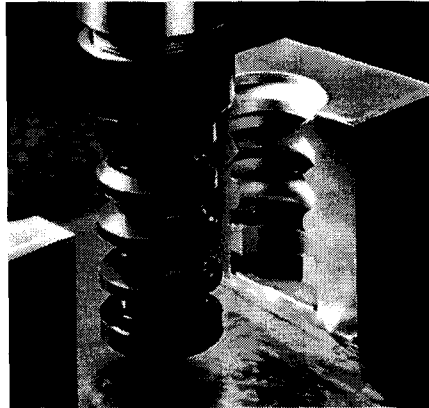
slurry	water	velocity stream
chemical	thermal	electrons
vaporization	erosion	photons
etchant	maskant	plasma stream
pressure	temperature	jet stream

1. Ultrasonic Machining (USM): Abrasives contained in a are driven at high velocity against work by a tool vibration at low amplitude and high frequency.
2. Water Jet Cutting (WJC): Uses a fine, high, high velocity stream of water directed at work surface for cutting.
3. Abrasive Water Jet Cutting (AWJC): When WJC is used on metals, abrasive particles must be usually added to
4. Abrasive Jet Machining (AJM): High of gas containing small abrasive particles.
5. Electrochemical Machining (ECM): Electrical energy used in combination with reactions to remove material.
6. Electrical Discharge Machining (EDM): Metal removal by a series of discrete electrical discharges (sparks) causing localized high enough to melt or vaporize the metal.
7. Electron Beam Machining (EBM): Uses high velocity stream of focused on workpiece surface to remove material by melting and vaporization.
8. Laser Beam Machining (LBM): Uses the high light energy from a laser to remove material by and ablation.
9. Plasma Arc Cutting (PAC): Uses a for operating at very high temperatures to cut metal by melting.
10. Chemical Machining (CHM): Material removal through contact with a strong chemical



Part II: Electrical Discharge Machining (5 Marks)

1. What is type of this EDM process? (1 Mark)

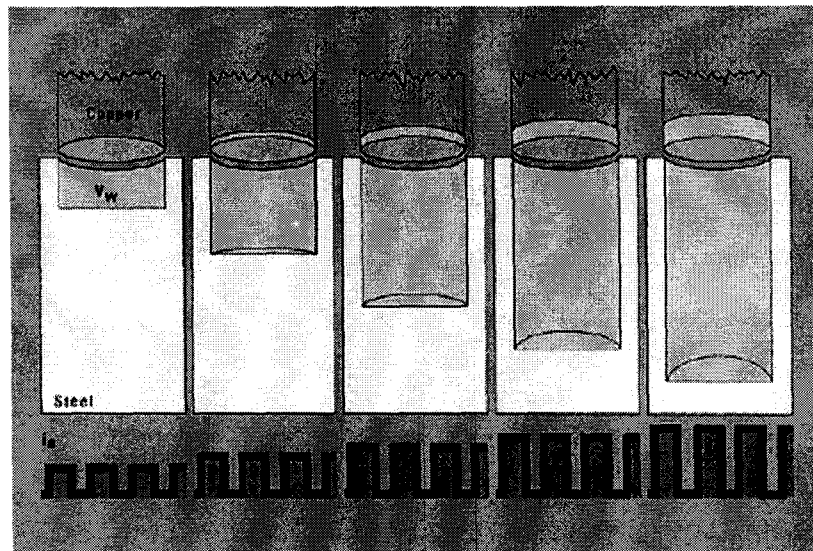


Answer.....

2. Give 4 samples of criteria for dielectric medium. (1 Mark)

- a.
- b.
- c.
- d.

3. Explain a concept of this picture. (1 Mark)



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Sapal

4. Give 2 examples of limitation in an EDM process. (1 Mark)

- a.
- b.

5. Calculate Wear Ratios of this data. (1 Mark)

Volume of Electrode Material Machined	Volume of Work Material Worn Out	Wear Ratio
3 (cm) ³ /min	9 (cm) ³ /min

Part III: High Speed Machining (5 Marks)

- 1. Take a small and cusp height goes down. (1 Mark)

- 2. Faster and lighter cutting can deliver a variety of benefits to electrode machining as follows:
(1 Mark)
 - a.
 - b.
 - c.
 - d.

- 3. What is the most of spindle bearing's stiffness and speed if used DN number criterion?
(1 Mark)

Type	Diameter (mm.)	Spindle Speed (rpm.)
A	30	65,000
B	35	60,000

Answer.....

- 4. Assume each character commands 10 bits of data. A serial connection with a baud rate of 9,600 bits per second. A program block may require 20 characters. If chord lengths are 0.020 inch long in a fine-detail region, then how fast can it cut? (2 Marks)

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Part IV: Water Jet Cutting/Abrasive Water Jet Cutting (5 Marks)

1. How to solve a "Jet Lag" problem in Water Jet Cutting/Abrasive Water Jet Cutting? (1 Mark)

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2. Water Jet Cutting and Abrasive Water Jet Cutting use the principle of pressurizing water to extremely high pressures, and allowing the water to escape through a very small opening (typical called the "....." or ".....")(1 Mark)

3. Comparing Water Jet Cutting/Abrasive Water Jet Cutting with Laser Cutting. (1 Mark)

Advantages	Disadvantages
a.....	a.....
b.....	b.....

4. Comparing Water Jet Cutting/Abrasive Water Jet Cutting with Electrical Discharge Machining. (1 Mark)

Advantages	Disadvantages
a.....	a.....
b.....	b.....

5. Comparing Water Jet Cutting/Abrasive Water Jet Cutting with Punch Press. (1 Mark)

Advantages	Disadvantages
a.....	a.....
b.....	b.....

Part V: Laser Machining (5 Marks)

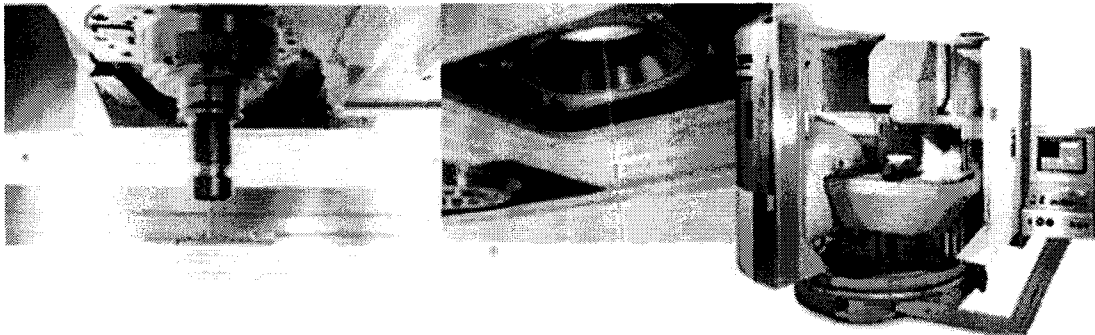
1. and are among the most important industrial lasers. The works well with most metals, plastics, wood, quartz, ceramics and glass. The works well with metals, especially those that are highly reflective. (1 Mark)

2. What are disadvantages of Laser Machining? (1 Mark)
 - a.
 - b.

3. is determined particularly by the hole taper for laser drilling, kerf geometry for laser cutting, and groove shape for three-dimensional machining. (1 Mark)

4. Laser cutting process is a cost effective process for prototyping and since no physical tooling is needed.

5. Explain a concept of this picture. (1 Mark)



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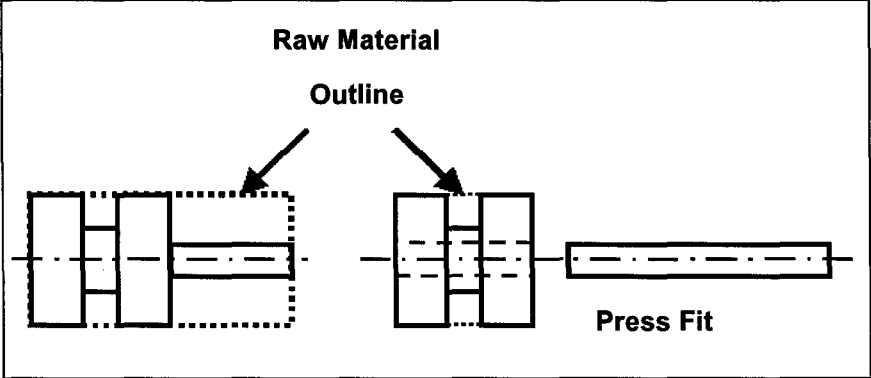
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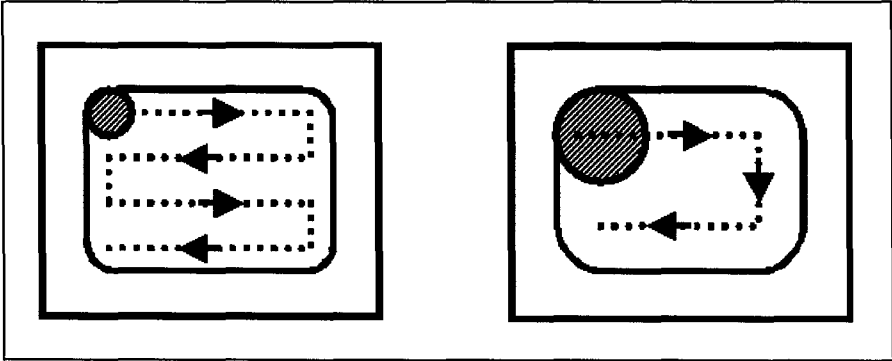
Part VI: Design for Machining (5 Marks)

1. Explain a concept of this picture. (1 Mark)



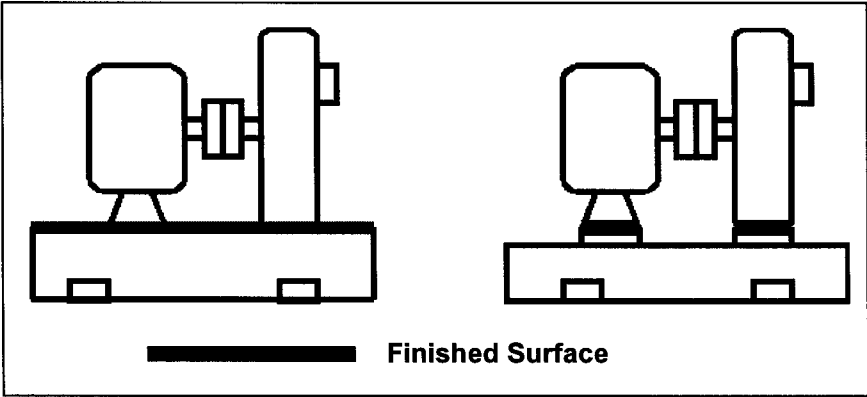
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2. Explain a concept of this picture. (1 Mark)



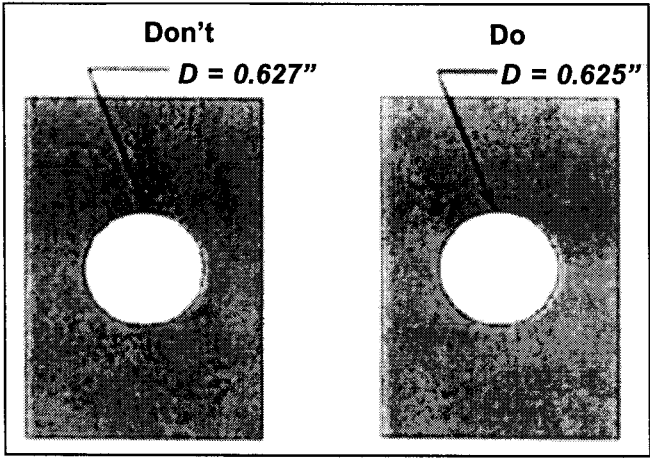
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3. Explain a concept of this picture. (1 Mark)



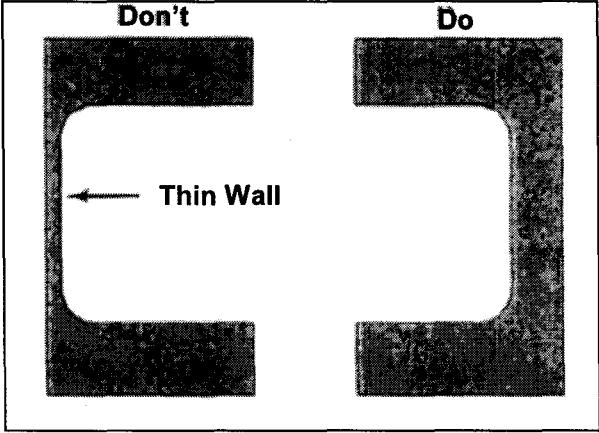
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4. Explain a concept of this picture. (1 Mark)



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5. Explain a concept of this picture. (1 Mark)



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Part VII: SMED & CIM (10 Marks)

1. List 7 types of waste. (2 Marks)

- a.
- b.
- c.
- d.
- e.
- f.
- g.

2. What is the meaning of external task? (1 Marks)

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3. What is the meaning of internal task? (1 Marks)

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4. Give 2 samples of reducing setup time. (1 Mark)

- a.
- b.

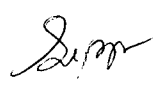
5. The definition of is: "All the work and time involved between making the last good product, batch or part to the next product, batch or part at normal efficiency/speed" (1 Mark)

6. What is the abbreviation of CIM? (1 Mark)

Answer.....

7. Give 2 benefits of CIM. (1 Mark)

- a.
- b.



8. What is the main problem of applying CIM system? (1 Mark)

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9. What is the meaning of "Mass Customization"? (1 Mark)

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