PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester 1   Academic Year: 2004
Date: October 1, 2004   Time: 9.00-12.00
Subject: 226-401 Machining Technology   Room: R300

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา

Instructions

- There are 6 questions in 9 pages.
- Answer all questions in this exam paper.
- All materials, books, notes, dictionaries and calculators are allowed.
- Total score is 95.

Name:	Student ID....................

Question #	Full Score	Assigned Score
1	20	
2	15	
3	25	
4	15	
5	10	
6	10	
Total	**95**	

Asst. Prof. Somchai Chuchom

Question #1 (20 marks)

1-1 What is the principal cause of tool wear in ECM?

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1-2 What effect does work-material hardness have on the metal-removal rate in ECM?

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1-3 Is the UM really a chipless process? Why?

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1-4 If the metal from which a part is to be made is quite brittle and the part will be subjected to repeated tensile loads, would you select ECM or EDM for making it? Why?

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1-5 If you had to make several holes in a large number of duplicate parts, would you prefer ECM, EDM, EBM or LBM? Why?

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1-6 Why might chipless machining processes have greater importance in the future?

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1-7 In AWM setup, what is the necessary function of the drain?

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Question #2 (15 marks)
Give a short answer for each following question.
2.1 Why do CO_2 laser and Nd YAG laser gain wide accepted than other laser types for industrial material cutting?
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2.2 The main problems of applying continuous mode lasers when compared to pulsed mode lasers are ....
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2.3 The main problems of applying CO_2 laser on *Al* workpieces are
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2.4 Why cutting forces in laser assisted machining are lower than those of conventional cutting processes? ....
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2.5 In academic point of view, discuss the potential success and development of Nd-Glass laser.
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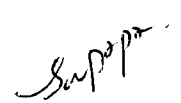...
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<u>Question #3</u> (25 marks)

The manufacturer receives an order of fine turning 1800 pieces. Each piece will be cut for 1 pass. The finished part is 90 mm in diameter and 250 mm in length. If apply cermet tools with tool life follows the equation $T = 1.85 \times 10^8 v^{-2.2}$ (T = tool life, min., v = cutting speed, m/min) The tool costs 520 Baht/tip. The expense of operating the machine (include labor cost) is 135 Baht/hr, the machine depreciation is calculated at 250 Baht per operating hour. Assume that this cost assignment is correct and accepted.

For each piece of work, the loading time, T_l = 1.5 min, unloading time, T_u = 0.75 min. Tool change for each tool tip is 1.5 min.

Calculate the appropriate cutting speed, spindle speed, tool life, total time per piece for manufacturing, total time for the entire lot, and the total cost of this order.

Name...ID..................

<u>Question #4</u> (15 Marks)

4.1 In CIM, what does '*Integration*' mean?

4.2 If a company decides to implement CIM in its organization, what guidelines would you recommend the MD to successfully implement the system?

4.3 Flexible manufacturing system, FMS, comprises many sub-systems.
List those sub-systems and briefly explain how each sub-system operates.

Question #5 (10 Marks)

What difficulties do the technicians encounter when setting the most appropriate cutting conditions in the shop floor? Demonstrate in details on how to set up the most appropriate cutting conditions for turning workpieces.

Question #6 (10 Marks)

6.1 What are the advantages of high speed cutting? How the tool life in high speed cutting is measured?

6.2 How to choose cutting tools in high speed cutting? Explain or demonstrate by case study.