

Prince of Songkla University

The Faculty of Engineering

Final Examination Semester 1

Academic Year 2004

Date :October 1, 2004

Time : 13.30-16.30

Subject : 226-409 Production Technology III

Room : A400

DIRECTIONS

- **Only short-note of A4-sheet (both sides) *written in your own hand-writing is allowed* and must be submitted with the answer book. (Duplicated note is not allowed.)**
- **Dictionaries and calculators are allowed.**
- **5 questions are included (3 pages) and must be done.**
- **Total score is 70.**
- **Your answers could be in English or Thai.**
- **Please check all questions before start working.**

Asst.Prof.Dr. Angoon Sungkha-pong

ทฤษฏีในการสอบ

**โทษขั้นต่ำคือ ปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา
โทษสูงสุดคือ ให้ออก**

Sungkha-pong

Question #1 (10 Marks)

Make a list of machining process (non-conventional process) that may be suitable for the following workpiece materials:-

- a) ceramics
- b) cast iron
- c) thermoplastics
- d) stainless steel
- e) fabrics

Question #2 (10 Marks)

Describe the principles or the concepts of Ultrasonic Machining Process (ECM), also draw the diagram to demonstrate the process. Discuss on the essential factors that affect the productivity and quality in this process.

Question #3 (25 marks)

The Southern Production Co.Ltd. got an order of 1000 pieces of AISI 304 stainless steel which be produced by fine turning. It is required two passes of cut per piece. The finished part is 50 mm in diameter and 600 mm long. If the company applies the ceramic tool of tool life follows the equation $T = 1.83 \times 10^4 v^{-1.7}$, where T = tool life (min) and v = cutting speed (m/min).

The machine depreciation is calculated at 180 Baht per one hour of machining. The tool costs 500 Baht per tip, the operating cost (include labor cost) is 105 Baht/hr. The loading time per piece is 1 min, The unloading time per piece is 0.5 min. Tool change per tip is 1.0 min. Other expense is assumed negligible. On your selected criterion (min cost or max production rate), answer following questions:

- a) calculate the optimum cutting speed;
- b) calculate the appropriate spindle speed;
- c) calculate the tool life;
- d) calculate the total machining time of the order;
- e) calculate the total cutting cost of the order.

Question # 4 (15 marks)

Water-Jet machining is a material-removal technique that can be applied to cut a variety of materials such as fabrics, rubber, wood products, paper, leather, brick and composite materials. In addition, the WJM technique's advantages are various.

Question 4.1: What are the other special works could be done by this technique? (5 marks)

Question 4.2: What are the 5 advantages provides from this technique? (10 marks)

Question #5 (10 marks) List the factors that should be considered in choosing a suitable material-handling system.

The End