

# Prince of Songkla University

## Faculty of Engineering

Final Examination : Semester 1

Academic Year : 2006

Subject : 226 – 409 Machining Technology

Time : 9.00 - 12.00

Date : 7 October 2006

Room : A401

ทฤษฎีในการสอบ โทษขั้นต่ำคือปรับตกในรายวิชาที่ทฤษฎี และพักการเรียน 1 ภาคการศึกษา

- ห้ามใช้โทรศัพท์มือถือ หรือเครื่องมือสื่อสารในห้องสอบ
- อนุญาตให้นำกระดาษขนาด A4 บันทึกโน้ตใดๆก็ได้ เข้าห้องสอบได้ไม่เกิน 1 แผ่น นำเครื่องคิดเลขรุ่นใดเข้าห้องสอบก็ได้ แต่ห้ามนำหนังสือ หรือ Sheet อื่น ๆ เข้าห้องสอบ

Answer all the questions in the book provided. There are 5 questions. The full marks are 50.

1. In machining of stainless steel work piece with a carbide tool, the tool life equation is

$$T = k v^{-0.5} f^{-4.0}$$

When  $T$  = tool life (min),  $v$  = cutting speed (m/min),  $f$  = feed rate (mm/rev)

At present the cutting condition was  $v = 100$  m/min,  $f = 0.1$  mm/rev,  $T = 60$  min.

*If the manufacturer wants to use a new cutting condition with  $v = 150$  m/min, and  $f = 0.05$  mm/rev, what is the new value of tool life?*

(10 Marks)

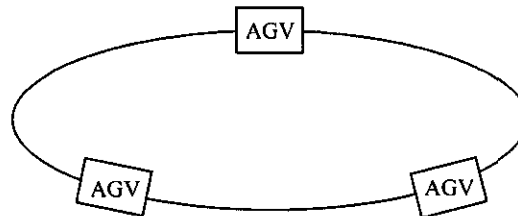
2. When a cutting tool "A" is used to cut a tool material "B" the value of  $v_{60}$  is 50 m/min.

and  $v_{30}$  is 80 m/min. *What is the value of  $v_{10}$ .*

(10 Marks)

3. Answer the following questions.

3.1 Automated guided vehicles (AGV) are arranged into 1 simple loop as shown in the sketch. *Explain 2 systems that can be used to prevent AGV from collision.*

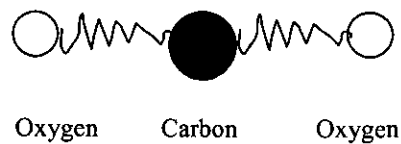


3.2 Write 3 reasons why a robot should be used to replace human. Give some examples in your explanation.

(10 Marks)

4. Answer the following questions.

4.1  $\text{CO}_2$  laser used one of the many modes of molecular vibration to generate the monochromatic light beam. *If the  $\text{CO}_2$  molecule can be represented by the following picture, use the picture to explain 3 different ways that vibration can take place.*



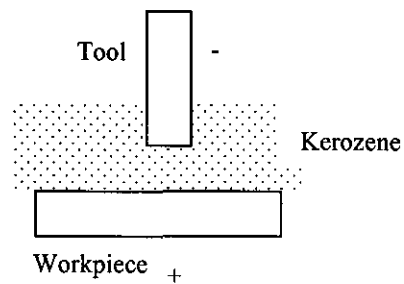
4.2 In a He Ne laser, Ne is known to be the luminant that releases light energy. *What is the role that He plays in the light emission process ?*

(10 Marks)

5. Answer the following questions.

5.1 In electric discharge machining, the workpiece is made a positive electric pole while the tool is made a negative pole. A dielectric liquid, ie. kerosene, is placed in the middle as shown in the sketch.

*Explain why the dielectric liquid must be put in between the tool and the workpiece.*



5.2 Water abrasive jet machining uses abrasive grains and high speed water jet to cut stones and marbles. *Explain the roles of the abrasive grains and the water jet in machining.*

(10 Marks)

++++++

Assoc. Prof. Dr. Supachok Wiriyacosol

SAPA