Prince of Songkla University

Faculty of Engineering

Final Examination : Semester 1 Academic Year : 2006

Subject : 226 – 308 Modern Manufacturing Technology Time : 09.00 - 12.00

Date : December 21, 2006. Room : A400

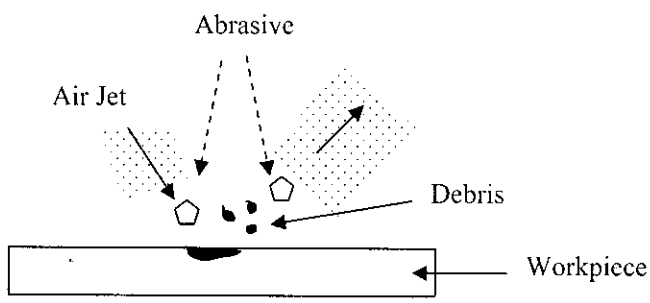
ทุจริตในการสอบ โทษขั้นต่ำคือปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา

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

Answer all the questions in the book provided. There are 10 questions. The full marks are 60.

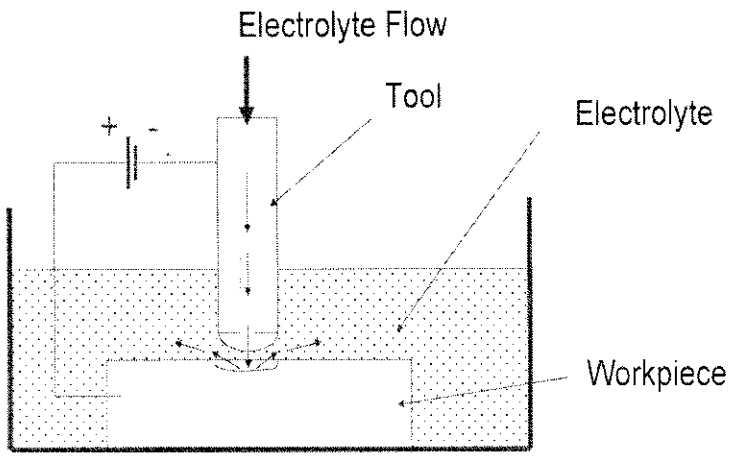
1. An abrasive jet machining process as shown in the following figure, used air as the carrier and aluminium oxide was the abrasive powder system, and the workpiece was carbon steel. After machining was completed the process was found to be very noisy and the work place was dirty and full of dust.

Explain how the process can be improved to reduce noise and reduce dust.



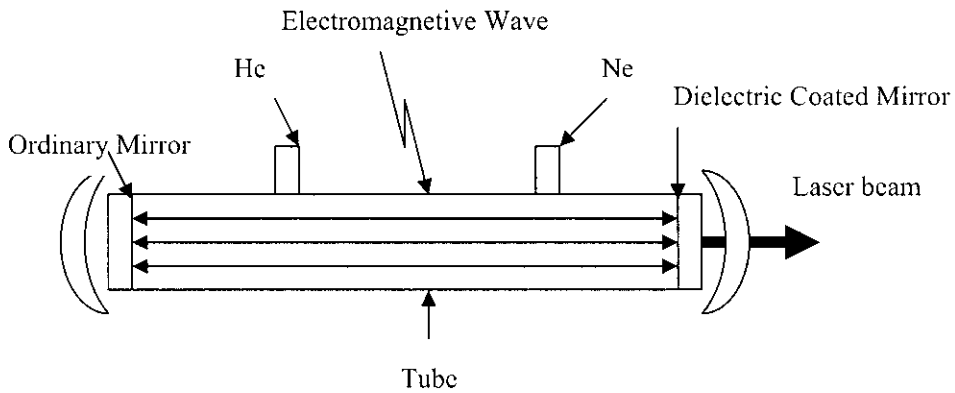
(6 Marks)

2. In the electrochemical machining (ECM) process as shown in the following figure, the tool is brass and the workpiece is an alloy steel. Explain how the ECM process work.



(6 Marks)

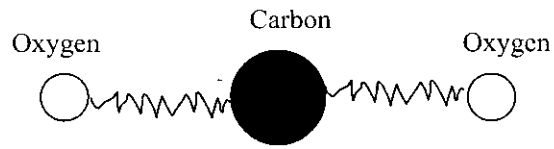
3. From the following sketch of a He Ne Laser Machine, explain how the laser beam is produced.



(6 Marks)

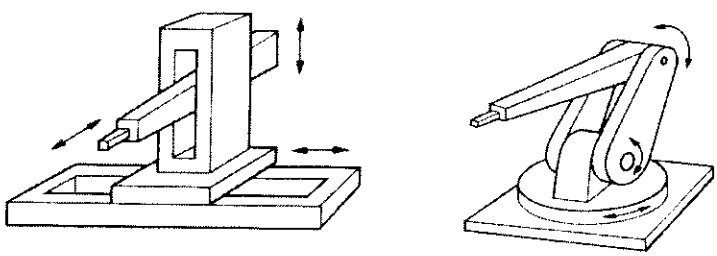
4. CO_2 Laser is produced by the vibration of carbon dioxide molecules. The molecule can be represented by one carbon atom and two oxygen atoms as shown in the following figure.

Explain the 3 different modes of vibration that produce 3 different monochromatic lights.



(6 Marks)

5. Explain why a joint arm robot can work faster than a cartesian coordinate robot.

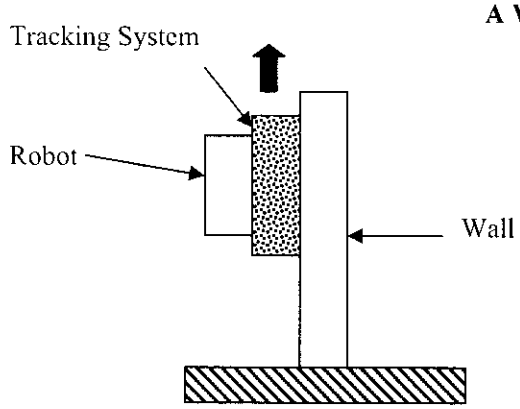


Cartesian Coordinate Robot Joint Arm Robot

(6 Marks)

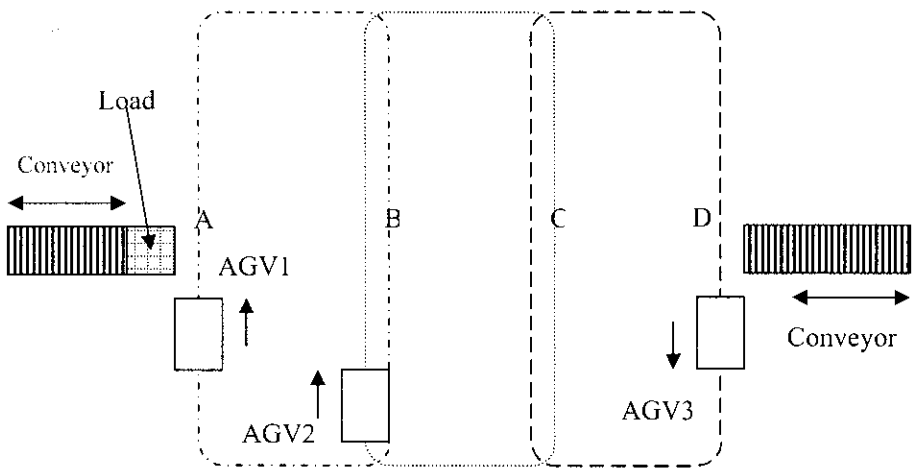
6. Explain the possible principle how a wall climbing robot, as shown in the following figure, can hold to the wall without falling down.

A Wall Climbing Robot



(6 Marks)

7. Explain how the automated guided vehicle AGV1 can transfer a load from point "A" to the point "D". Each AGV can move only in its own track in the clockwise direction. The material transfer system is as shown in the following figure.

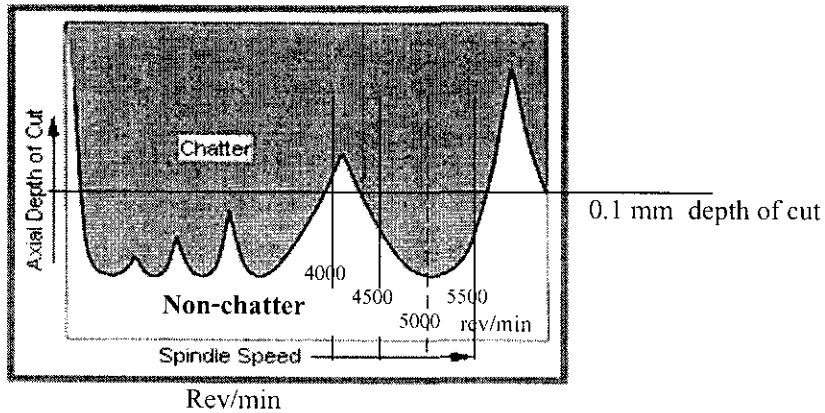


(6 Marks)

8. Explain the reason why an aluminium workpiece can be cut at a speed as high as 10,000 m/min but a steel workpiece can be cut at the highest speed only 500 m/min.

(6 Marks)

9. When a machine tool is used to cut a workpiece at 0.1 mm depth of cut, and spindle speed 4,500 rev/min, chatter or machine vibration happens. Keeping the 0.1 mm depth of cut, what is the closest higher speed that should be used to be free of chatter or vibration.



(6 Marks)

10. In a laser machining operation where laser beam was used to cut a gold workpiece. It was found that no cutting happened. Explain the reason why no cutting took place.

(6 marks)

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Assoc. Prof. Dr. Supachok Wiriyacosol