PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester II — Academic Year: 2012
Date: December 17, 2012 — Time: 9:00-12:00
Subject: 226-301 Advanced Manufacturing Technology — Room: หัวหุ่น, R201

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และ พักการเรียน 1 ภาคการศึกษา

INSTRUCTION:

1) There are 10 questions in 3 pages.
2) Attempt all 10 questions and write your answer in the ***answer-book*** provided. Start from question 1 to 10 accordingly.
3) All calculators, notes and materials are allowed.
4) Total score is 110.

Question	Full Score	Assigned Score
Q1	10	
Q2	15	
Q3	15	
Q4	10	
Q5	5	
Q6	5	
Q7	15	
Q8	10	
Q9	10	
Q10	15	
Total	110	

Assoc. Prof. Somchai Chuchom

Q1 Specify the global trends that may affect today's business. After the year 2015, Thailand will enter into AEC. What types of the manufacturing industries in *Southern Thailand* will get benefits? Why? (10 points)

Q2 Consider the special shapes of workpieces as shown in Figure 1, their details are also listed in a) to f) of Table 1. Select the most appropriate non-traditional machining processes for each shape and give your reasons. (15 points)

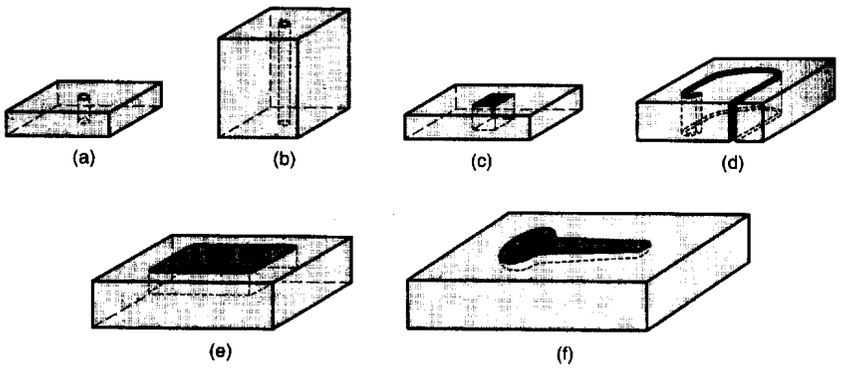

Figure 1

Table 1

	Details	Appropriate non-traditional Machining Processes /reasons
a)	Very small holes below 0.125 mm in diameter	
b)	Holes with large depth-to-diameter ratios (d/D > 20)	
c)	Holes that are not round	
d)	Narrow slots in slabs and plates of various materials, the slots are not necessarily straight	
e)	Shallow pockets and surface details in flat parts	
f)	Special contoured shapes for mold and die applications	

Q3 Choose one of the rapid prototyping system from each initial form of its material (liquid-based, solid-based, and powder-based). For each chosen system, describe its process method and highlight the key strengths or weaknesses involved (15 points)

Q4 Examine the model shown in Figure 2 (the same material for the whole piece). In which orientation you would choose to produce the part when applying a) FDM process and b) LOM process? Sketch and explain your idea. If the supports are required, show them in the sketch. (10 points)

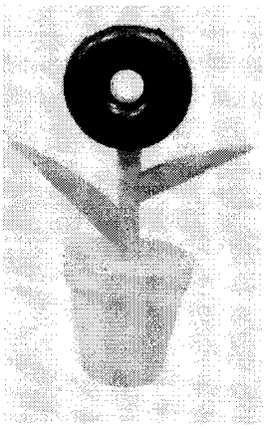

Figure 2

Q5 Ceramic and cermet cutting tools have certain advantages over carbide tools. Why, then, are they not completely replacing carbide tools? (5 points)

Q6 Explain how the EDM process is capable of producing complex shapes. (5 points)

Q7 What functions/components of the organization need to be integrated in CIM company? Explain the common database required and how to communicate effectively in the system (15 points)

Q8 Describe your thoughts regarding the laser-beam machining of nonmetallic materials. Give several possible applications, including their advantages as compared to other processes. (10 points)

Q9 Why is high-speed cutting important? When cutting cast iron workpiece in high-speed mode, what cutting speed should be applied? What kind of the cutting tools should be recommended? Why?(10 points)

Q10 Choose one of the advanced manufacturing processes covered in the class, show what you know about it and specify a part or product that is most appropriate produced by this chosen process. (15 points)

Vapisphon