

Name : ID. Code : Years :

Prince of Songkla University

Faculty of Engineering

Final Examination Semester 1

Academic Year : 2003

Date : 6 October 2003

Time : 9.00-12.00

Subject : 226-495 Special Topics in Manufacturing V (CAD/CAM Technology) Room :

Instruction

1. There are 5 questions , 100 marks.
2. Attempt to do all questions in this test paper. More blank papers can be requested if needed.
3. Books, notes, a dictionary and a calculator are allowed.
4. Don't write in red pen.

No.	Full Score	Marks
1	20	
2	10	
3	10	
4	40	
5	20	
Total	100	

Mr. Pichet Trakarnchaisiri

Lecturer

Name : ID. Code : Years :

1. Please write the short explanation for each question below. (Select to answer only 5 questions)

(4 marks / 1 question)

1.1 What are the duties of computer aided process planning?

1.2 What kind of environment should generative process planning be used instead of variant process planing system?

1.3 What are the advantages and disadvantages of Flexible Manufacturing System?

Name : ID. Code : Years :

1.4 What are the three popular GT classification and coding systems? Please list and define.

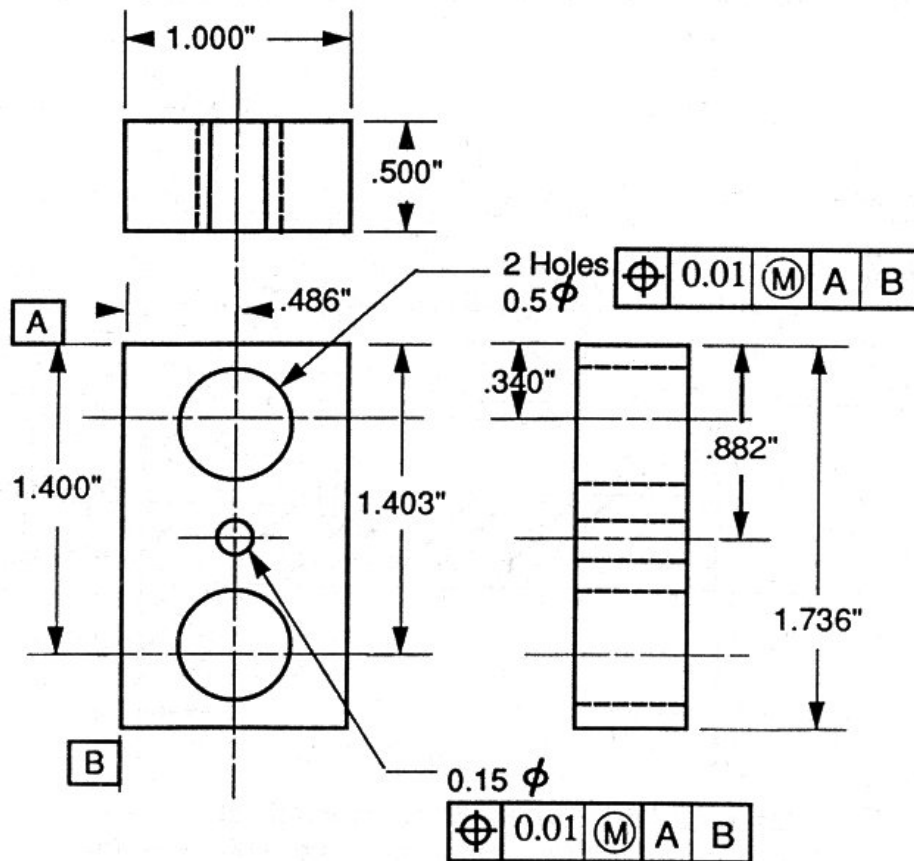
1.5 What are the different between Numerical control and Computer Numerical control?

1.6 What are the main components of Main control Unit (MCU)? Describe the duty of MCU.

Name : ID. Code : Years :

2. The part shown in Figure below is made of stainless steel type 304 cold rolled, the hardness is 40 HRc. The dimension of bilateral tolerance is 0.005 in. and the surface finish is 125 μin.

(10 marks)



2.1 Describe the meaning of geometric tolerancing symbol in figure. (2 marks)

2.2 Write the geometric tolerancing symbol of flatness tolerance of part thickness 125 μin.

(Define it on part drawing) (2 marks)

2.3 Write the geometric tolerancing symbol of symmetry tolerance of part side A 150 μin.

(Define it on part drawing) (2 marks)

2.4 Write the geometric tolerancing symbol of parallelism tolerance of part side B 200 μin.

(Define it on part drawing) (2 marks)

2.5 Write the geometric tolerancing symbol of roundness tolerance of a small hole 30 μin.

(Define it on part drawing) (2 marks)

Name : ID. Code : Years :

3. List the step of process when you want to produce a part by using CAD/CAM and CNC machine.

(10 marks)

Name : ID. Code : Years :

4. Generate a design of the part shown in job description paper on NC program report. The NC program is planned to operate on the CNC machining center, with Cincinnati controller system. Design the operations and calculate the suitable value in each parameter, fill all in the blank of job description paper and NC program report. (Dimension of blank part : 100 X 100 X 30 mm.) (40 marks)

Job description paper				
M/C Name : Machining Center	Material : Stainless steel	Unit : mm.		
Job Name : Cavity plate	Job No. : 1	Planner name :		
<p>Part figure</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Top View</p> </div> <div style="text-align: center;"> <p>Right Side View</p> </div> </div> <div style="margin-top: 20px;"> <p>Front View</p> </div> <div style="text-align: center; margin-top: 20px;"> </div> <div style="margin-top: 20px;"> <p>Holes with tapping (∅10x20)x2</p> <p>Rectangular pocket 50x40x10 R4.0</p> <p>Semi-circular groove (∅6x3x20)x2</p> <p>Holes (∅8x30)x2</p> <p>Chamfer (C5.0)x2</p> <p>Filllet (R7.0)x2</p> </div>				
Step of Operation	No. of Cutting Tool	Configuration	Spindle Speed (N)	Feed
1. Rough contour milling at outside edge with z step = 2.5 mm, 4 times by tool no.1 (stock 1 mm.)	1. Tool no. 1	HSS End mill M16, 2 flute	rpm	mm./min.
2. Finishing contour milling at outside edge with z step = 10 mm. 1 time by tool no.2	2. Tool no. 2	HSS End mill M16, 4 flute	600 rpm	20 mm./min.

Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : Page : /
Machine : Machining Center		Program Name :	Programmer : Date :
N 005			
N 010			
N 015			
N 020			
N 025			
N 030			
N 035			
N 040			
N 045			
N 050			
N 055			
N 060			
N 065			
N 070			
N 075			
N 080			
N 085			
N 090			
N 095			
N 100			
N 105			
N 110			
N 115			
N 120			
N 125			
N 130			
N 135			
N 140			
N 145			
N 150			

Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : Page : /
Machine : Machining Center		Program Name :	Programmer : Date :
N 155			
N 160			
N 165			
N 170			
N 175			
N 180			
N 185			
N 190			
N 195			
N 200			
N 205			
N 210			
N 215			
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N 295			
N 300			

Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : Page : /
Machine : Machining Center		Program Name :	Programmer : Date :
N 305			
N 310			
N 315			
N 320			
N 325			
N 330			
N 335			
N 340			
N 345			
N 350			
N 355			
N 360			
N 365			
N 370			
N 375			
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N 445			
N 450			

Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : Page : /
Machine : Machining Center		Program Name :	Programmer : Date :
N 455			
N 460			
N 465			
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N 485			
N 490			
N 495			
N 500			
N 505			
N 510			
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N 590			
N 595			
N 600			

Name : ID. Code : Years :

NC program report			
Job name :	Job No. :	Drawing No. :	Page : /
Machine : Turning Center	Program Name :	Programmer :	Date :
N 605			
N 610			
N 615			
N 620			
N 625			
N 630			
N 635			
N 640			
N 645			
N 650			
N 655			
N 660			
N 665			
N 670			
N 675			
N 680			
N 685			
N 690			
N 695			
N 700			
N 705			
N 710			
N 715			
N 720			
N 725			
N 730			
N 735			
N 740			
N 745			
N 750			

Name : ID. Code : Years :

5. Generate a design of the part shown in job description paper on NC program report. The NC program is planned to operate on the CNC Turning center, with Cincinnati controller system. Design the operations and calculate the suitable value in each parameter, fill all in the blank of job description paper and NC program report. (Cylinder blank part : Ø 2.125 X 7.0 in.) (20 marks)

Job description paper				
M/C Name : Turning Center	Material : AISI 1050 BHN : 200 Brinell	Unit : Inch		
Job Name : Bullet Holding	Job No. : 2	Planner name :		
Step of Operation	No. of Cutting Tool	Configuration	Spindle Speed (N)	Feed
1. Rough turning with depth cut = 1.00 mm., retract = 0.5 mm. (stock for finishing x = 0.25,z = 0.25 mm.) by tool no.1	1. Tool no. 1	Diamond 55° SDUSR126P	rpm	in./r.
2. Finishing contour turning by tool no.2	2. Tool no. 2	Diamond 35° SVXHR125G	900 rpm	0.010 in./r
3. Grooving at z = 4.375" and 0.25" depth by tool no.3	4. Tool no. 3	Groove insert STGNN164R LBEF662	900 rpm	0.010 in./r
4. Thread turning G34 (ACME thread Ø 2-4.5 UNC , Minor Dia. 1.7113) by tool no.4	3. Tool no. 4	Thread 29° STGNN164R	500 rpm	-

Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : /
Machine : Turning Center		Program Name :	Programmer : /
Date :			
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N 145			
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Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : /
Machine : Turning Center		Program Name :	Programmer : /
Date :			
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Name : ID. Code : Years :

NC program report			
Job name :		Job No. :	Drawing No. : /
Machine : Turning Center		Program Name :	Programmer : /
Date :			
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