Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree program
1st Semester Examination – March/April 2013

Uva Wellassa University

SCT 468-2 Computer Aided Design and Manufacturing

Total **three (03)** Questions
Time: Two (02) Hours
Answer **all** questions on the question paper itself.
Total mark allocation 300.

1.

a. What are the drawbacks in the sequential product development process?

(20 marks)

b. What are the advantages of having a simultaneous/integrated product development process?

(20 marks)

c. Explain the needs recognition matrix using an example.

(20 marks)

d. What is conceptual design? How do you select the best concept from a group of possible solutions?

(40 marks)

2.

a. What are the reasons to have an integrated CAD/CAM system?

(20 marks)

b. What is CIM? Give a model for CIM implementation.

(20 marks)

c. Discuss different types of features in CAD.

(20 marks)

d. What is the difference between design features and manufacturing features? Explain your answer using sketches.

(40 marks)

3.

a. What is the difference between G02 and G03 in CNC machine programming? Explain with an example.

(10 marks)

b. What are the different methods of inputting a program into a CNC machine?

(10 mark)

c. Write G-Code CNC program for the part shown in Fig.Q03. List of G-Codes and M-Codes are given at the end of the question paper. All dimensions are in inches. Thickness of the part is 0.5 inch. Propose a suitable material for the workpiece and diameters of the tools used. Select a work coordinate system. Write down any other assumed data if any.

(80 mark)

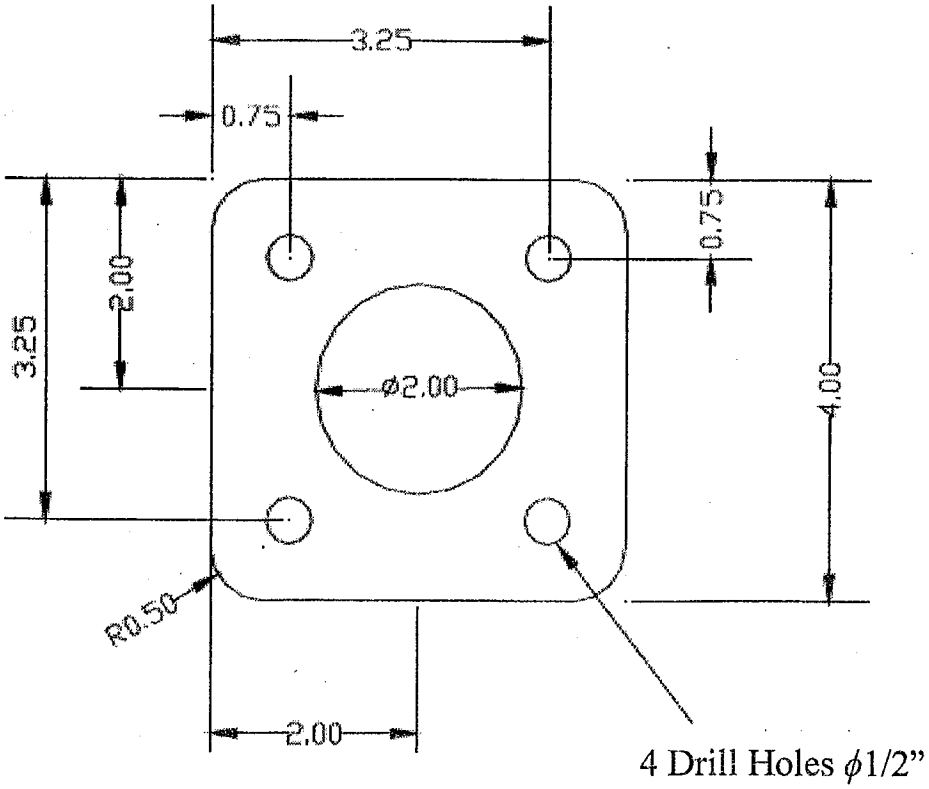

Fig.Q03

Standard M-Codes

M00 program stop
M01 optional stop
M02 end of program (no rewind)
M03 spindle CW
M04 spindle CCW
M05 spindle stop
M06 tool change
M07 mist coolant ON
M08 flood coolant ON
M09 flood coolant OFF
M19 spindle orientation ON
M30 end program (rewind stop)
M98 call sub-program
M99 end sub-program

G-Code List Machining Centers

G00 positioning (rapid traverse)
G01 linear interpolation (feed)
G02 circular interpolation CW
G03 circular interpolation CCW
G04 dwell
G07 imaginary axis designation
G09 exact stop check
G10 offset value setting
G17 XY plane selection
G18 ZX plane selection
G19 YZ plane selection
G20 input in inch
G21 input in mm
G22 stored stroke limit ON
G23 stored stroke limit OFF
G27 reference point return check
G28 return to reference point
G29 return from reference point
G30 return to 2nd, 3rd & 4th ref. Point
G31 skip cutting
G33 thread cutting
G40 cutter compensation cancel
G41 cutter compensation left
G42 cutter compensation right
G43 tool length compensation + dir
G44 tool length compensation - dir
G49 tool length compensation cancel
G45 tool offset increase
G46 tool offset decrease
G47 tool offset double increase
G48 tool offset double decrease
G50 scaling OFF
G51 scaling ON
G52 local coordinate system setting
G54 work coordinate system 1 select
G55 work coordinate system 2 select
G56 work coordinate system 3 select
G57 work coordinate system 4 select
G58 work coordinate system 5 select
G59 work coordinate system 6 select
G60 single direction positioning
G61 exact stop check mode
G64 cutting mode
G65 custom macro simple call
G66 custom macro modal call
G67 custom macro modal call cancel
G68 coordinate system rotation ON
G69 coordinate system rotation OFF
G73 peck drilling cycle
G74 counter tapping cycle
G76 fine boring
G80 canned cycle cancel
G81 drilling cycle, spot boring
G82 drilling cycle, counter boring
G83 peck drilling cycle
G84 tapping cycle
G85,G86 boring cycle
G87 back boring cycle
G88,G89 boring cycle
G90 absolute programming
G91 incremental programming
G92 programming of absolute zero point
G94 per minute feed
G95 per revolution feed
G96 constant surface speed control
G97 constant surface speed control cancel
G98 return to initial point in canned cycle
G99 return to Ref point in canned cycle