Uva Wellassa University, Sri Lanka
End Semester Examination – July 2010
ENG 402-2 Computer Aided Design and Manufacturing

Time: Two (02) hours

Total 05 Questions
Answer **four (04)** questions only

1.

1.1. What is the sequential product development process?

(05 marks)

1.2. What is the simultaneous/integrated product development process?

(05 marks)

1.3. Explain the needs recognition process of the product development cycle.

(05 marks)

1.4. What is conceptual design? How to select the best concepts to use with the design?

(10 marks)

2.

2.1. What are the reasons to have a CAD system?

(05 marks)

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

(05 marks)

2.3. Discuss about different types of feature in CAM.

(05 marks)

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

(10 marks)

3.

3.1. What is the variant process planning? Explain using an example.

(05 marks)

3.2. What is the generative process planning? Explain using an example.

(05 marks)

3.3. Compare wireframe modeling with solid modeling.

(05 marks)

3.4. Draw the CSG tree for the object shown in Fig.Q03.

(05 marks)

3.5. Explain the feature recognition procedure using a flowchart.

(05 marks)

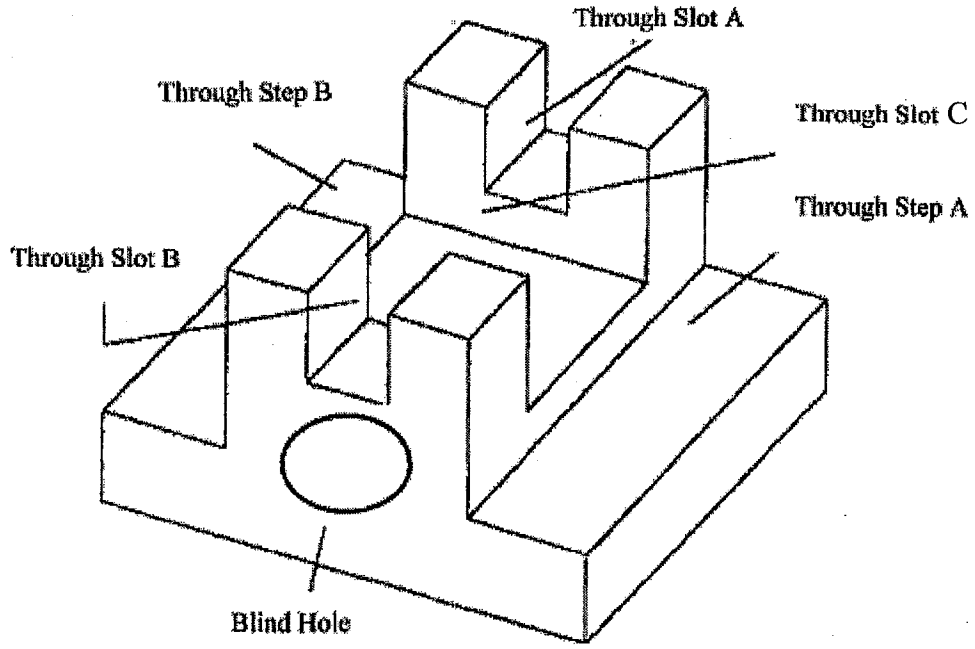

Fig.Q03

4.

4.1. What is the difference between G01 and G00 in CNC machine programming? Explain with an example.

(05 marks)

4.2. What are the different methods of inputting a program in to a CNC machine?

(05 marks)

4.3. Write G-Code CNC program for the part shown in Fig.Q04. List of G-Codes and M-Codes are given at the end of the question paper. Thickness of the part is 8 mm. Give the material of the workpiece, diameters of the tools used, selected origin for the work coordinate system and other assumed data.

(15 marks)

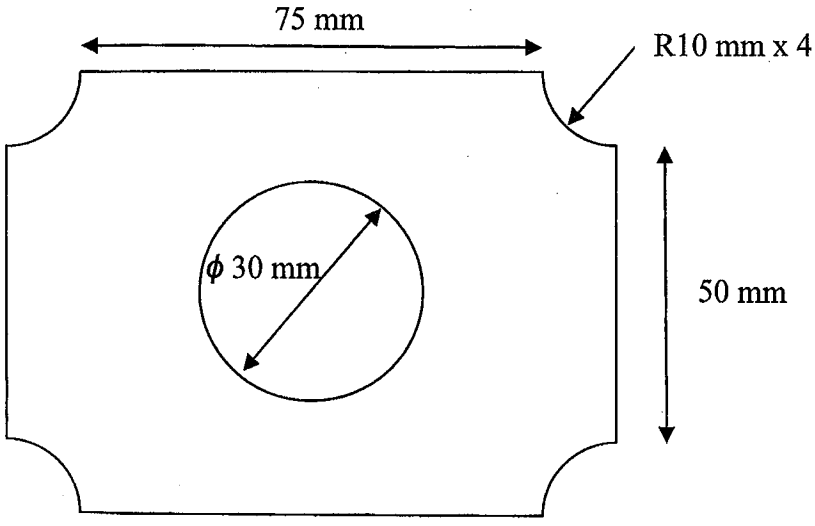

Fig.Q04

5.

5.1. Discuss 03 (three) applications of CNC machines.

(05 marks)

5.2. What are the advantages and drawbacks of CNC machines?

(05 marks)

5.3. Compare open loop control and closed loop control related to CNC systems.

(05 marks)

5.4. Draw a sketch of a CNC system and explain different modules.

(10 marks)

M-Code	Function
M0	Program stop.
M2	End of program.
M3	Spindle ON FWD.
M4	Spindle ON REV.
M5	Spindle OFF.
M8	Coolant ON.
M9	Coolant OFF.
M30	Jump to new program.
M98	Call subprogram.
M99	End subprogram.
M100	Mirror image.
M105	Dry-run, all axes.
M106	Dry-run, NO Z axis.
M107	Dry-run off (cancels M105 or M106).

Modal		Non-Modal	
G-Code	Function	G-Code	Function
G0	Positioning-Rapid Traverse	G4	Dwell
G1	Linear Interpolation-Feed	G5	Ellipse
G2	Circular Interpolation-CW	G9	Exact Stop Check
G3	Circular Interpolation-CCW	G28	Return to Machine Home
G22	Stored Stroke Limit ON	G29	Return from Machine Home
G40	Tool Radius Compensation, Cancel	G31	Probe Move
G41	Tool Radius Compensation (Left)	G45	Mold Rotation
G42	Tool Radius Compensation (Right)	G49	Elbow Milling
G53	Work Coordinate System	G62	Automatic Feed Override for Arcs
G59	Modal Corner Rounding	G63	Automatic Feed Override for Arcs Cancel
G60	Modal Corner Rounding Off	G65	User Macro Single Call
G61	Exact Stop Check Mode	G66	User Macro Modal Call
G64	Cutting Mode (Continuous Path ON)	G67	User Macro Modal Call Cancel
G66	User Macro Modal Call	G68	Coordinate System Rotation
G67	User Macro Modal Call Cancel	G73	Draft Pocket Milling Cycle
G68	Coordinate System Rotation	G75	Frame Milling
G70	Inch Programming	G76	Hole Milling Cycle
G71	MM Programming	G77	Circular Pocket Cycle
G72	Axis Scaling	G78	Rectangular Pocket Cycle
G90	Absolute Programming	G79	Bolt Hole Circle Cycle
G91	Incremental Programming	G80	Cancel Modal Drilling
G94	Per Minute Feed	G169	Area Clearance
G95	Per Revolution Feed	G170	Facing Cycle
G81	Basic Drilling Cycle	G171	Circular Profile Cycle
G82	Counterbore Drilling Cycle	G172	Rectangular Profile Cycle
G83	Basic Peck Cycle	G177	Plunge Circular Pocket
G84	Tapping Cycle	G178	Plunge Rectangular Pocket
G85	Basic Bore Cycle	G179	Hole Pattern Drilling
G86	Uni-directional Boring Cycle	G181	Thread Mill Cycle
G87	Chip Break Drilling Cycle		
G89	Flat Bottom Bore Cycle		
G92	Absolute Zero Preset		