Uva Wellassa University, Sri Lanka
End Semester Examination – February/March 2012
SCT 468-2 Computer Aided Design & Manufacturing

Time: Two (02) Hours



Total 04 Questions
Answer all questions

1)

I. Define Computer aided manufacturing (CAM).

(20 marks)

II. List the most important reasons of using CAD systems in the manufacturing environment. Explain them briefly

(20 marks)

III. Write down 05 different types of features used in design and manufacturing environment.

(05 marks)

IV. Describe feature-based approach briefly.

(25 marks)

V. Describe briefly the CAM cycle in feature – based manufacturing environment.

(30 marks)

2) Identification and grouping of feature entities from a geometric model is known as feature recognition in manufacturing engineering.

I. List 05 feature recognition approaches used in manufacturing engineering.

(10 marks)

II. Explain the graph-based approach using a suitable example.

(30 marks)

III. Develop a rule by using the logic based approach for the following component.

(60 marks)

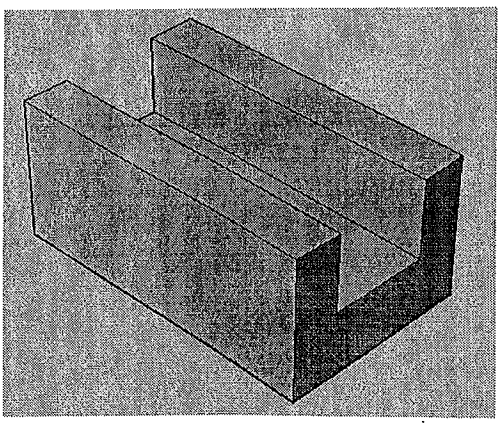

Fig. 2.1

3)

I. Define Geometry and Topology of an object.

(12 marks)

II. List different types of geometric modeling techniques for representing 3 dimensional objects. Explain them briefly.

(18 marks)

III. Construct the CSG tree for the part shown in Fig. 3.1.

(30 marks)

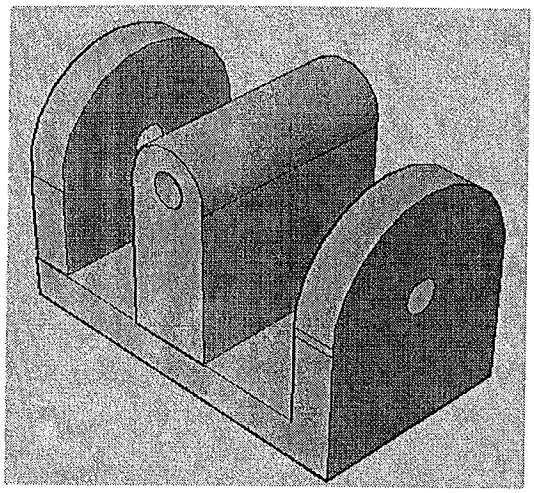

Fig. 3.1

IV. Check the validity of the part shown in Fig 3.2 using Euler's formula.

(20 marks)

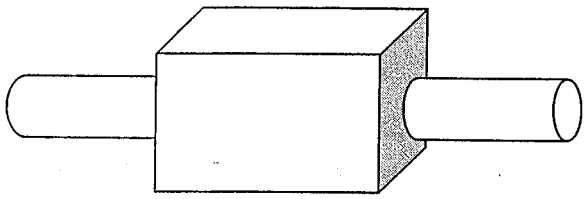

Fig. 3.2

V. Draw the part obtained by applying rotational sweep for the boundary set given in Fig. 3.3.

(20 marks)

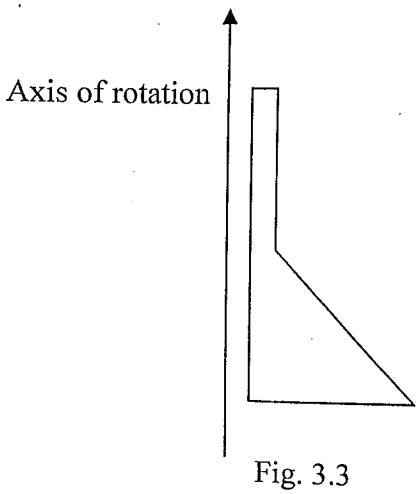


Fig. 3.3

4)

I. Describe variant process planning (VPP) briefly. (15 marks)

II. Write a G- code program for the part in Fig 4.1. (85 marks)

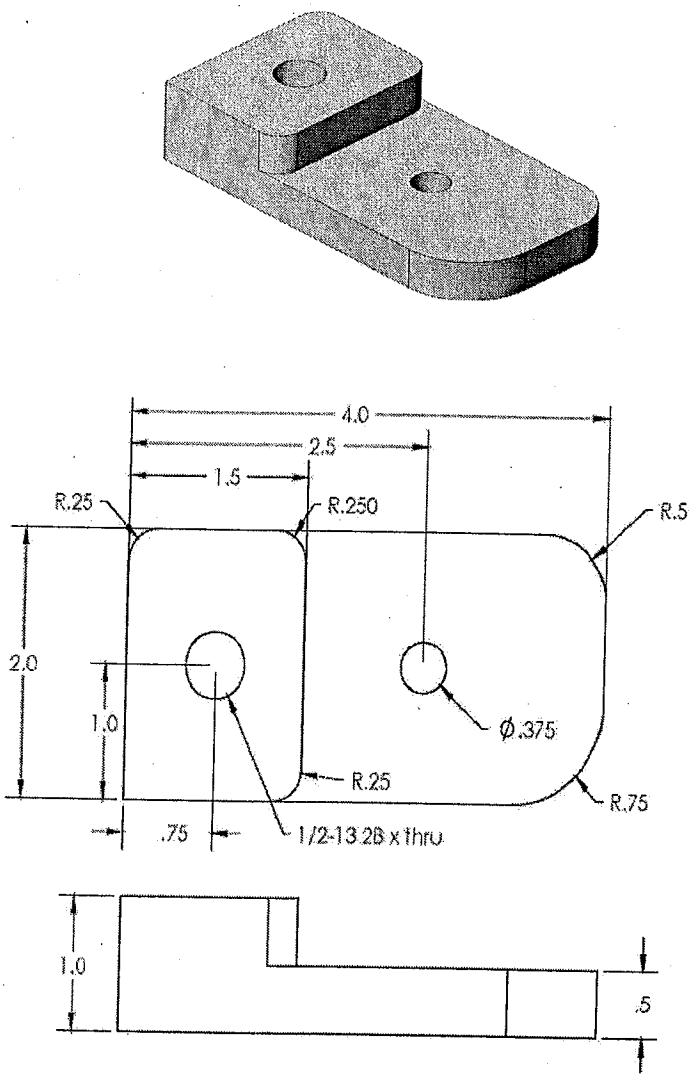


Fig 4.1



35

| 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 |