College of Engineering, Pune

(An Autonomous Institute of Government of Maharashtra, Pune -411005)

Subject : CAD/CAM [ME-14001] **Academic Year**: 2014-15

Semester: I **Year**: B.Tech.(Mechanical)

Duration: 3 Hrs. 2-00PM - 5-00PM **Max. Marks**: 60

Instructions: 1.Solve **ALL** questions, 24 NOV 2014

2. Make necessary assumptions and assume suitable data wherever required.

Q1 Solve any TWO

a. A rectangle ABCD having diagonal corner A(2,2) and C(10,8) is to be reflected about line $y = 1.7321\ x - 3$. Determine the concatenated matrix and the coordinates of rectangle after transformation. 8

b. The model coordinate system (MCS) is located at origin (0,0,0). The Working Coordinate System (WCS) is positioned with origin at point P1 (9,6). The X axis of WCS is drawn between P1 and P2 (10,16). The coordinates of P1 and P2 are with respect to MCS.
If triangle ABC with A(3,3), B (9,3) and C (6,8) is drawn with respect to WCS, find the position of triangle ABC with respect to MCS. 7

c. Find the equation of Hermite cubic spline curve that connects points P0(2,3) and P1(10,1) such that lines from point P2(8,6) are tangents to curve at points P0 and P1. Calculate five points on the curve. 7

Q.2

a. What do you mean by canned cycle? Explain Threading cycle and peck drilling cycle for turning Center. 8

b. Explain the Cutter radius and Cutter length compensation for machining center. 7

Q.3

a. A circle with radius 5 having center located at point (20, 10, 0) is rotated about the x-axis by an angle 2π to obtain a surface of revolution. Calculate the surface point at $\Phi = \pi$ and $\theta = \pi$. 8

b. Describe how a CAM system generates an NC program. What are the functions of post processor? 7

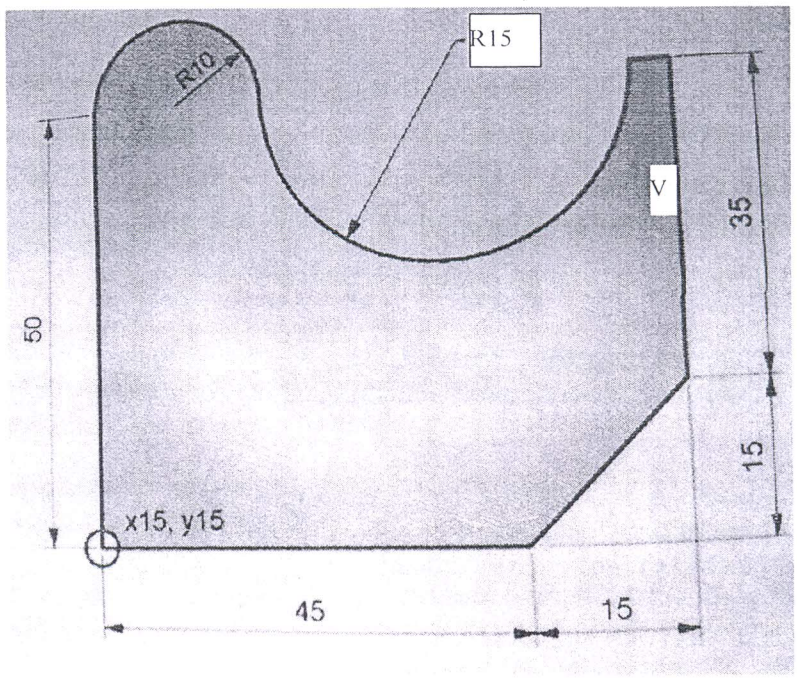
Q.4

a. Write a part program to cut a slot for the following component using FANUC CNC Machining Center. Use 6 mm dia. End mill cutter. Prepare NC part program by showing following details.
i. Draw NC drawing by indicating axis, home position and the selection of datum point on the sketch of the part.
ii.Calculate speed, feed considering Aluminum work material and HSS as tool material,
iii.Prepare coordinate table,
iv. Prepare Process Sheet
v.Write part program in Absolute mode with remarks. 8

Assume depth of slot is 10mm and program zero is at origin (0, 0).
Work material- Aluminum, Tool- HSS end mill cutter

a.

Show circular interpolations block in the form of I,J and K values.



b. Following component is to be made using CNC Turning Center equipped with FANUC controller. Write a NC part program using Turning FACING cycle. Assume workpiece material as MS and Cutting tool material as HSS. 7