(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0420　　Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B. Tech.

(SEM. VII) ODD SEMESTER THEORY
EXAMINATION 2010-11
CAD & CAM

Time : 3 Hours　　　　　　　　　　*Total Marks : 100*

Note :— (1)　Attempt all questions.

(2)　Assume any missing data suitably.

(3)　Be precise in your answer.

1.　Attempt any **four** parts of the following :　　　　**(5×4=20)**

(a)　Discuss the stages in the product life cycle and the importance of each stage.

(b)　What is CIM ? Explain its salient features.

(c)　Write a short note on different types of manufacturing systems.

(d)　How is a line displayed on a graphic monitor ?

(e)　Compare the relative merits and demerits of different input devices.

(f)　Write a short note on the classifications of numerical control (NC) machines.

2.　Attempt any **four** parts of the following :　　　　**(5×4=20)**

(a)　Differentiate between 2D and 3D wire frame modeling.

(b) Write a short note on constructive solid geometry (CSG) techniques.

(c) Describe an algorithm for removal of hidden lines.

(d) What are the different types of geometric relations ? Why are they used in 3D geometric modeling ?

(e) Find the transformation matrix that transforms a square ABCD to half its size with center remains at the same position. The coordinates of the square are A[2, 2,], B [4, 2], C[4, 4], D[2 ,4] and center at [3, 3].

(f) Develop a 3D rotation matrix for rotating a point about z-axis by an angle θ.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Draw a Bezier spline for following control points : (0, 0), (4, 3), (8, 4) and (12, 0).

(b) What are the key features of NURBS ? Describe a NURBS algorithm to formulate a curve.

(c) A spring loaded safety valve is held against its seat by a close coiled helical compression spring. The diameter of valve is 75 mm and blow off pressure is 1.1 MPa. Mean diameter of the coil is 100 mm and maximum compression is 25 mm. Find the diameter of spring wire and number of active coils if permissible shearing stress for spring material is 500 MPa and modulus of rigidity is 80000 MPa.

Attempt any **two** parts of the following : **(10×2=20)**

(a) Draw a neat flow chart and discuss various steps involved in a numerical control procedure. What are the merits and limitations of NC system ?

(b) Describe manual part programming. Explain absolute and incremental coordinate systems. Also discuss the key features of part program for lathe operation.

(c) Write an APT program to drill 3 circular holes of size 12 mm in a square plate of size 100 mm along its longitudinal axis. The holes are equally spaced along the axis. The plate is 6 mm thick. Spindle speed is 2000 rpm and feed rate is 0.1 mm per revolution.

Attempt any **two** parts of the following : **(10×2=20)**

(a) What is the advantages of stepper motors ? With help of neat schematic diagrams explain the working principle of permanent magnet hybrid stepper motors.

(b) What is the need of an interpolator ? Briefly describe linear, circulator and parabolic interpolator.

(c) What is an adaptive control ? Describe various output process that are used in it. Also distinguish between ACC and ACO type of adaptive control.