

MECHANICAL ENGINEERING DEPARTMENT

End Semester Examination (Dec. 7, 2006)

COURSE : CAD (ME-013)

TIME : 3 HOURS

Note: Attempt any five questions.

INST. : SKS

MARKS: 60

(17)

- 1 a. Describe the term "Product cycle" in context of conventional manufacturing environment. Discuss the potential benefits of overlaying CAD/CAE tools on a conventional manufacturing environment. 5
- b. Explain the different types of registers, which are used in CPU of a computer and what are their functions? 4
- c. Explain with the help of suitable examples, how does the database generated in design phase helps in manufacturing phase by showing the relationship between CAD and CAM? 3
- 2 a. Discuss the mid point algorithm for scan converting a line. Why is it preferred over the line DDA method? Use the midpoint approach to scan convert a line starting from point (2,2) to (12,6). 6
- b. Discuss different types of projection of geometric models. Discuss the stepwise procedure to obtain the orthographic projections of an object. Also write the corresponding transformation matrices for obtaining front, top and left hand side views 6
- 3 a. Discuss the following terms as related to raster scan CRT
Blanking, Shadow masking, Over scan, Refresh rate 4
- b. Explain the working principle of the following input /output devices 8
 - (i) Laser printer (ii) Dot matrix printer
 - (iii) Light pen (iv) Mouse
- 4 a. A vector is defined as $ai + bj + ck$ in 3-D space. Derive a transformation matrix, which aligns this vector along the positive side of x-axis (i.e. along i). 6
- b. A square is specified by four points A (4, 8), B (12, 8), C (12, 16) and D (4,16). Develop the concatenated matrix for the following transformations and thus obtain the transformed points for each step: 6
 - a. Scale up the given square by a factor of 2 about the point (8,12).
 - b. Rotate the enlarged square about the origin through an angle of 90° .
- 5 a. What do you understand by C_0 , C_1 , C_2 continuity of curve segments. 3
- b. Compare the characteristics of Bezier curves B-Spline curves. 2
- Coordinates of the four control points are given as [2,2], [2,3], [3,3], and [3,2]. Develop the equation of the resulting Bezier curve using the blending function 5

$$B_{i,n}(u) = C(n,i) \times u^i \times (1-u)^{n-i}$$
 Also find the coordinates of the points lying on the curve at values of parameter $u=0, 0.25, 0.5$ and 1.0
- c. Compare and contrast the B-rep and CSG techniques of solid modeling 2
- 6 a. Differentiate between the following 7
 - 1. Through next and through until
 - 2. Full view and Partial view
 - 3. Dependent and independent copied features
 - 4. Sketcher constraints and Assembly constraints
 - 5. Delete and delete pattern
 - 6. Varying and Identical pattern
 - 7. Feature and driven dimensions
- b. Explain the use of following in the Pro-E using suitable examples 3
 - (i) Align and Mate constraints in assembly
 - (ii) "Create an entity from an edge" in blend feature
 - (iii) Datum plane- through cylinder and parallel to a datum plane
- c. Discuss with the help of suitable examples valid combinations of trajectory and sketch in a sweep feature 2