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BME-002

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

00410

Term-End Examination

June, 2015

BME-002 : COMPUTER AIDED DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is allowed. Assume any data, if missing / required.*

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1. (a) Differentiate between random and raster scan display. What is the aspect ratio of an image ? *5*

(b) What are the limitations of a light pen as a locating device. *5*

2. Find the transformation that scaled

(a) S_x units in x direction

(b) S_y units in y direction and

(c) S_x and S_y in x and y directions simultaneously.

Also find the scaling matrix w.r.t P (l, m). *10*

3. What do you understand by Back Face Detection method ? Write an algorithm for Back Face Detection method. *10*

4. (a) What is control polygon ? How is the shape of a curve controlled ? *5*

   (b) What is meant by synthetic curve ? Why are synthetic curves used for various engineering applications ? *5*

5. (a) Discuss the construction of Bezier curves. *5*

   (b) Compare B-Splines and Bezier curves. *5*

6. Consider the parabolically blended curve defined by the points P_1 [0 1 0], P_2 [2 3 0], P_3 [4 1 0], P_4 [5 2 0]. Rotate this curve about the x-axis through 360° to obtain a surface of revolution. Calculate the surface point at u = 0·5 and $\phi = 60° = \pi/3$. *10*

7. Show that the bilinearly blended Coons patch, when applied to cubic boundary curves, yields a cubit patch. *10*

8. (a) Differentiate between surface modeling and wire frame modeling. *5*

   (b) Discuss the properties of B-Spline surface. *5*

9. (a) Discuss the important properties of Bezier surface. *5*

(b) What is half space ? Explain the half space method of representation of solids. *5*

10. Discuss the salient features of "STEP" that are applicable for transfer of manufacturing databases. *10*