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Question Paper Code : 27367

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Mechanical Engineering

ME 6501 – COMPUTER AIDED DESIGN

(Common to Manufacturing Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention any four applications of computer aided design in mechanical engineering.
2. List and differentiate the types of 2D geometric transformations.
3. Generate the conical surface obtained by rotation of the line segment AB around the z-axis with, A = (1, 0, 1) and B = (7, 0, 7).
4. Differentiate between analytical curves, interpolated curves and approximated curves.
5. Define interpolative shading and list the two methods used for interpolative shading.
6. What is meant by 'visible surface determination' in 3D computer graphics?
7. Mention the importance of geometric tolerancing.
8. Define the following terms : (a) Interference fit (b) Running and sliding fit.
9. Compare the shape based and the product data based exchange standards.
10. What is meant by CAD data exchange? Mention its importance.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Rotate the rectangle (0, 0), (2, 0), (2, 2), (0, 2) shown in Fig. 1, 30° counter clockwise about its centroid and find the new coordinates of the rectangle. (8)

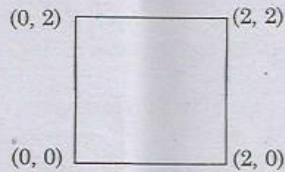


Fig. 1

- (ii) Given the triangle, described by the homogeneous points matrix below, scale it by a factor $3/4$, keeping the centroid in the same location. Use (1) separate matrix operation and (2) condensed matrix for transformation. (8)

$$[P] = \begin{pmatrix} 2 & 2 & 0 & 1 \\ 2 & 5 & 0 & 1 \\ 5 & 5 & 0 & 1 \end{pmatrix}$$

Or

- (b) (i) Write short notes on concurrent engineering. (6)
- (ii) Rotate the rectangle shown in Fig. 2, 30° counter clockwise about the line EF and find the new coordinates of the rectangle. (10)

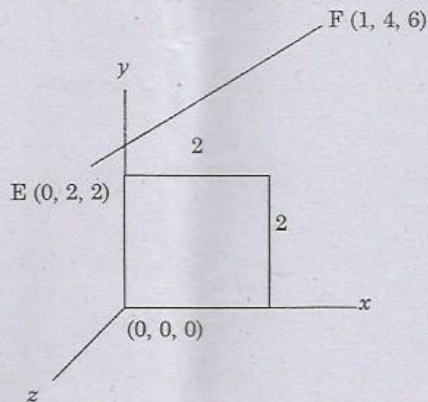


Fig. 2

12. (a) Briefly explain the different schemes used to generate a solid model.

Or

(b) Write short notes on approximated synthetic curves.

13. (a) Explain the different types of hidden line algorithms.

Or

(b) Briefly explain the user driven, procedural and data-driven animation techniques.

14. (a) Briefly explain the following traditional tolerance analysis methods with examples :

(i) Worst-case analysis (ii) Root sum of squares.

Or

(b) Write short notes on (i) Mechanism simulation (ii) Assembly modeling.

15. (a) Explain the initial graphics exchange specification methodology.

Or

(b) Write short notes on :

(i) OpenGL

(ii) Standards for computer graphics.