209602

May, 2019
B.Tech. (ME) VI-SEMESTER
Computer Aided Design (ME-304-C)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*

2. *Answer any four questions from Part-B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) State two advantages of CAD in comparison with conventional process. (1.5)

     (b) What is the need of drawing standards? (1.5)

     (c) What do you mean by 2D geometrical transformation? (1.5)

     (d) Define the term composite transformation. (1.5)

     (e) Write one drawback of NURBS. (1.5)

     (f) What do you mean topology in solid model? (1.5)

(g) What is the significance of CSG? (1.5)

(h) What do you understand by term 'Finite Element" in FEA? (1.5)

(i) Differentiate between coarse and fine meshing. (1.5)

(j) What is preprocessing in CAE? (1.5)

PART–B

2. Describe the following :

(i) Isometric to orthographic views generation.

(ii) Concept of Layers.

(iii) STP, DXF and DXB file formats. (15)

3. (a) What is 3D transformation of geometry? With suitable figure and matrix discuss following transformation.
(i) Rotation (ii) Reflection. (10)

(b) A rectangle formed by four points PQRS whose coordinates are P(50, 50), Q(100, 50), R(100, 80), S(50, 80). Find the new coordinates of the rectangle in reduced size using scaling factors $S_X = 0.5$ and $S_Y = 0.6$. (5)

4. (a) Explain the properties and advantages of the following :

(i) Bezier Curve (ii) B-splines. (8)

(b) Discuss the surfaces used in automobile industry. How are these surfaces modeled? (7)

5. (a) Distinguished clearly between wireframe and Solid models. (5)

(b) Discuss the following :

(i) Sweep representation.

(ii) Cell Decomposition technique. (10)

6. What is FEA ? List and describe the steps involved in its engineering applications with suitable example. (15)

7. (a) Derive the interpolation (shape function) for constant strain triangular element. (5)

(b) For the plane stress element whose co-ordinates are given by A(100, 100), B(400, 100), C(200, 400). The nodal displacements are $u_1 = 2$ mm, $v_1 = 1$mm, $u_2 = 1$ mm, $v_2 = 1.5$ mm, $u_3 = 2.5$ mm, $v_3 = 0.5$ mm. Determine the element stress. Assum, $E = 200GN/m^2$, Poisson's ratio = 0.3, t = 10 mm. (10)

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