

B.E. (Mechanical Engineering) Model Curriculum Semester-VII
PCC-ME-402 - Computer Aided Design

P. Pages : 2

Time : Three Hours



GUG/W/24/14263

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Solve Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, Q. 7 or Q. 8, Q. 9 or Q. 10.
 5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Define CAD: What are the advantages of CAD over conventional Design Cycle? Explain. 8
- b) What is frame buffer? Explain. 4
- c) Differentiate between Raster scan and Random scan display system. 4

OR

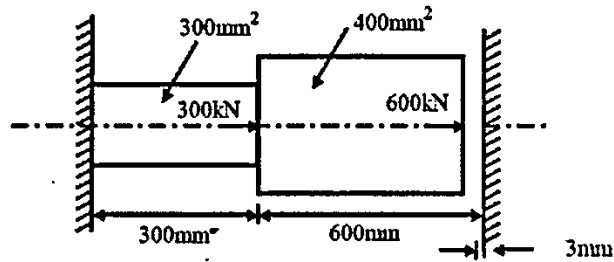
2. a) Derive an expression for decision parameter Δ_i and possible choice of pixel for Bresenham's circle generation algorithm. 8
- b) Explain changes required to be made in Bresenham's Line generation algorithm for first octant, so that it can be generalized for all octants. 8
3. a) Perform the reflection of triangle A (-8, 3), B (5, 4) and C (-8, 6) about a line $Y = 3x + 5$. Show its initial and final position Graphically. 10
- b) State and explain in brief image generation techniques used in computer graphics. 6

OR

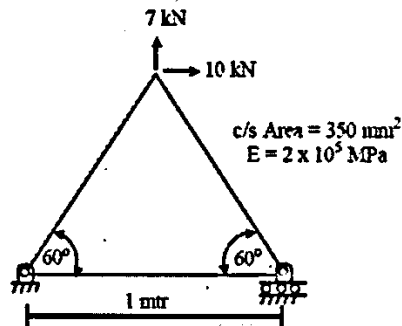
4. a) An object is to be reflected about a line. 12
 $X = 2u + 3$
 $Y = 5u + 4$
 $Z = 2u - 3$
Find the final transformation matrix.
- b) Explain need for homogeneous co-ordinate. 4
5. a) What do you understand by "post processing" in finite element analysis? 8
- b) Explain in brief the types of element used in FEM along with their characteristics. 8

OR

6. Consider the two bars shown in fig. If the deformation of the right end is not to exceed 3mm, find nodal displacement, element stresses and support reactions. Take $E = 200 \text{ GPa}$. 16

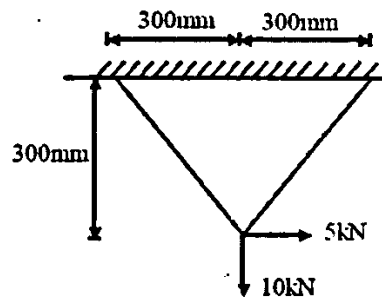


7. For a pin joined truss shown in fig. treating each member as I-D linear element, determine. 16
- Stiffness matrix of each element.
 - Assembled global stiffness matrix
 - Displacement at nodes.
 - Stresses in each member.



OR

8. Figure show a two dimensional plate of thickness 20 mm. If load is applied as shown in Figure, determine nodal displacements and stresses in the element. Take $E = 200 \text{ GPa}$. And $\nu = 0.3$. 16



9. Design a circular bar for minimum weight. It is subjected to axial tensile force of 45kN. Factor of safety on yield point strength is $N = 1.8$, length of bar is 600mm. Diameter of bar to lie between 10mm to 40mm. The available material are steel SAE1020, Steel SAE 2320, AL alloy SAE 38 and yellow brass. 16

OR

10. a) What do you mean by compatible and in compatible problem in optimum design? Explain. 8
- b) Distinguish between engineering design and optimum design. What are the objectives of optimum design? 8
