B.E.(with Credits)-Regular-Semester 2012 - Mechanical Engineering Sem VIII

ME805 - Computer Aided Design

P. Pages : 2 **GUG/W/16/7119**

Time : Three Hours * 4 8 9 1 * Max. Marks : 80

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. Diagrams and Chemical equation should be given wherever necessary.
5. Retain the construction lines.
6. Illustrate your answers wherever necessary with the help of neat sketches.
7. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
8. 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.
9. Use of Non-programmable calculator is permitted.

1. a) What do you mean by Computer Aided Design (CAD)? Discuss reasons for implementing CAD in industry. **8**

b) Explain Bresenham's algorithm for generation of line. **8**

OR

2. a) Explain DDA algorithm for generation of line. **8**

b) Discuss: Raster scan and frame Buffer. **8**

3. a) What is Bezier curve? How it is defined? Where it is used? Write its basic properties. **8**

b) Explain 3-D transformation with matrix. **8**

OR

4. a) Derive the 3-D transformation matrix for the rotation and scaling. **8**

b) Write necessary steps and transformation matrix for rotating a point in 3D space about a given 3D line. **8**

5. a) What are the various steps involved in FEM? **8**

b) Explain the shape function for 1-D bar element alongwith their salient features. **8**

OR

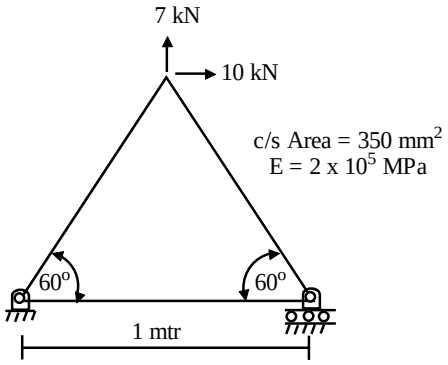
6. a) What do you understand by "post processing" in finite element analysis? **8**

b) Explain in brief the types of element used in FEM alongwith their characteristics. **8**

7. a) For a pin joined truss shown in fig. treating each member as 1-D linear element, determine. **13**

i) Stiffness matrix of each element. ii) Assembled global stiffness matrix.

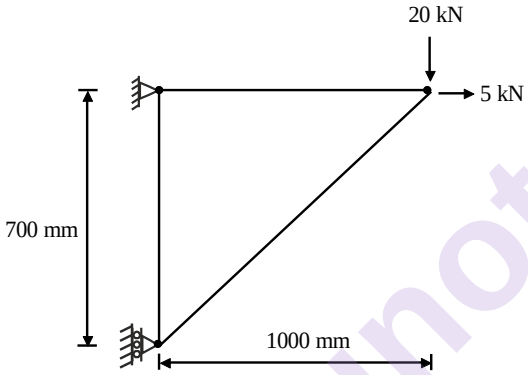
iii) Displacement at nodes. iv) Stresses in each member.



b) What are the properties of a stiffness matrix? **3**

OR

8. a) For a truss shown in fig. determine the displacement of nodes, stresses in members and reactions at the support, Cross sectional area of all members is 400 mm^2 and E=200 GPa. **13**



b) What do you understand by shape function? Name the various shape functions used for one dimensional finite element modelling. **3**

9. a) Explain Johnson's optimization method with suitable examples. **8**

b) What do you mean by primary and subsidiary design equation? Explain with example. **8**

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**

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