

GANPAT UNIVERSITY

M.Tech. Sem. Ist Advance Manufacturing Techniques

Jan. 2013 Regular Examination

3ME104 Computer Aided Design

Time: 3 Hrs

Marks: 70

Instructions:

- (i) All questions are compulsory.
- (ii) Answers to two sections must be written in separate answer books.
- (iii) Figure to the right indicates full marks.

SECTION - I

Questions	Marks
Que 1(a) What is scan conversion? What is raster scan display How it is different from CRT display? What is frame buffer?	5
Que 1(b) What are the requirements of geometric modeling in CAD? Gives advantages of wire frame modeling over solid modeling? What are the various typed of wire frame modeling?	7
Que 2(a) Derive matrix for any object to rotate about an arbitrary axis	5
Que 2(b) A triangle ABC has vertices A (2,4),B (4,6),C (2,6) it is desired to reflect through an arbitrary line $y=0.5x+2$ Calculate the new vertices of triangle and show the results graphically	6
OR	
Que 2(a) Show that transformation matrix for a reflection about line $y=x$ is equivalent to reflection relative to X axis followed by anticlockwise rotation of 90°	5
Que 2(b) Plot the Bezier curve having end points P_0 (1,3) and Q (7,2) the control points are P_1 (5,6) AND P_2 (6,0) plot the values for $U=0,0.1,0.2,\dots,1$ and draw the curve	6
Que 3 Explain any three from the following	12
(a) Derive the matrix for hemite cubic spline curve	
(b) How B-spline curve is different from Bezier and hermite curve	
(c) What is homogenous transformation system?	
(d) Explain Bresenham's circle drawing algorithm	
(e) Explain in short about GKS and IGES cad standards	

SECTION – II

Que 4(a) Define Finite Element Method? Enlist its application in manufacturing process? 5
What is shape function in FEM?

Que 4(b) Derive the Elemental stiffness matrix, Force matrix using minimum potential energy principle 7

OR

Que 4(a) Discuss the properties of global stiffness matrix 5

Que 4(b) Derive the Elemental stiffness matrix, Force matrix using Galerkin approach 7

Que 5 As shown in fig.1 a Load $P = 60 \times 10^3$ N is applied, Determine displacement, Stress and support reaction in the body take $E = 20 \times 10^3$ N/mm² 11

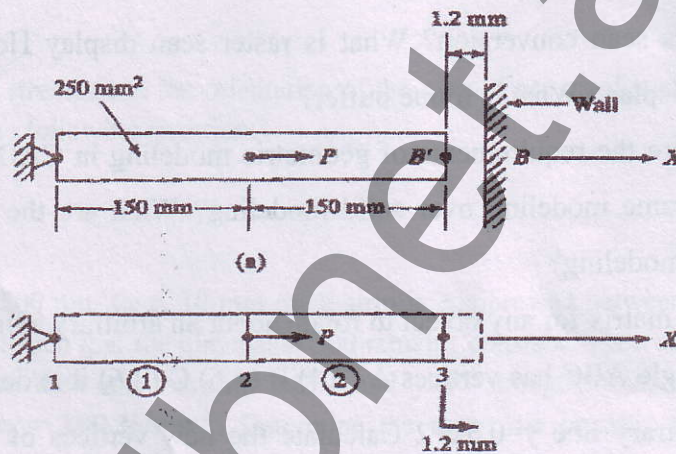


Fig.1 Que 5

OR

Que 5 Consider the bar loaded as shown in figure 2, Determine the Nodal displacements, Element stresses and support reactions. Adopting the method of elimination for handling boundary condition. 11

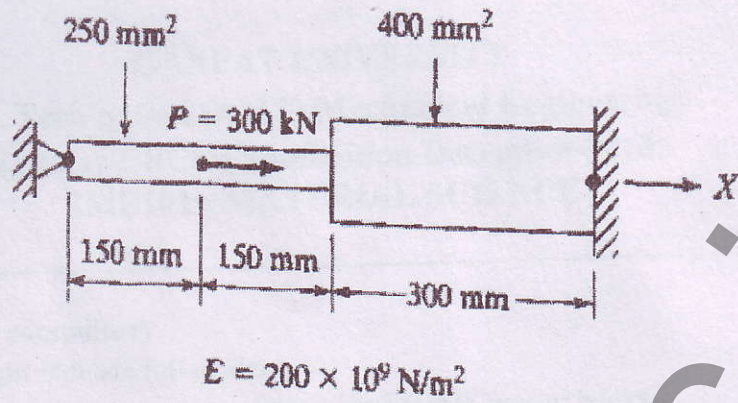


Fig.2 Que 5 OR

Que 6(a) What is Local and global coordinates in truss and derive the elemental stiffness in truss using FEM 5

Que 6(b) 7

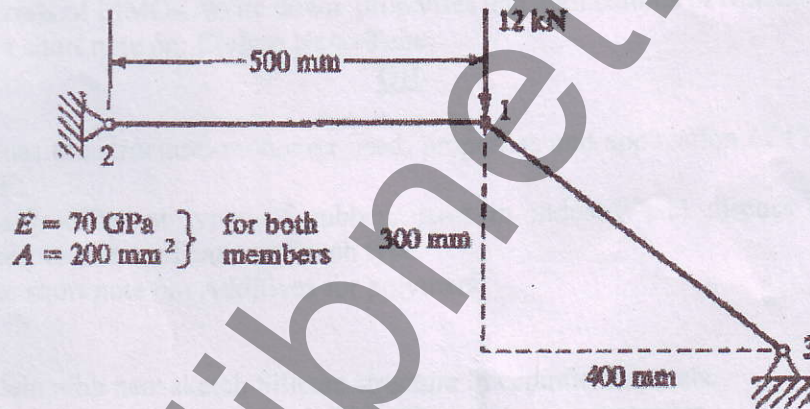


Fig.3 Que 6

For two bar truss as shown in figure 3 determine displacement at nodes 1 and stress in element 1-3.
