

CODE NO: NR422105.SET NO. 3

USN

--	--	--	--	--	--	--

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

IV B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS
FINITE ELEMENT METHODS
(AERONAUTICAL ENGINEERING)

JULY- 2005

TIME: 3 HOURS

MAX MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks
?????

1. (a) Compare the finite element method with other methods of analysis.
(b) What is general applicability and description of finite element method?
2. Starting from the basics derive the stiffness matrix and the load vector for a bar element under axial loading and also subjected to a temperature rise.
3. What is global stiffness matrix? Indicate the assemblage process of global stiffness matrix for a 8 noded beam element.
4. Distinguish the plane stress and plane strain problem.
5. (a) Obtain the properties of an isotropic axisymmetric solid element.
(b) Derive the shape functions of any one of the 3-D structural element.
6. A constant strain triangle in a state of plane stress is subjected to a uniform temperature change of ΔT . Assuming that the coefficient of thermal expansion is α derive the equation for the nodal forces due to temperature change.
7. (a) Explain Hamilton principle for natural vibrations.
(b) Derive the consistent mass matrix for a four d.o.f flexural beam element.
8. Write the subroutines to compute the shape functions and [B] matrix. Using these subroutines develop a subroutine to compute the stiffness matrix [K] at a given Gauss point for a three noded triangular element