R09

Code No: C7611

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations March/April-2011
COMPUTATIONAL STRUCTURAL ANALYSIS
(AEROSPACE ENGINEERING)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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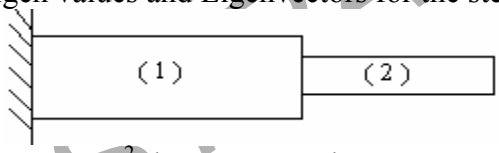
1. Explain the history of Finite Element Method in brief. Also Explain about FEM Related computer software. [12]

2. Show that the Stress (σ) = EBq for three nodded 1D element, by deriving and using the Quadratic shape functions. [12]

3. Derive the Strain displacement matrix for revolving triangular 2D element by Finite Element modeling. [12]

4. Explain: a) Coordinate systems and transformations.
   b) Sparse matrix storage schemes. [12]

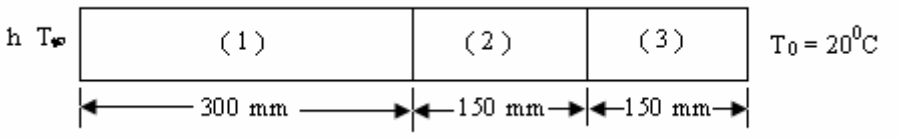
5. Determine the Eigen values and Eigenvectors for the stepped bar shown in figure:



$A_1 = 25\ mm^2$, $A_2 = 15\ mm^2$, $l_1 = 250$ mm, $l_2 = 150$ mm, E = 210 KN/mm^2, SP: wt: (f) = 7800 kg /m^3. [12]

6. Explain the steps involved in the element stress computation and discuss steps for line elements, Triangular shell Elements and solid elements. [12]

7. A Composite wall consists of three materials as shown in the Figure. The outer temperature (T_o) be 20^0C, Convective Heat Transfer takes place on the inner surface of the wall with temperature = 800^0C and the convective heat transfer coefficient h = 25 W/m^2 ^{0}C .Determine the temperature distribution in the wall. Take Thermal conductivities of the materials 1, 2, 3 are $K_1 = 20$ W/m^0 C, $K_2 = 30$ W/m^0C, and $K_3 = 50$ W/m^0C respectively. [12]



8. Explain about the Discretization of the Euler Equation. [12]

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