Code :R7410102 **R7**

IV B.Tech I Semester(R07) Supplementary Examinations, May/June 2011
FINITE ELEMENT METHODS IN CIVIL ENGINEERING
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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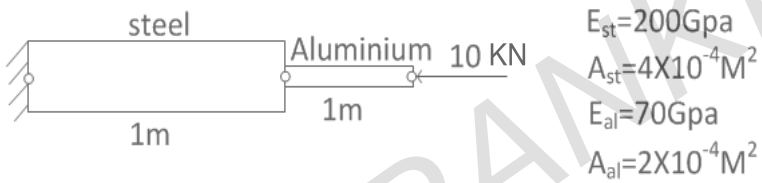
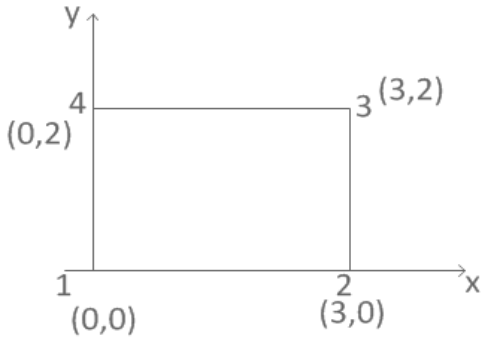
1. Find the maximum deflection for a simply supported beam subjected to u.d.l of 'W'/metre length and a central concentrated load 'P' units using Rayleigh-Ritz method of functional approximation.
2. Explain the constitutive relationships for plane stream, plane strain and Axi-symmetric stream conditions.
3. For the bar assemblages shown in figure determine the nodal displacements, the stream in each element and the support reactions.



4. (a) Discuss the area and volume co-ordinates.
   (b) Derive the shape functions for a 3-noded CST element.
5. Derive the element stiffness and nodal load matrices for a 4-noded rectangular element.
6. (a) Discuss the concepts of troparametric elements for 2D analysis.
   (b) What are lagrange and serendipity elements?
7. Discuss the formulation of 4-noded iso-parametric axi-symmetric element.
8. The nodal displacements of a four node quadrated element shown in figure are given as:
   $\bar{U}$ =[0.0 0.0 0.02 0.03 0.06 0.02 0.15 0.0]^{T}cm
   Take E=20x10^6 N/cm^2 and V=0.25. Determine J, B and σ at $\varepsilon_s = 0$ and $\eta = 0$. Assume plane stress conditions.



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