Code No: 156AZ

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August - 2022
FINITE ELEMENT METHODS
(Common to ME, MCT)

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1. An axial load P = 385 kN is applied to the composite block as shown in figure 1. Determine the stress in each material. [15]

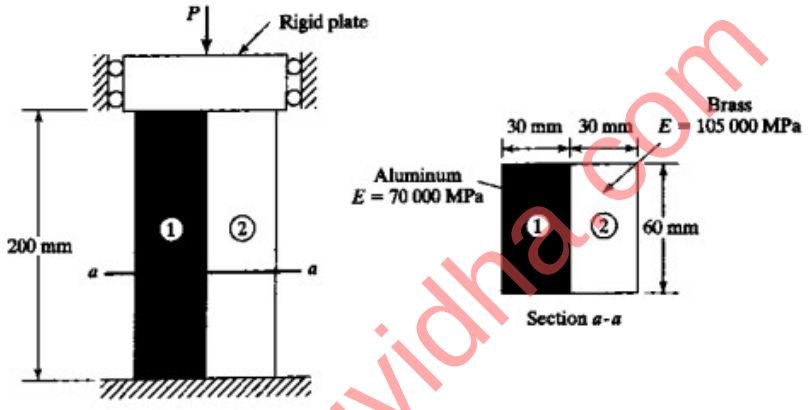

Figure 1

2. Find the temperature distribution in the stepped fin shown in figure 2 using two finite elements. [15]

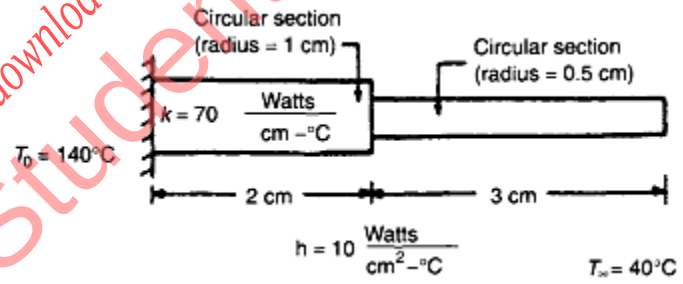

Figure 2

3.a) Differentiate between a bar element and a truss element.
b) Using variational approach derive element stiffness matrix of (i) bar element (ii) plane truss element. [6+9]

4. Explain the elimination method and penalty method of imposing boundary conditions. Comment on the two methods. [15]

5.a) What is Constant Strain Triangle in structural analysis? How do stresses vary within the constant strain triangle element?

b) What are axi-symmetric solids? Mention their applications. What are the conditions for a problem to be axi- symmetric? [7+8]

6. For the CST element shown in figure 3, assemble strain–displacement matrix. Take, $t = 20$ mm, $E = 2 \times 10^5$ N/mm^2. [15]

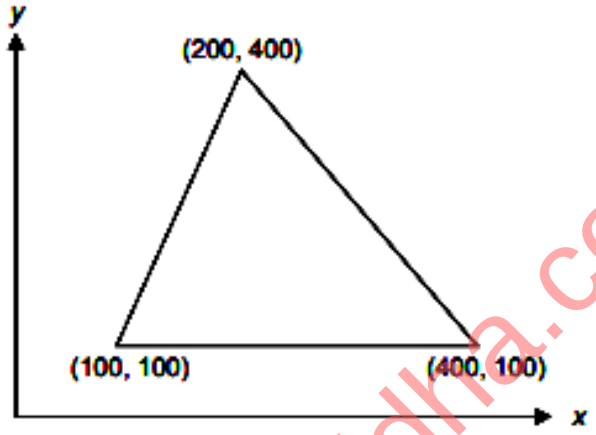

Figure 3

7. Discuss Galerkins approach for one dimensional heat transfer in fins. [15]

8. Explain in detail about the Eigen values and Eigen vectors evaluation. [15]

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