

Jaypee University of Information Technology, Waknaghat

T 2 Examination – October 2018

M. Tech. 1st Semester (Structural Engineering) & B. Tech. 7th Semester (Civil Engineering)

Dr. Parbhaj Kumar

Course Code: 13M1WCE131

Max. Marks: 25

Course Name: Finite Element Methods

Course Credit: 03

Max. Time: 90 Minutes

Note: All questions are compulsory. Carrying of mobile phone during examination will be treated as case of unfair means. Assume any missing data.

Q.1 Derive the expression for displacement vector transformation (local to global ordinate system) in two dimensional coordinate system for a bar element. 3

Q.2 Derive the expression for displacement vector transformation (local to global ordinate system) in three dimensional coordinate system two for a bar element. 3

Q.3 Derive the expression for global stiffness matrix in two and three dimensional coordinate system for a bar element. (2.5X2)

Q.4 Compute the stress expression for a bar element in plane and space coordinate system. (2X2)

Q.5 Derive the bar element equation from potential energy approach. 4

Q.6 Determine the nodal displacement, forced in each element for the bar assemblage shown in figure.1 (a) and (b), using direct stiffness approach. (3X2)

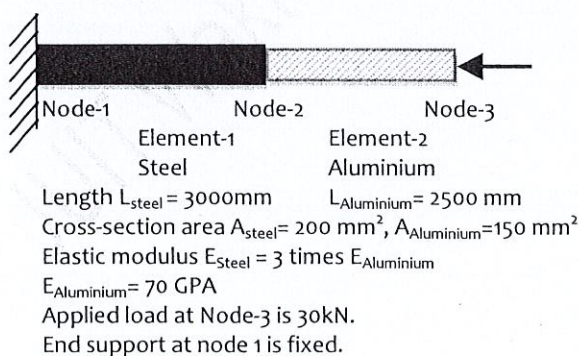


Figure:1 (a)

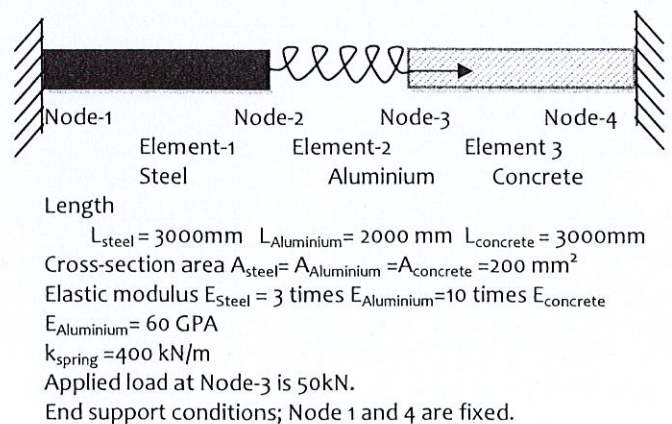


Figure:1 (b)