

Day: Monday
Date: 19/11/2018

W-2018-3148

Time: 11.00 AM TO 02.00 PM
Max. Marks: 60

N.B:

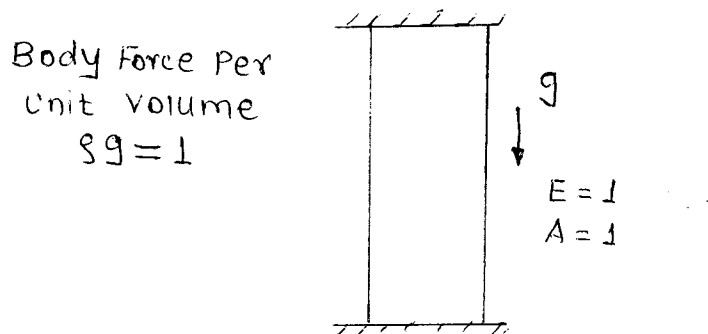
- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Assume suitable data if necessary.

SECTION-I

- Q.1 Derive the Linear and quadratic shape function for the (10)
- i) 1D Bar and ii) 1D Beam element

OR

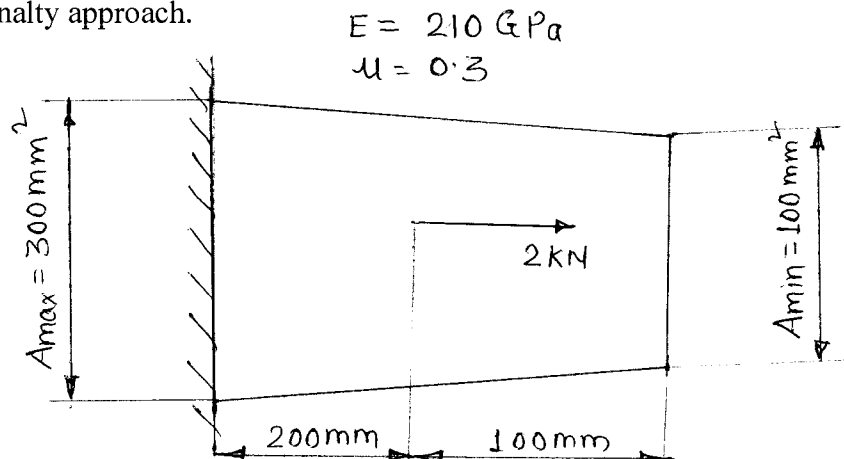
- Q.1 A rod fixed at its end is subjected to a varying body force as shown. Use the (10)
Rayleigh Ritz method with an assumed displacement field.
 $U = a_0 + a_1x + a_2x^2$ to determine the displacement $u(x)$ and stress $\sigma(x)$



- Q.2 Write short notes on: (10)
- a) Gauss Elimination Method
b) Penalty approach

OR

- Q.2 Determine the displacement, strain and stresses induced in the body using (10)
penalty approach.

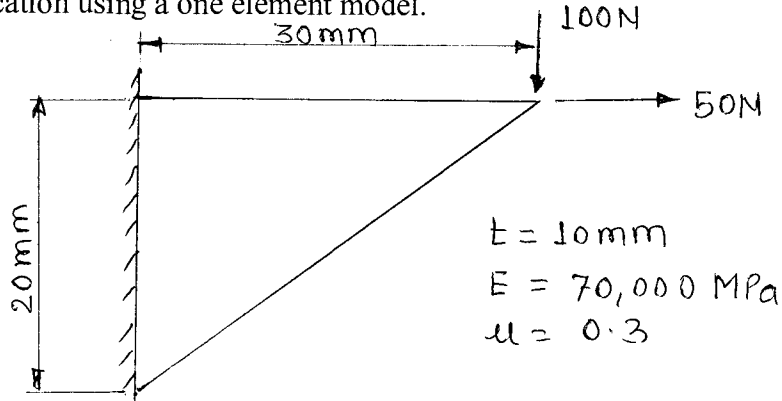


- Q.3 Derive the body force and traction force vectors for the CST element? (10)

OR

P.T.O.

- Q.3** For the configuration shown determine the deflection at the point of load application using a one element model. (10)



SECTION-II

- Q.4** Derive the shape function for Eight Noded Quadrilateral element? (10)

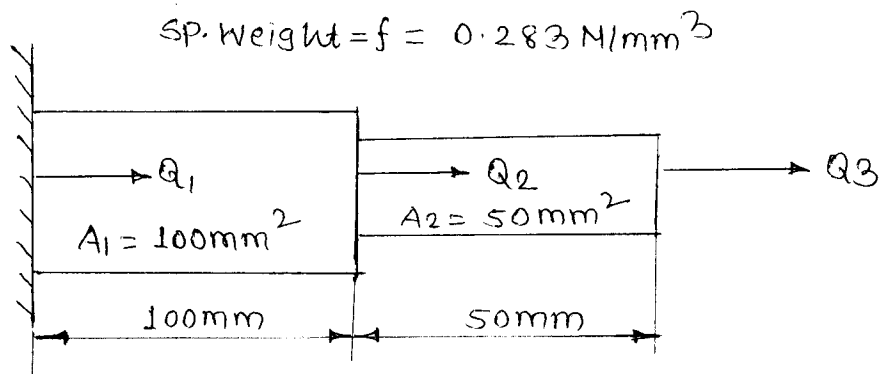
OR

- Q.4** Write Newton cotes formula and Gauss Quadrature formula in 1D and 2D triangular and rectangular elements? (10)

- Q.5** Write Hamilton's principle? Illustrate the principle using spring mass system? (10)

OR

- Q.5** Determine the Eigen values and Eigen vectors for the stepped bar as shown in fig. (10)



- Q.6** Explain the importance of sub-modelling and sub-structuring in FEM? (10)

OR

- Q.6** State various finite element methods adaptive techniques? Explain any one of them in detail? (10)