

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE - RAIGAD - 402 103
Summer Semester Examination, May 2018**

Branch: M. Tech. Civil (Structural Engineering)

Semester: II

Subject with Subject Code: Finite Element Analysis
[CVSE202]

Marks: 60

Date: 16 / 05 / 2018

Time: 3 Hrs.

Instructions to the Students

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1.

A] Enlist the weighted residual methods. Explain any one method.

(06)

B] Determine the displacements of nodes 1 and 2 in the spring system shown in fig.1
Use minimum potential energy principle.

(06)

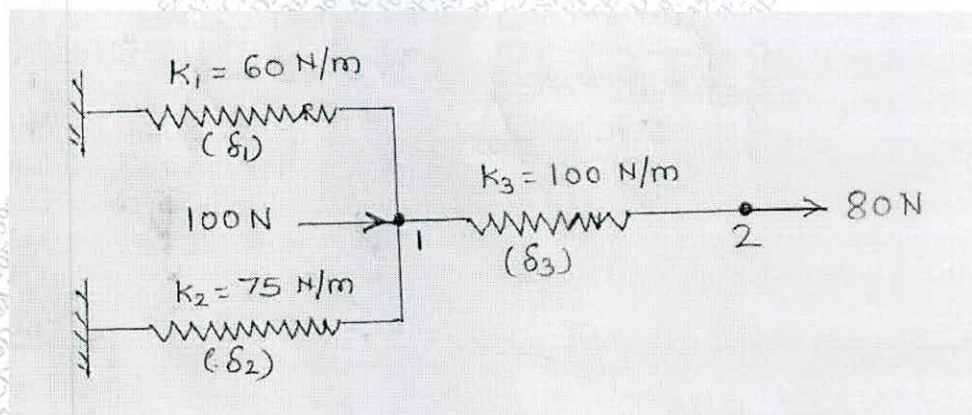


Fig.1

Q.2.

A] Using Lagrange polynomial find shape functions for three noded bar element. Plot the variation of shape functions.

(06)

B] Derive the stiffness matrix for beam element.

(06)

Q.3.

A] For the plane truss shown in fig 2. Determine the nodal displacements and stress in each member. Take $E = 200 \text{ GPa}$ and $A = 250 \text{ mm}^2$.

(12)

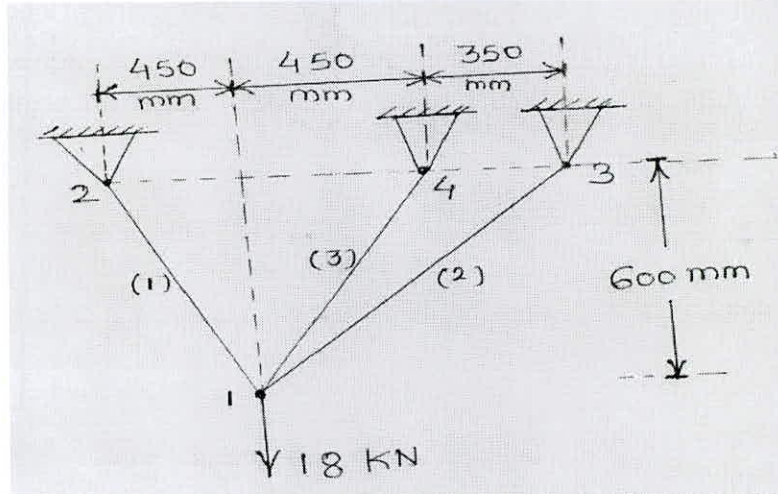


Fig.2

OR

A] Analyze the beam shown in fig.3 by finite element method and determine the end reactions. Also determine the deflections at mid spans. Given $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 5 \times 10^6 \text{ mm}^4$. (12)

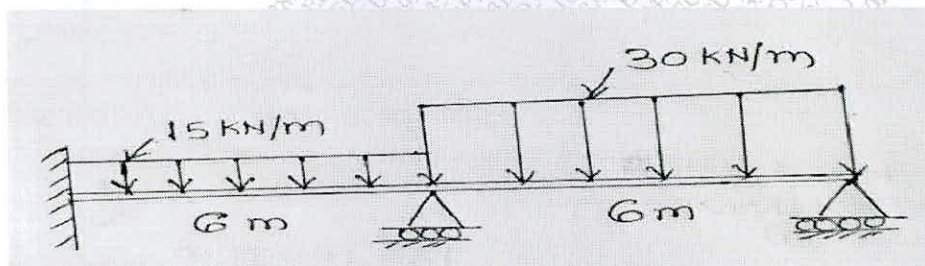


Fig.3

Q.4.A]

- i) Explain Pascal's triangle for polynomial function. (06)
- ii) Explain the isoparametric concept in finite element analysis. (06)

OR

A] Determine the shape functions for CST element. Show that they are nothing but area coordinate. (12)

Q.5.

- A] Explain the term Axi – symmetric problems. (06)
- B] Write short notes on Gaussian quadrature integration technique. (06)

Q.6.

- A] Explain h-version of finite element method. (06)
- B] Explain p-version of finite element method. (06)

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