



	InSem Examination-II Summer 2024		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester: II	
	Name of Programme: FY M.Tech (Structural Engineering)	Pattern: 2022	
	Name of Course: Finite Element Method	Course Code: CIV225108	
	Max. Marks: 30	Duration: 1 Hr	

	<p>Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.</p> <ol style="list-style-type: none">1. This question paper contains 02 pages.2. Answer to each new question is to be started on a new page.3. Assume suitable data wherever required, but justify it.4. Draw the neat labelled diagrams, wherever necessary.5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.	
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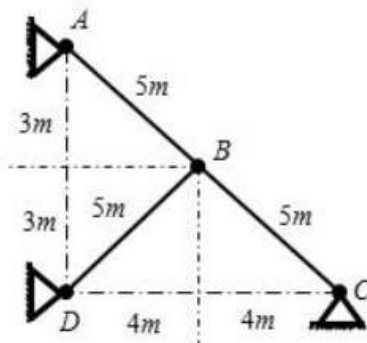
Question No. 1 Attempt following Question

- a) State and explain the convergence requirements of polynomial functions? (5) CO1

OR

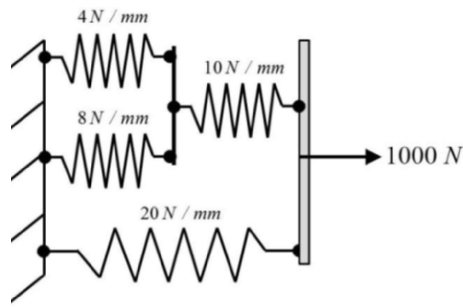
- b) Draw three dimensional Pascal's triangle. (5) CO1

- c) For the truss as shown in figure, using FEM, determine deflections at loaded joints. The joint B is subjected to 50 kN horizontal force towards left and 80 kN force vertically downward. Take cross sectional area of all members 1000 mm^2 . Young modulus is 200 GPa. (10) CO2



OR

- d) Figure shows cluster of four springs. One end of the spring assembly is fixed and a force of 1000 N is applied at the other end. Using the finite element method, determine deflection of each spring. Both the vertical plates can move only in translational direction. (10) CO2



Question No. 2 Attempt following Question

- a) Explain errors and accuracy in Finite element analysis. (5) CO1

OR

- b) Explain 'Galerkin method' (5) CO1

- c) Derive element stiffness matrix for one dimensional bar element by using variational principal. (10) CO2

OR

- d) Explain in detail all the steps of Finite Element Method. What are the advantages of FEM over conventional methods? (10) CO2

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