Sanjay Ghodawat University, Kolhapur

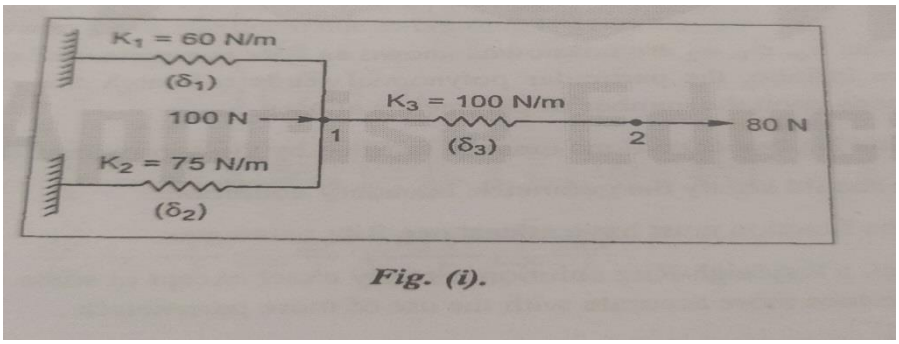
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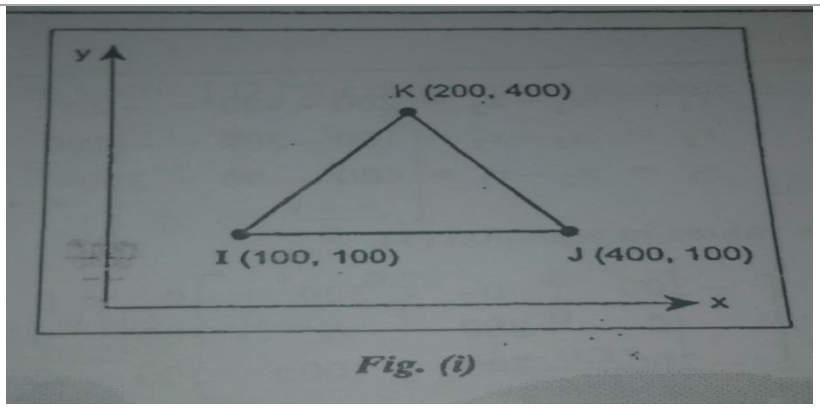
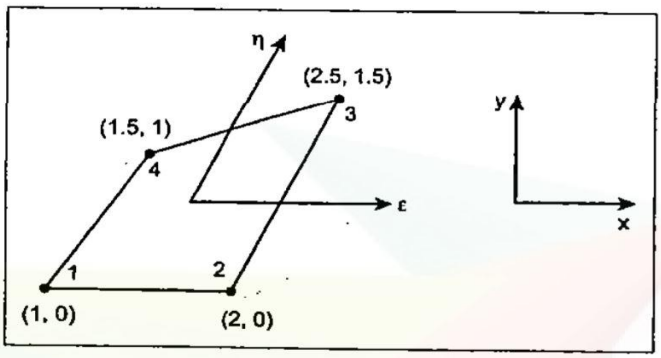
2020-21

EXM/P/09/00

Year and Program: B.Tech Final Year	**School of Technology**	**Department: Aeronautical Engineering**
Course Code: AET308A	**Course Title: Finite Element Method**	**Semester : VIII**
Day and Date:	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory.

Q.1		**Answer/Solve the following (any Two)**	**Marks**	Bloom's Level	CO
	a)	What is FEA? Explain in detail the advantages, disadvantages and applications of FEM.	8	2	CO1
	b)	Determine the displacements of nodes 1 and 2 in the spring system shown in fig(i). Use minimum of potential energy principle to assemble equations equilibrium.  *Fig. (i).*	8	3	CO1
	c)	Explain in detail the steps used in Rayleigh Ritz method for solving structural problems.	8	2	CO2
Q.2		**Answer/Solve the following (any two)**			
	a)	Consider a one dimensional bar element with two nodal points and a center point P. At node 1, x_1=20mm, u_1=3mm and at node 2, x_2=36mm, u_2=-5mm and at center point P, x=24mm. Calculate the (i)Shape function N_1 and N_2 at point P. (ii)Displacement u at point P.	8	3	CO3
	b)	Derive the strain displacement matrix [B] for the two dimensional constant strain triangular element(CST).	8	2	CO4
	c)	For the constant strain triangular element shown in figure, assemble strain displacement matrix. Take t=20mm and E=$2x10^5$ N/mm^2.	8	3	CO4

		 Fig. (i)			
Q.3		**Answer/Solve the following (any two)**			
	a)	What is dynamic analysis. Explain in detail about the steps and methods used in dynamic analysis.	9	2	CO6
	b)	Evaluate the jacobian matrix for the isoparametric quadrilateral element shown in figure. 	9	3	CO5
	c)	Explain the terms (i)Superparametric element, (ii)Subparametric element, (iii)Isoparametric element, (iv)Stiffness matrix, (v)Jacobian matrix.	9	2	CO5

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