

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Matrix methods of Structural Analysis
Program: M. Tech (Structural Engg.)

Semester: I
Course Code CIVL7003
Max. Marks: 100

SECTION A

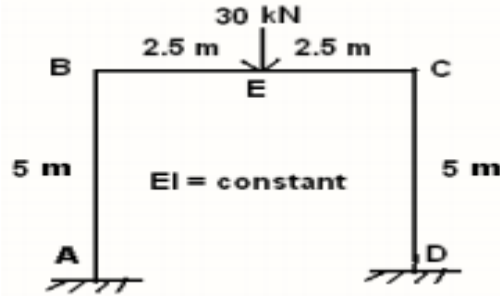
S. No.		Marks	CO
Q.1	State Maxwell reciprocal theorem & its effect in matrix method of structures	4	CO1
Q.2	Explain system & element coordinates with suitable examples	4	CO2
Q.3	Prove that flexibility is inverse of stiffness matrix	4	CO3
Q.4	What are Eigen values & Eigen vectors	4	CO4
Q.5	Obtain the force displacement equation of beam element	4	CO3

SECTION B

Q.6	Using the flexibility matrix , Analyze the beam supported & loaded as shown in Figure below. Assume the flexural rigidity constant. Adopt element approach	10	CO1
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Q.7	a. Derive the stiffness matrix for two node beam element of length “L” and axial rigidity “AE” b. Explain various properties of stiffness matrix obtained.	10	CO2
Q.8	Analyze the pin jointed steel plane truss supported & loaded as shown in figure below. The cross sectional area of each member is 1000mm ²	10	CO2

Q.9	a. Portal frame ABC is loaded as shown in figure below. It subjects to point load over span BC. Draw BMD taking EI constant for AB & BC. Use stiffness method . Adopt Element approach.	10	CO1
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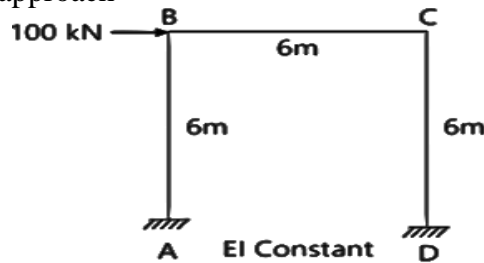


OR

b. Define the stiffness coefficient & derive the stiffness matrix of a space truss element.

SECTION-C

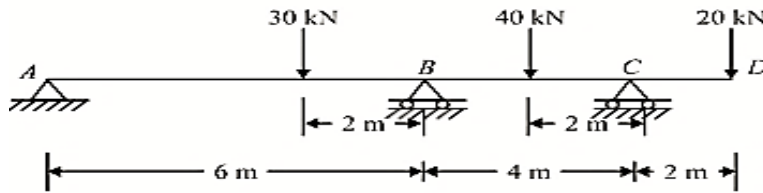
Q.10 Analyze the frame shown in figure below by **flexibility matrix**. Draw B.M.D for the frame. Adopt element approach



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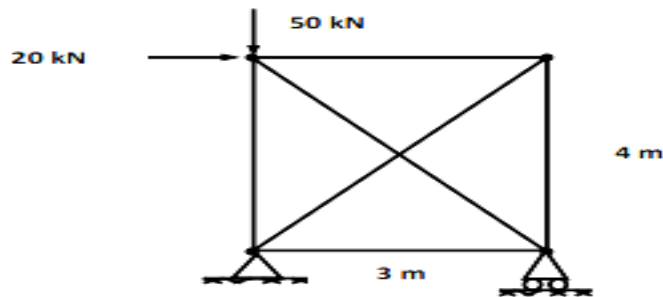
CO3

Q.11 Analyze the overhang beam shown in figure below by stiffness method. Adopt element approach



OR

Q.11 Analyze the rigid jointed frame shown in figure below. Adopt Element approach



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CO4