

Reg. No:

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
 (AUTONOMOUS)
M.Tech I Year I Semester Regular Examinations Jan 2020
ADVANCED STRUCTURAL ANALYSIS
 (Civil Engineering)

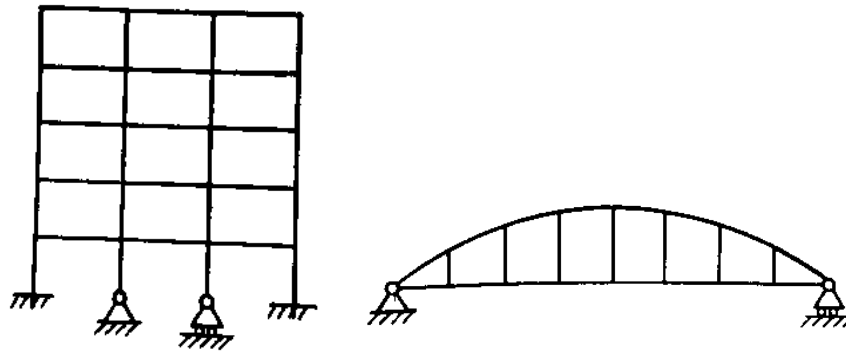
Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Write short notes on pin-jointed and Rigid-jointed frames. 4M
 b Determine the degrees of static indeterminacy of the figures shown below. 8M



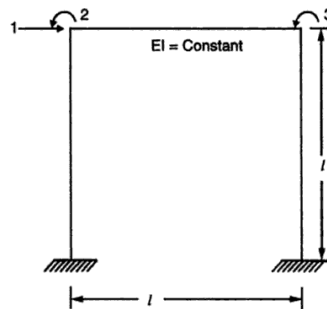
OR

- 2 a Explain co-ordinate systems with sketches. 6M
 b Determine the degrees of Kinematic indeterminacy of the figures shown below. 6M



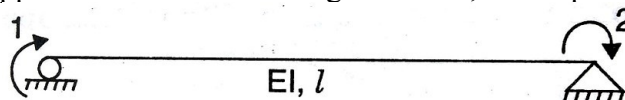
UNIT-II

- 3 Develop the stiffness matrix for the structure with the co-ordinates as shown in figure below. EI is constant. 12M



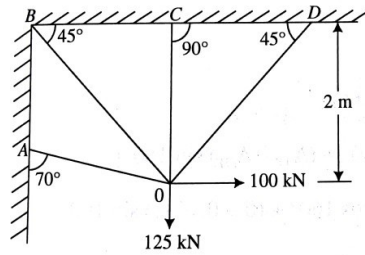
OR

- 4 a Prove that the product of flexibility and stiffness matrices is a unit matrix. 4M
 b For the simply supported beam shown in figure below, develop the flexibility matrix. 8M



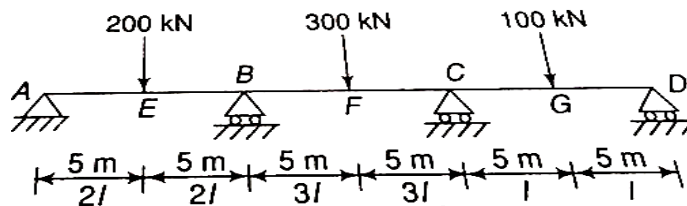
UNIT-III

- 5 Analyze the pin-jointed structure shown in figure below by stiffness matrix method. **12M**
 The area of each member is 1000mm^2 . Take $E = 2 \times 10^5 \text{ N/mm}^2$.



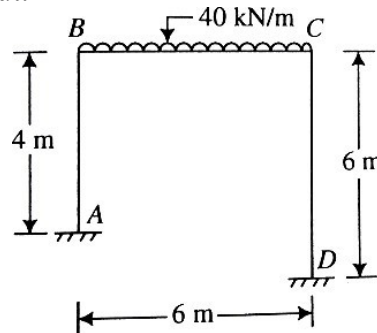
OR

- 6 Analyze the continuous beam shown in figure below by flexibility method. The downward settlement of supports 'B' and 'C' in KN.m are $1500/EI$ and $750/EI$. **12M**



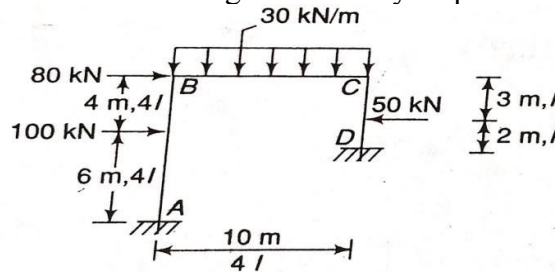
UNIT-IV

- 7 Analyze the rigid-jointed plane frame shown in figure below by flexibility matrix method. 'EI' is constant throughout. **12M**



OR

- 8 Analyze the portal frame shown in figure below by displacement method. **12M**



UNIT-V

- 9 Determine the solution by using Gauss elimination method. **12M**

$$\begin{aligned} 2x_1 - 2x_2 + 4x_3 &= -3 \\ 2x_1 + 3x_2 + 2x_3 &= 5 \\ -x_1 + x_2 - x_3 &= 1 \end{aligned}$$

OR

- 10 Explain briefly about frontal solution technique and static condensation. **12M**

*** END ***

