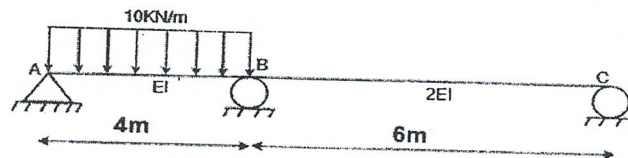


Exam.	Back (New Course)		
Level	BE	Full Marks	60
Programme	BCE	Pass Marks	24
Year / Part	II / II	Time	3 hrs.

Subject: - Theory of Structures II (ENCE 252)

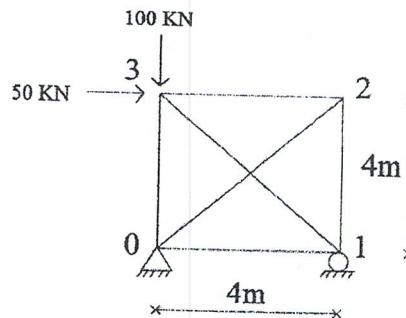
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Describe difference between static and kinematic indeterminacies with an example. [4]
- b) Determine the reaction at the support B in the figure below using Castigliano's theorem. [6]

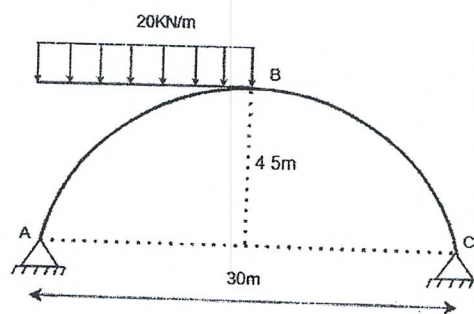


2. Compute the member forces of the truss shown in the figure below due to, [10]
 - a) loads given
 - b) member 02 is large by 2 cm
 - c) member 02 is heated by 36°C

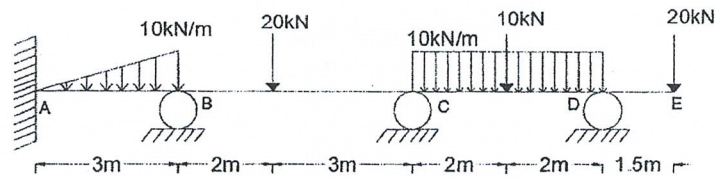
$\alpha = 15 \times 10^{-6} / ^{\circ}\text{C}$, $E = 2 \times 10^6 \text{ MPa}$, $A = 500 \text{ mm}^2$ for all members.



3. A two hinged parabolic arch as shown in figure below has secant variation of moment of inertia. Determine the value of support reactions, bending moment, normal thrust and radial shear at 10m from the left support. [6]

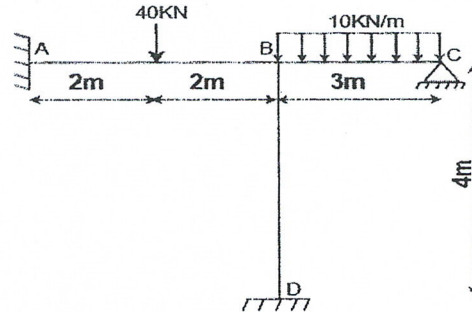


4. Analyze the beam shown in the figure below using slope deflection method if support B sinks down by $200/EI$ and support C uplift by $100/EI$. Take EI is constant. [5]



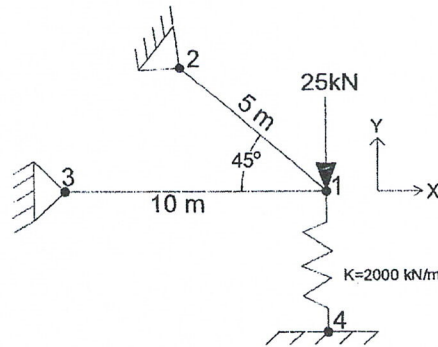
5. Analyze the frame shown in the figure below to calculate end moments using moment distribution method if support A settles down by 15mm. Take $EI = 20000 \text{ kNm}^2$ constant throughout.

[5]



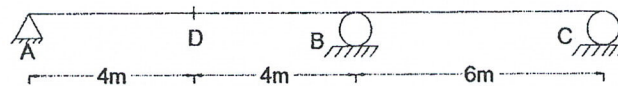
6. Determine member stiffness matrices for each member and using direct stiffness methods, find the displacement of node 1 for the following structure. Combine spring and bar elements. Both bars have $E = 210 \text{ GPa}$ and $A = 5 \times 10^{-4} \text{ m}^2$. The spring stiffness of spring $k = 2000 \text{ kN/m}$.

[3+9]



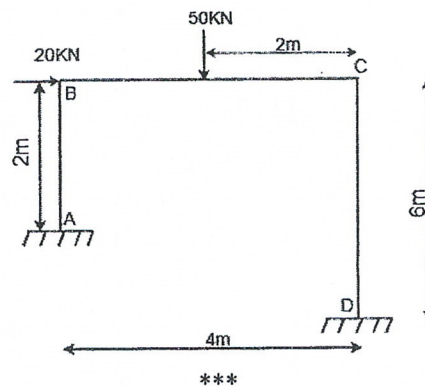
7. Draw ILD for SF at D for given continuous beam shown in the figure below. Compute ordinate at 2m interval. Take $EI = \text{constant}$.

[6]



8. Determine the plastic moment capacity of the frame for given loading for load factor 1.5 shown in figure below.

[6]



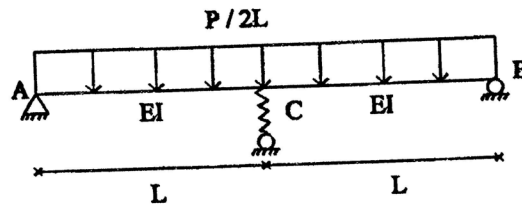
Exam.	Regular (New Course)		
	BE	Full Marks	60
	BCE	Pass Marks	24
	II / II	Time	3 hrs.

Subject: - Theory of Structures II (ENCE 252)

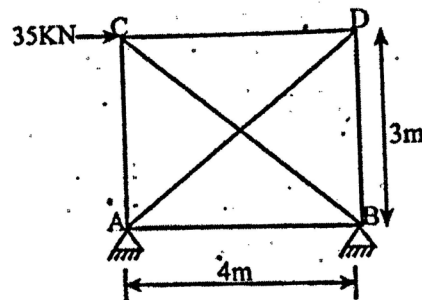
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. a) Describe method of flexibilities and stiffness. [4]

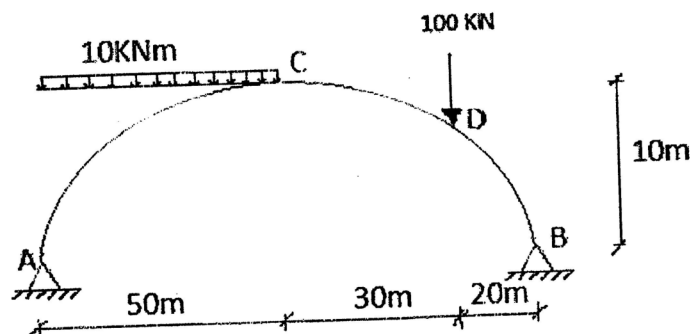
b) A spring with stiffness k supports a simply supported beam shown in the figure below. Find the reaction at elastic support using Castigliano's theorem. [6]



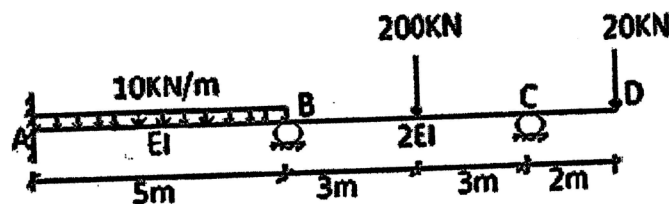
2. For the truss shown in figure below, calculate the member forces using force method. Take EA constant for all. [10]



3. Calculate the horizontal thrust of the given two hinged parabolic arch. [6]

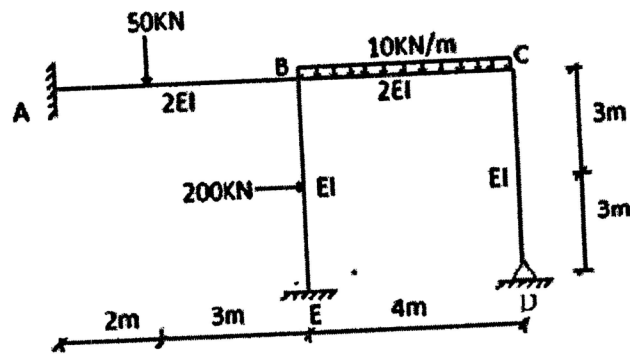


4. Analyze the beam shown in figure below using slope deflection method. [5]

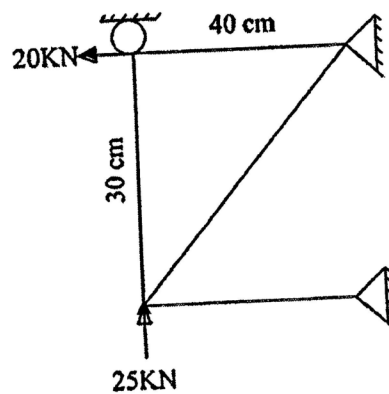


[5]

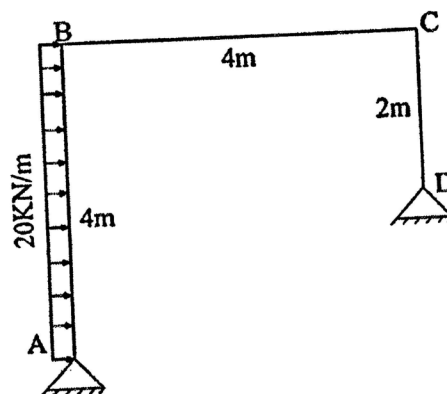
5. Analyze the frame by using moment distribution method.



6. Determine member stiffness matrices for each member and find the reactions in all supports of truss as shown in figure below using direct stiffness method. [4+8]



7. Determine the plastic moment capacity for the frame shown in figure below. Take load factor 1.5. [6]



8. Draw ILD for reaction at fixed support of a propped cantilever beam of span 6 m. Take 1 m ordinate interval. [6]
