Menofia University. Faculty of Engineering Civil Engineering Department. **Date:** Wednesday, 10/1/2018	**Subject:** Matrix Analysis of Structures **Code:** CVE 501 **Year:** Diploma Level 500 **Academic year:** 2017-2018
Allowed Tables and Charts: (None)	

Read carefully the given data and solve all questions.

Question 1

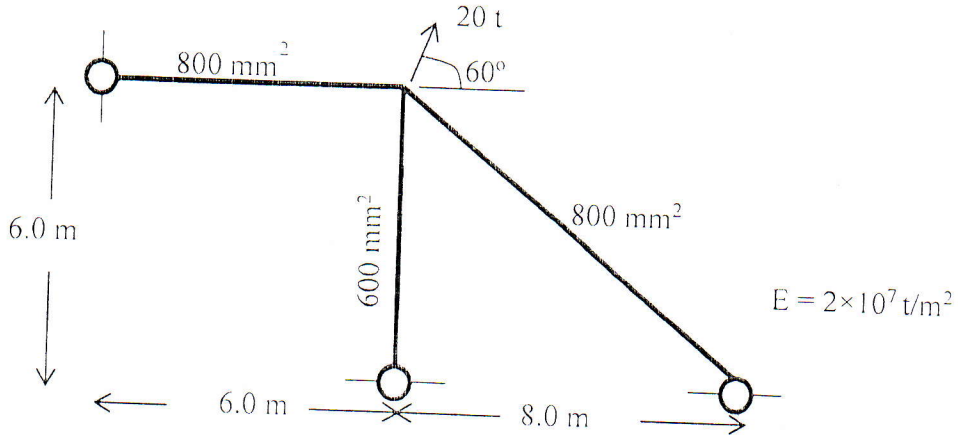
[15 Marks]

a) Identify types of framed structures explaining degrees of freedom in each type [5M]
b) Show the difference between Local, Global and structural stiffness matrices [5M]
c) Illustrate the assumptions of linear analysis. [5M]

Question 2

[30 Marks]

For the truss shown in **Figure (1)**, use matrix method to write and solve equations of equilibrium required to find displacements at joints. Then compute reactions at supports and bar forces.



Question 3

[30 Marks]

Determine joint displacements, member end forces and support reactions for the beam shown in **Figure (2)**. Draw BMD, SFD and the deformed shape of the beam.

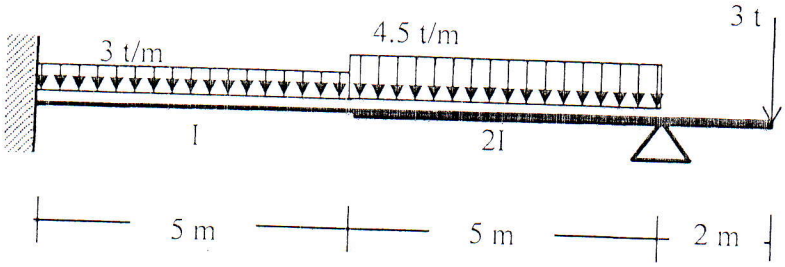


Figure (2)

Question 4

[25 Marks]

The frame shown in **Figure (3)** is subjected to the given loads. Identify by numbers the degrees of freedom and restrained coordinates.

If the global deformations of the inclined member are:

$$\begin{bmatrix} -1.006\times10^{-5}\ \text{m} \\ -7.543\times10^{-6}\ \text{m} \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

Calculate end forces of this member in both global and local directions.

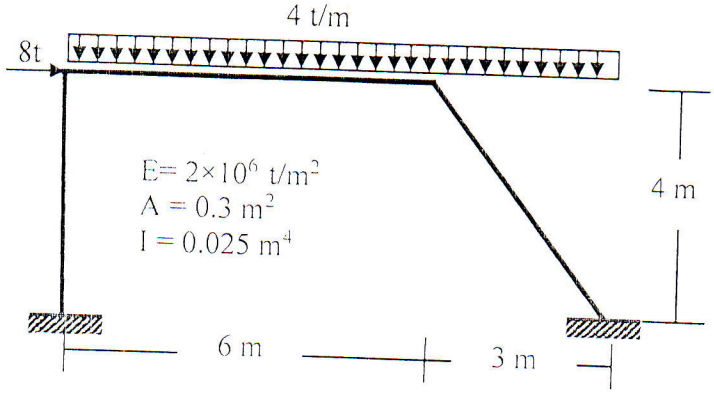
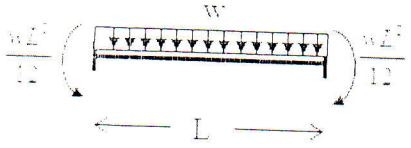


Figure (3)



Our best wishes,

This exam measures the following ILOs

Question number	Q1-a	Q1-b	Q1-c			Q2	Q3				Q4				
skills	A1	A2	A4			B1	B2				C4				
	Knowledge and understanding skills					Intellectual skills					Professional skils				