Ministry of Higher Education
Giza Higher Institute of Engineering & Technology
Civil Engineering Department
Course Name: **Theory of Structures (3)**
Course Code : **CIV 301** Date : **30 / 12 / 2017**

Academic Year : **2017/2018**
Semester : **First**
Level : **3rd**
Time : 3 **Hours**
Examiner**:** ***Dr. M. Abdel-Kader***

Final Exam

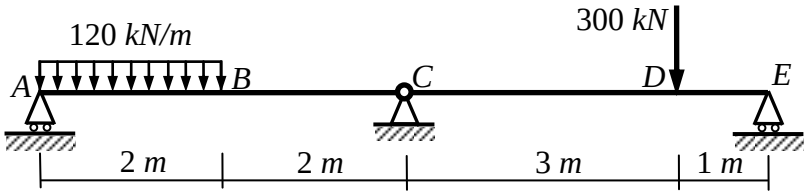
Total Marks**: 60** No. of Questions**:5** (Attempt all questions)

Question (1): (12 Marks)

For the shown beam, using the **double integration method**:

(a) Determine the deflections at *B* and the mid-span *CE*.
(b) Determine the slopes just to the left and the right of *C*.
(c) Sketch the elastic curve of the beam.

$EI = 2\times10^7\ N.m^2$

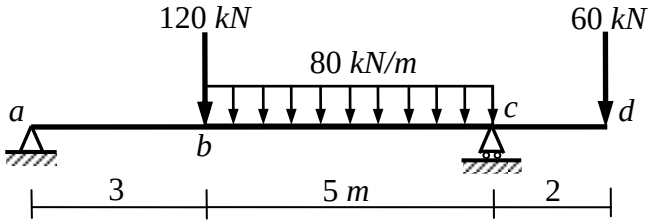


Question (2): (12 Marks)

For the shown beam, using the **moment-area method**:

(a) Determine the slope at *a*.
(b) Determine the deflections at *b* and *d*.
(c) Sketch the elastic curve of the beam.

$EI = 150\ MN.m^2$

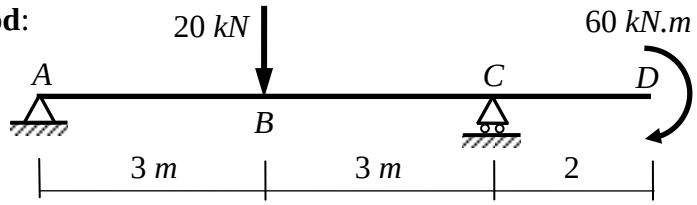


Question (3): (12 Marks)

For the shown beam, using the **conjugate beam method**:

(a) Determine the slope at ***C***.
(b) Determine the deflections at *B* and ***D***.
(c) Sketch the elastic curve of the beam.

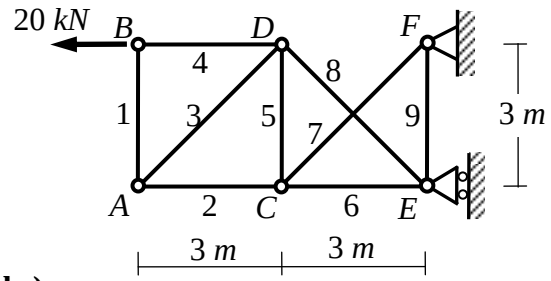
$EI = 40\times10^3\ kN.m^2$

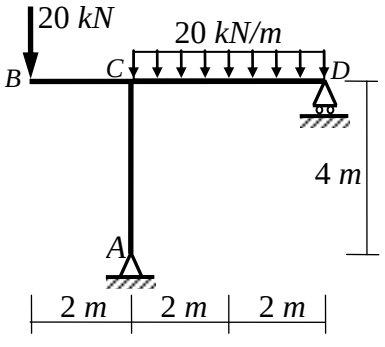


Question (4): (12 Marks)

For the shown frame and truss, using the **virtual work method**, determine the horizontal displacements at ***B*** (δ_{Bh}).

For the frame, $EI = 20\times10^3\ kN.m^2$. For the truss, assume that all members have the same axial rigidity $EA = 30000\ kN$.



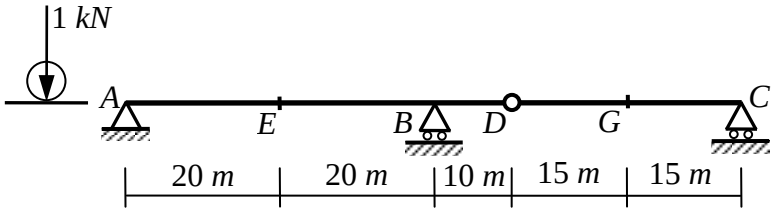


Question (5): (12 Marks)

For the shown beam, draw the influence line for:

(a) The reactions A_y, B_y and C_y.
(b) The shear forces at the sections *E* and B_{right} .
(c) The bending moments at the sections *E* and *G*.

Also, determine the maximum moment at *E* caused by a concentrated moving load of 90 *kN* and a uniform live load of 30 *kN/m*.



With my best wishes
Dr. M. Abdel-Kader