Ministry of Higher Education
Giza Higher Institute for Eng. & Tech.
Civil Engineering Department
Course Name: **Theory of Structures (3)**
Course Code : **CIV 301**

Academic Year : **2014-2015**
Semester : **First**
Level : **3rd**
Time : **3 Hours**
Date : **10 / 1 / 2015**
Examiner: ***Dr. M. Abdel-Kader***

First Semester Final Exam

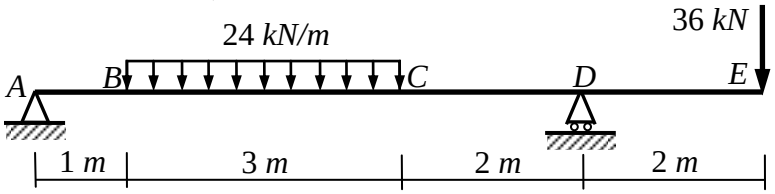
- Attempt all questions.
- The Exam consists of **5** questions in **1** page.
- Maximum grade is **60 Marks**

Question (1): (12 Marks)

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

(a) the deflections at *C* and *E*,
(b) determine the slope at *D*,
and sketch the elastic curve of the beam.

$EI = 10\times10^6\ N.m^2$

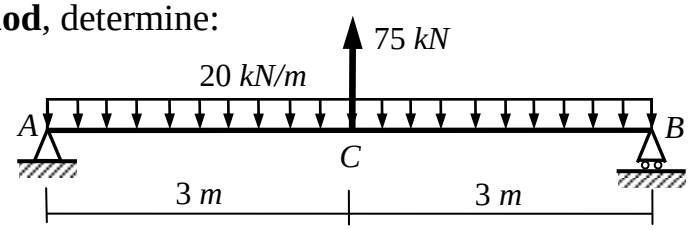


Question (2): (12 Marks)

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

(a) the slope at ***A***,
(b) the deflection at ***C***,
and sketch the elastic curve of the beam.

$EI = 20\times10^6\ N.m^2$

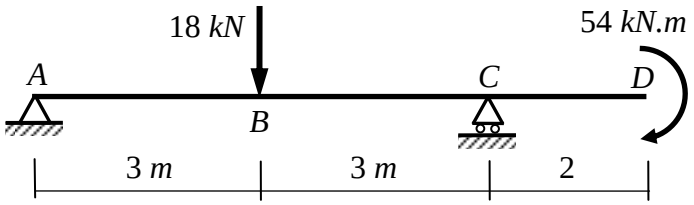


Question (3): (12 Marks)

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

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

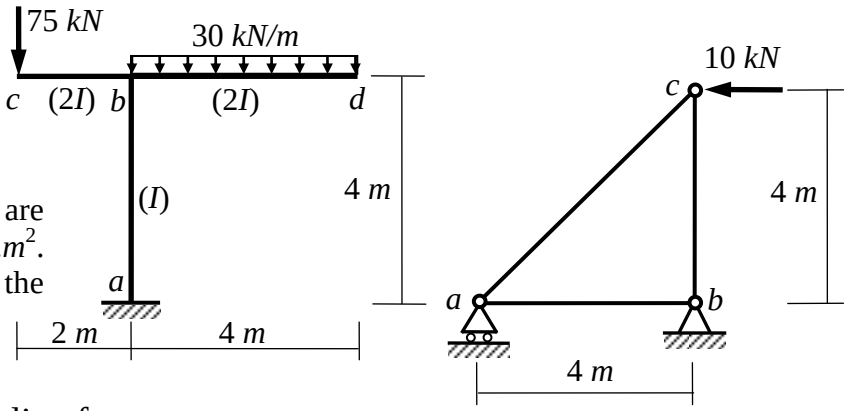
$EI = 20\times10^3\ kN.m^2$



Question (4): (12 Marks)

For the shown frame and truss, using the **virtual work method**, determine the horizontal and vertical displacements at *c* ($\delta_{c\,h}$ and $\delta_{c\,v}$).

For the frame, the relative moments of inertia are given between brackets and $EI=20\times10^3\ kN.m^2$. For the truss, assume that all members have the same axial rigidity $EA=1000\ kN$.

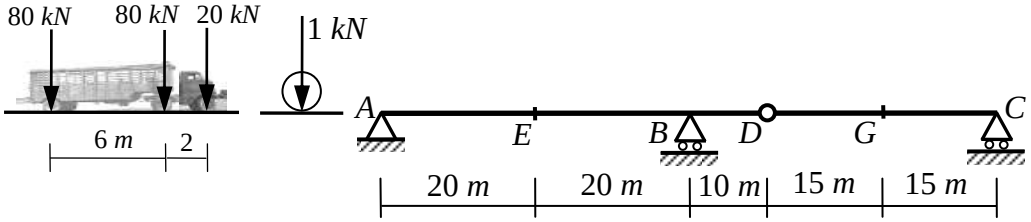


Question (5): (12 Marks)

For the shown beam, draw the influence line for:

(a) the reactions A_y, B_y and C_y.
(b) the shear force at the section *E* and the bending moments at the sections *E* and *G*.

Also, determine the maximum moment at *G* caused by the shown moving truck.



With my best wishes
Dr. M. Abdel-Kader