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 : **2013–2014**
Semester : **First**
Level : **3 rd**
Time : **3 Hours**
Date : **31 / 12 / 2013**
Examiner : ***Dr. M. Abdel-Kader***

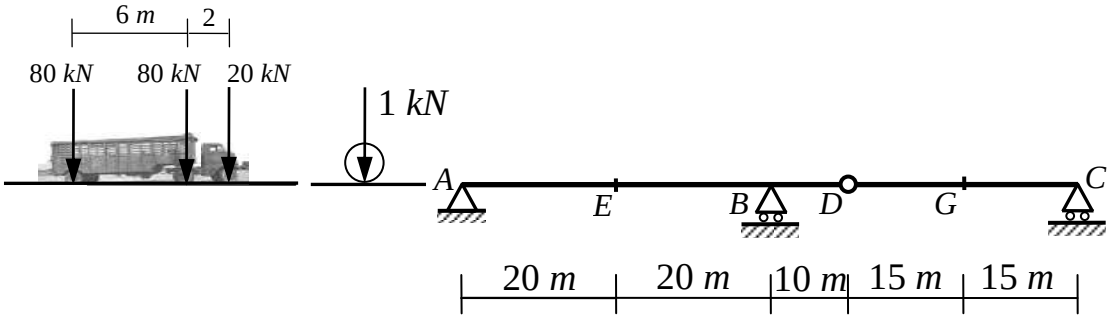
First Semester Final Examination

- The Exam consists of **6** questions in **2** pages.
- Maximum grade is **60 Marks**

Question (1): (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 sections *E* and just to the right of *B* (B_R).
(c) the bending moment at the sections *E* and *G*.
Also, determine the maximum moment at *G* caused by the shown moving truck

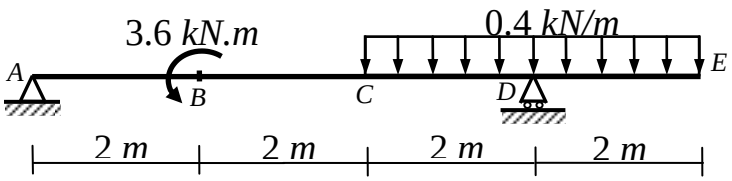


Question (2): (12 Marks)

For the shown beam, draw the elastic line of the beam and using the **double integration method**, determine:

(a) the deflection at *C*.
(b) the slope at *E*.

$EI = 45.0\times10^4$ N.m^2

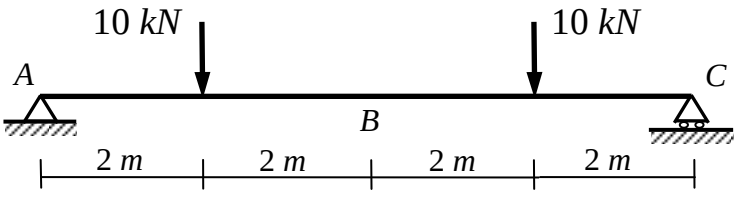


Question (3): (10 Marks)

For the shown beam, draw the elastic line of the beam and using the **moment-area method** determine:

(a) the slope at ***A***.
(b) the deflection at ***B***.

$E = 200$ *GPa* and $I = 1300$ *cm*^{4}



Please turn over

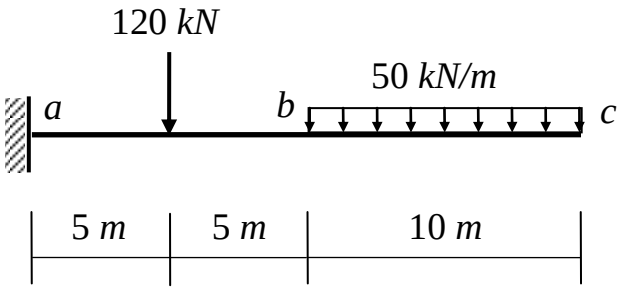
Question (4): (10 Marks)

For the shown cantilever beam, draw the elastic line of the beam and using the **conjugate beam method**, determine:

(a) the slope at ***c***.

(b) the deflection at ***c***.

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



Question (5): (12 Marks)

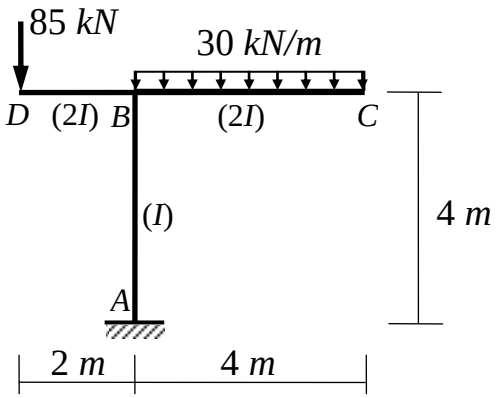
For the shown frame, using the **virtual work method**, calculate:

(a) the horizontal displacement at *D*.

(b) the vertical displacement at *D*

(c) the slope at *C*.

The relative moments of inertia are given between brackets.



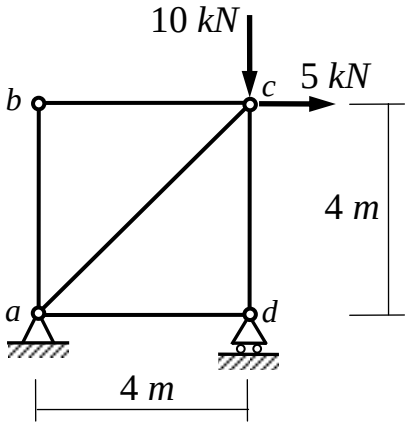
Question (6): (10 Marks)

For the shown truss, using the **virtual work method**, calculate:

(a) the horizontal deflection of joint ***c***.

(b) the vertical deflection of joint ***c***.

Assume that all members of the truss have the same axial rigidity *EA*.



Good luck!

Dr. M. Abdel-Kader