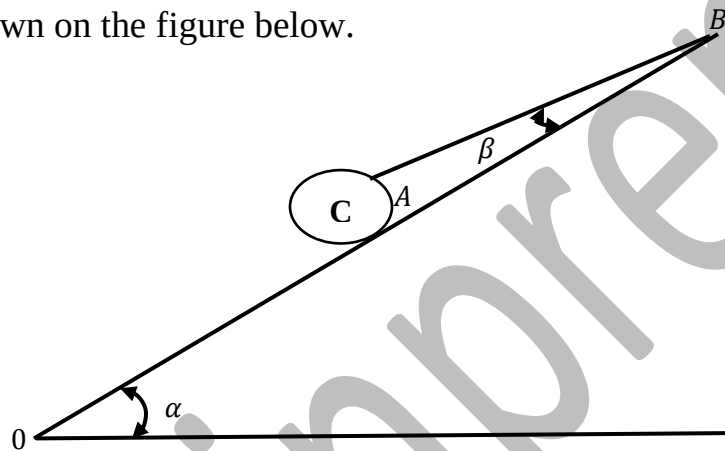


COMPETITIVE ENTRANCE EXAMINATION INTO HTTTC BAMBILI	
<u>CYCLE</u> :1 st CYCLE	Session: 2012
<u>LEVEL</u> : 1 st	
<u>OPTION</u> : BUILDING AND PUBLIC WORKS	
DURATION: 3hrs	

Exercise 1:(6pts): let have a sphere laying on a slope plane and tied with a rope AB as shown on the figure below.

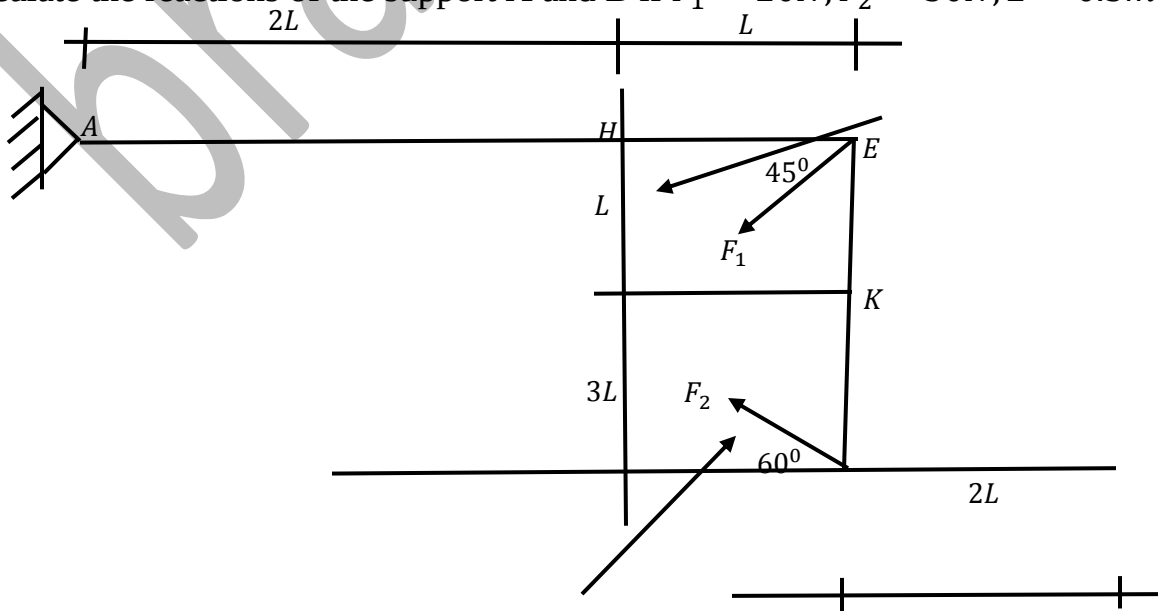


Determine the expression of the reaction R_i of the slope plane and the tension of the rope R_a , if the weight of the sphere is equal to G

Application: $\alpha = 45^\circ, \beta = 30^\circ, G = 60N$

Exercise 2(3pts): let's have a frame work shown on the figure below.

Calculate the reactions of the support A and B if $F_1 = 20N, F_2 = 30N, L = 0.5m$

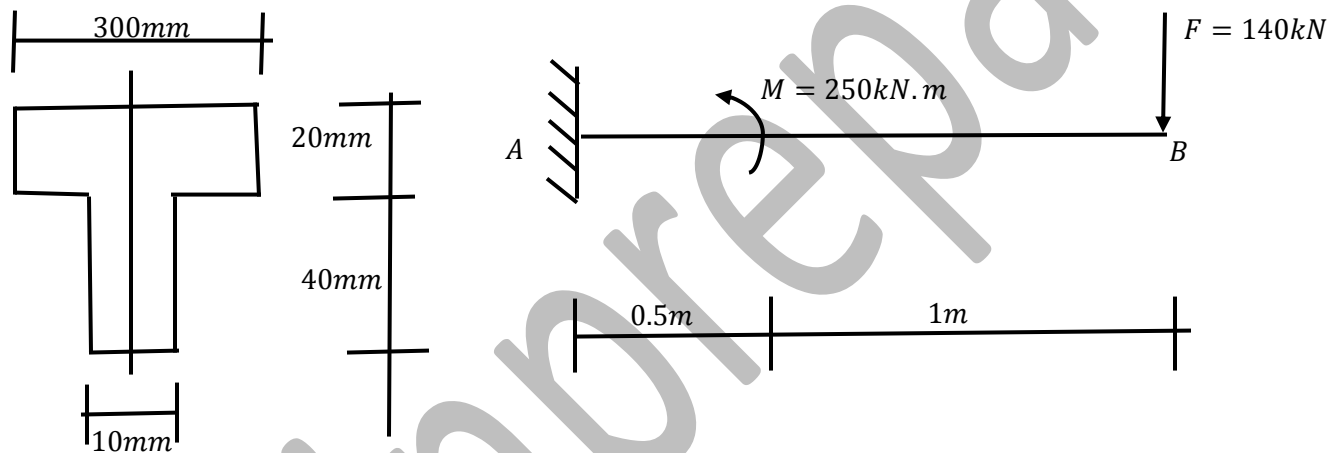


Exercise 3(8,0pts):

Let's have a cantilever of constant rigidity submitted to the load as on the figure represented below. The cantilever is made of iron.

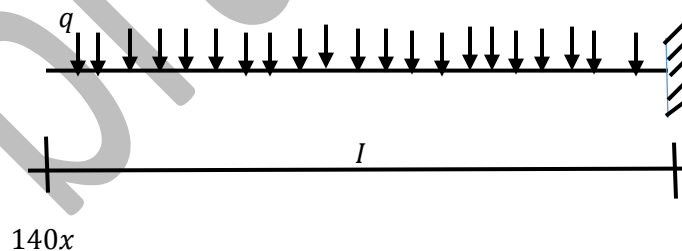
Given: tensile constraint $|\sigma_T| = 30\text{N/mm}^2$, compressive constraint $|\sigma_C| = 90\text{N/mm}^2$

- 1) Draw the diagram of the bending moment
- 2) Verify the resistance of the cantilever if its cross section has T form

**Exercise 4: (3,0pts)**

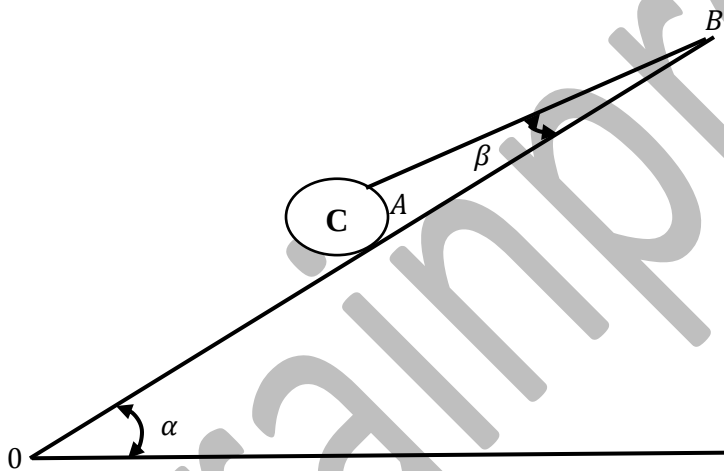
Let consider the cantilever represented below ($EI = \text{const.}$)

1. Draw the diagrams of the bending moment and the shear force
2. Calculate the rotation angle displacement at left end of the cantilever (The results have to be expressed by q , I and EI)



<u>CYCLE:</u> 1 st CYCLE	Session: 2012
<u>LEVEL:</u> 1 st	
<u>OPTION:</u> BUILDING AND PUBLIC WORKS	
DURATION: 3hrs	

Exercice 1 : (6,0pts) : soit une sphère placée sur un pane inclinée au angle α avec le plan horizontal. La sphère est retenue par AB, qui forme un angle β avec le plan incline

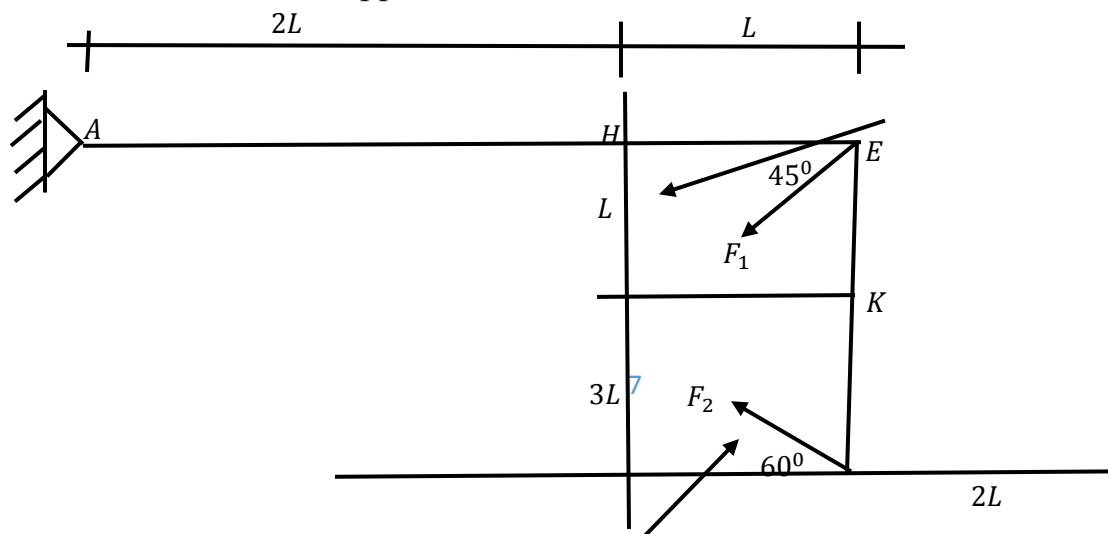


Déterminer les réactions R_I du plan incline et R_a du fil, si le poids de la sphère est G : Application Numérique: $\alpha = 45^\circ$, $\beta = 30^\circ$, $G = 60N$.

Exercice 2 : (3,0pts)

Soit le portique représenté ci – dessous.

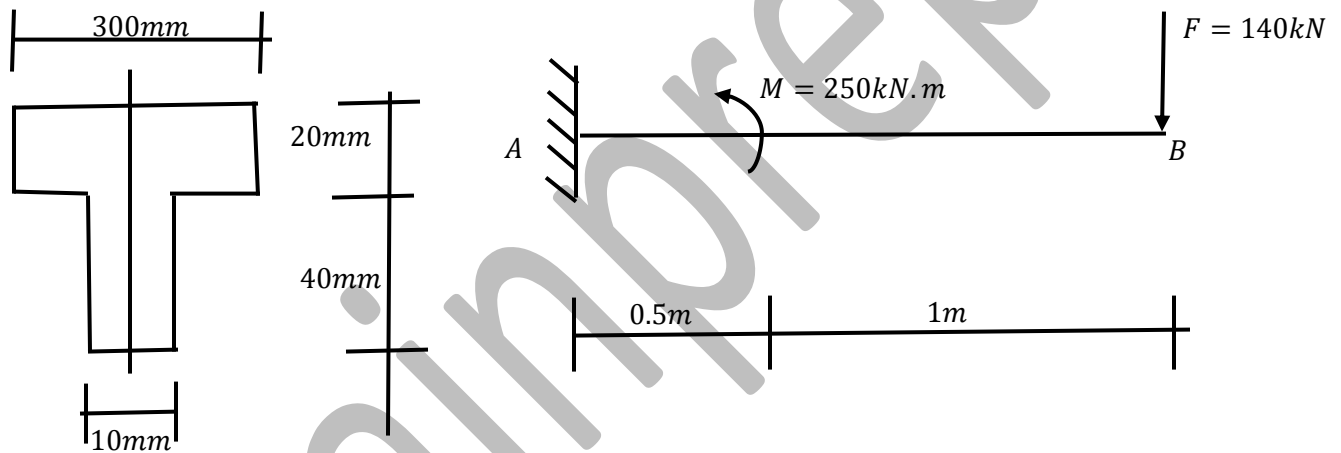
Calculer la réaction d'appui en A et en B si $F_1 = 20N$, $F_2 = 30N$, $L = 0,5m$



Exercice 3(8,0pts)

Soit la console de rigidité constante, chargée comme l'indique la figure ci – dessous. La console fente. On donne la contrainte limite en réaction $|\sigma| = 90$

- 1) Tracer le diagramme du moment fléchissant;
- 2) Vérifier la résistance de cette console si la section transversale est forme de T.

**Exercice 4(3,0pts)**

Soit la console représentée ci – dessous,

- 1) Tracer les diagrammes du moment fléchissant et de l'effort tranchant
- 2) Calculer l'angle de rotation et l'extrémité jobrée de la console en fonction de q, I, EI.

