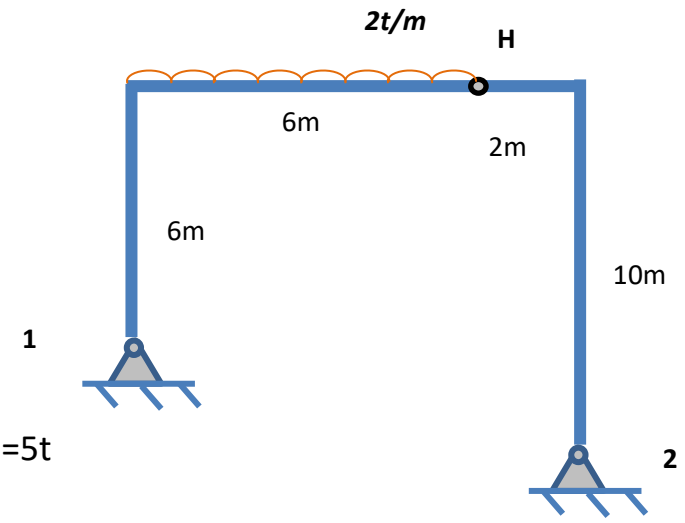
Alfurat Al-Awsat Technical University
Technical College / Al-Najaf
Department : Building & Construction Technology Engineering
Subject: Theory of Structures
Class: Third year
Lecturer : Professor Dr. Hakim Alkurayshi

Problems in Statically determinate rigid frames

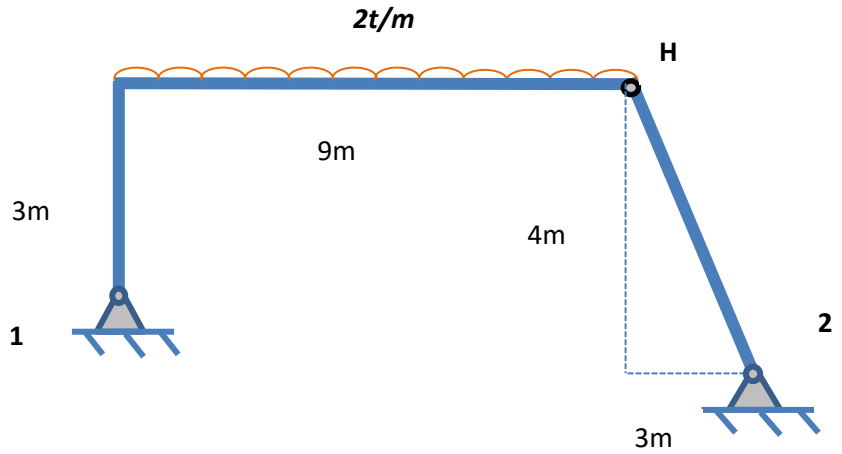
Draw (A.F.) .(S.F.) &(B.M.) diagrams for the following problems:

(1)



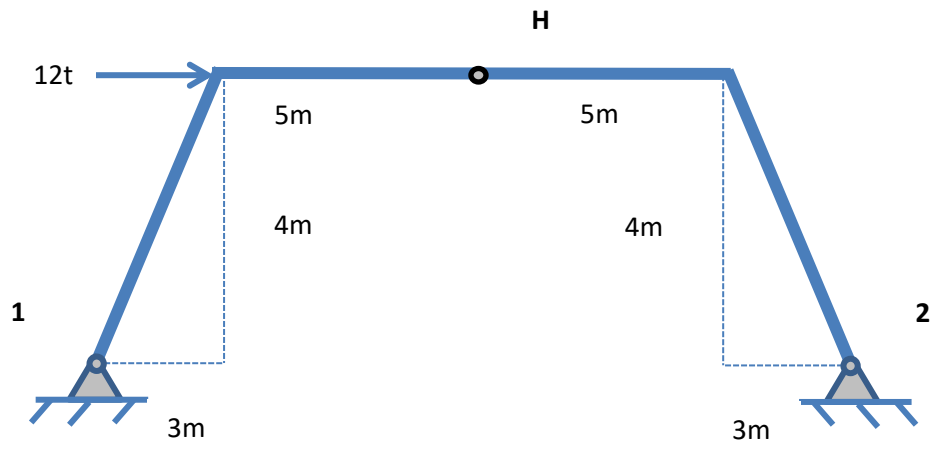
Answer: H1=1t ,V1=7t , H2=1t,V2=5t

(2)



Answer: H1=5.4t(to the right) ,V1=10.8t(up) , H2=5.4t,V2=7.2

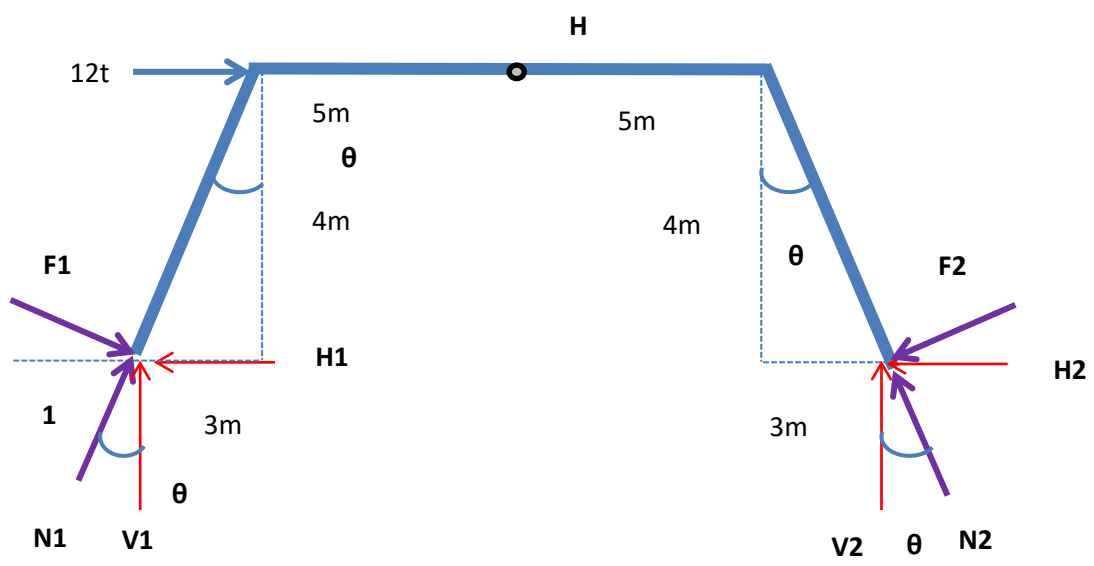
(3)



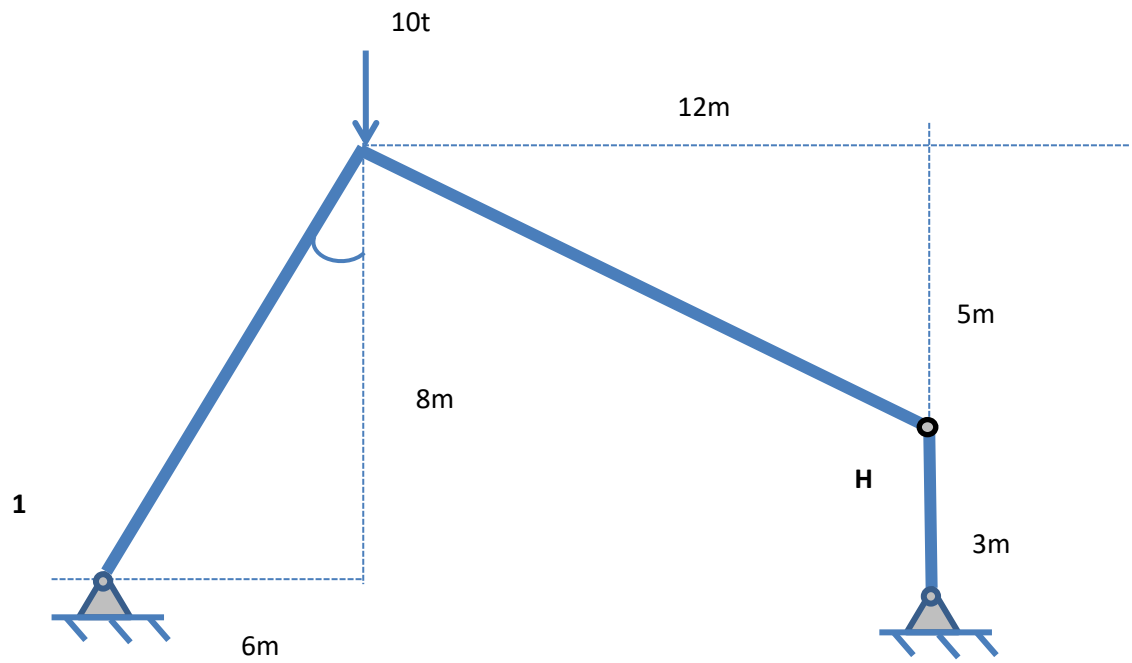
Answer: H1=6t(to the left) ,V1=-3t(up) , H2=6t(to the left),V2=3t(up)

N1=-6t(tension),F1=3t ,N2=6t (compression),F2=3t

Note …… N2=V2cosθ+H2 sin θ , F2=H2cosθ-V2 sin θ

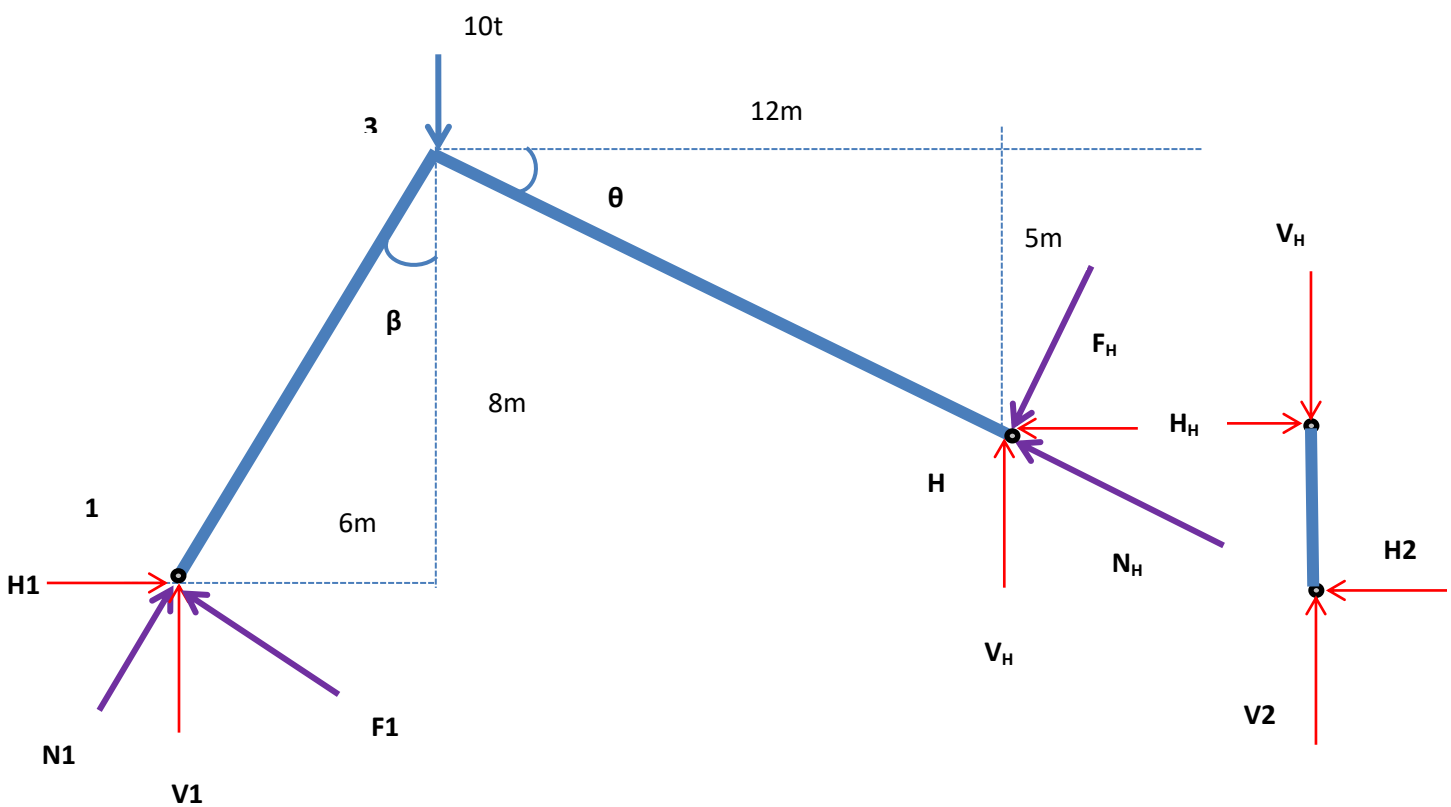


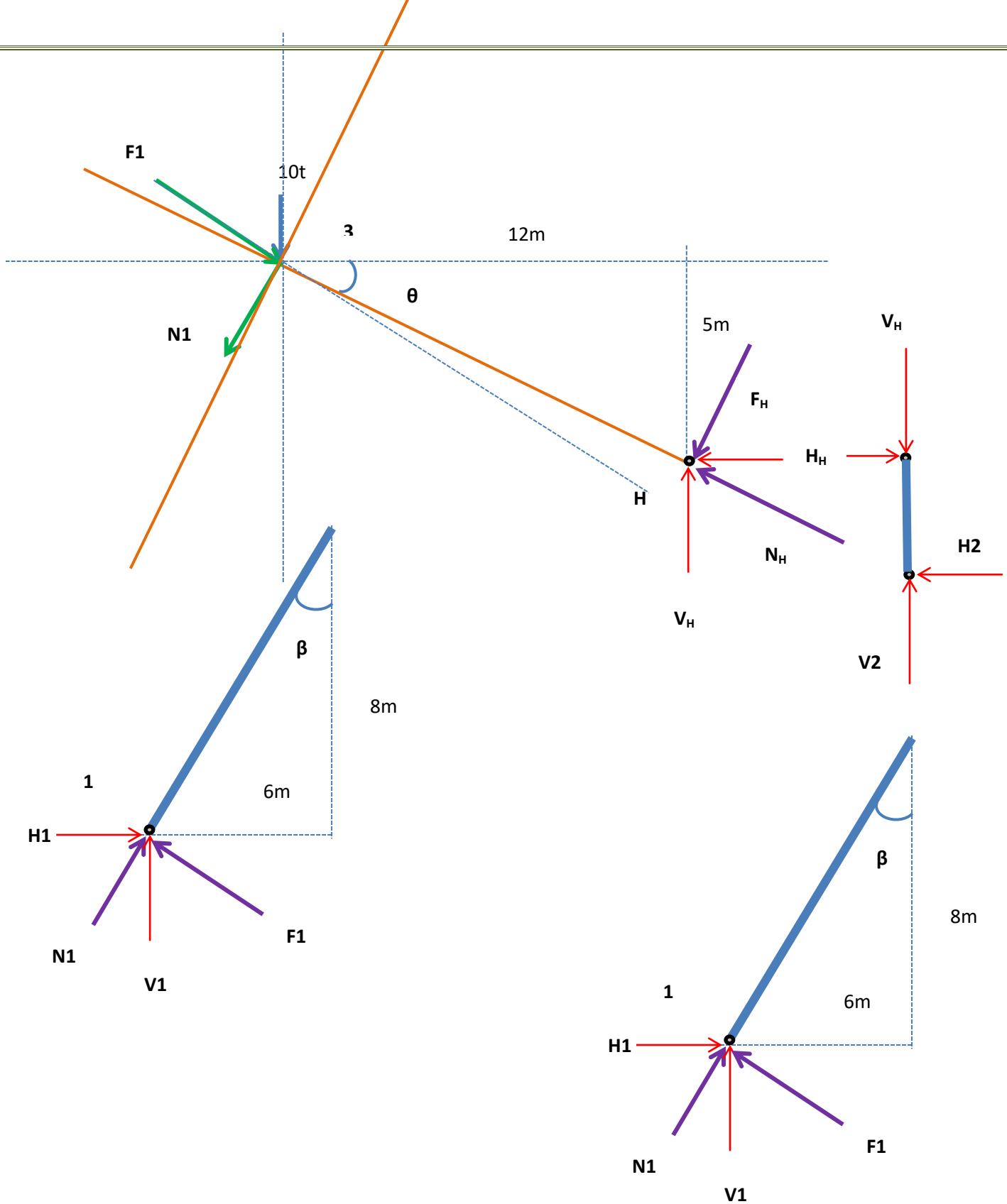
(4)

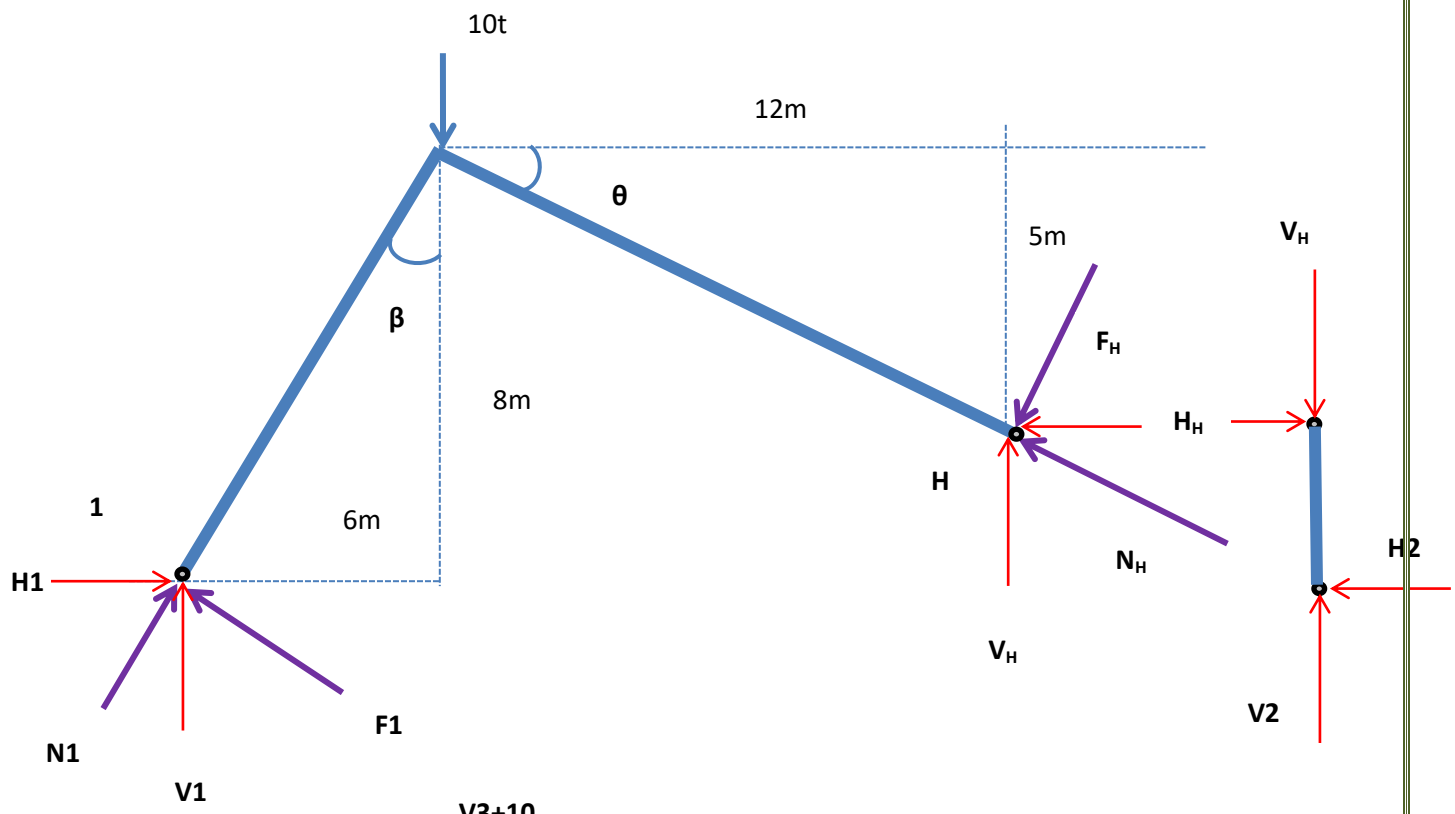


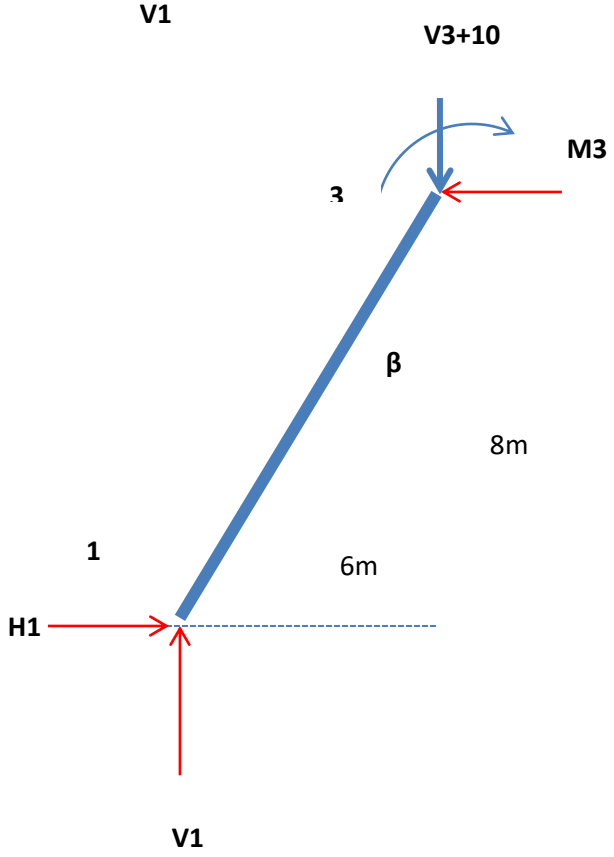
Hint: Separate the structure into two segments at the hinge H. After finding V_H and H_H , resolve into N_H and F_H .

N_H =axial force in the inclined member. F_H =shearing force in the inclined member.




F1
10t
3
12m
θ
N1
5m
V_H
F_H
H_H
H
N_H
V_H
H2
V2
β
8m
1
6m
H1
N1
V1
F1
β
8m
1
6m
H1
N1
V1
F1


10t
12m
θ
5m
V_H
β
F_H
8m
H_H
H
1
6m
H2
H1
N_H
V_H
V2
F1
N1
V1


V3+10
M3
3
β
8m
1
6m
H1
V1