

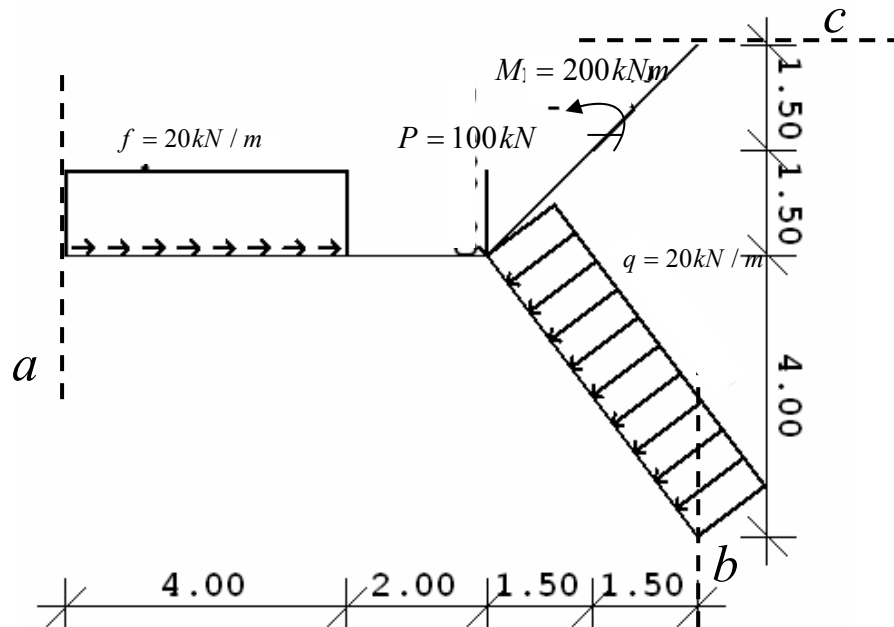
# TEHNIČKA MEHANIKA

16. 04. 2007.

grupa **A**

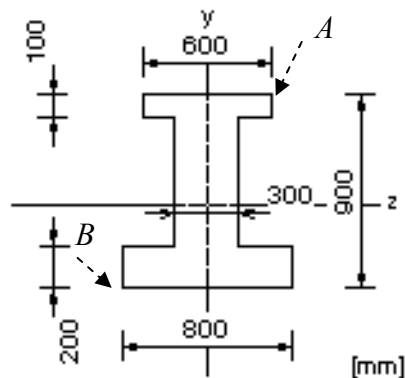
(ime i prezime ; matični broj)

- 1.) Zadani sustav u ravnini uravnotežiti silama A, B i C na pravcima "a" i "b" i "c". (15 bodova)



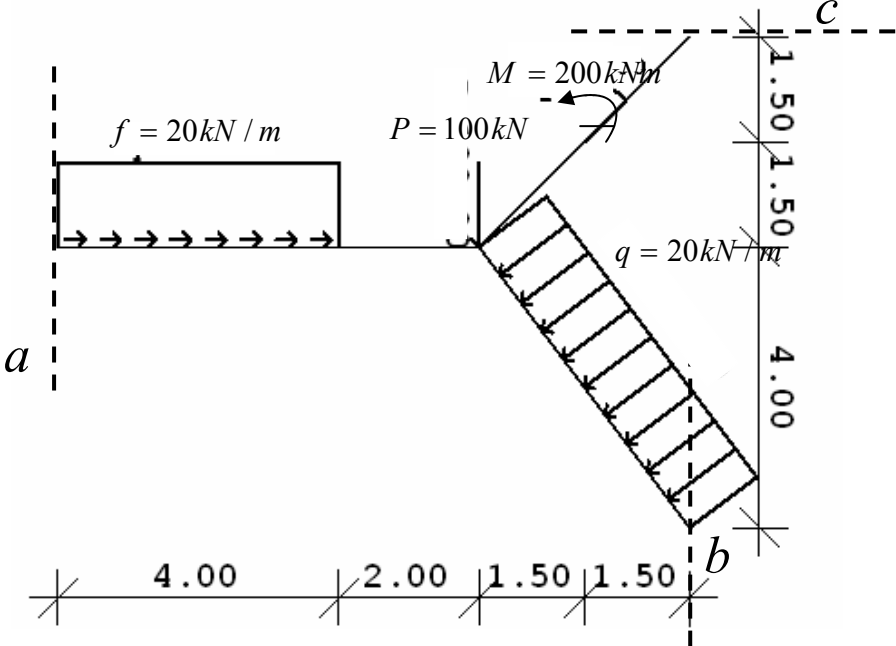
- 2.) Za uravnoteženi sustav iz prvog zadatka izračunati i nacrtati dijagrame unutarnjih sila. (55 bodova)

3. Ako u točki B djeluje vlačno naprezanje  $\sigma_B = 900 \text{ kN/m}^2$ , odredite koliko iznosi sila u točki A koja uzrokuje to naprezanje. (30 bodova)

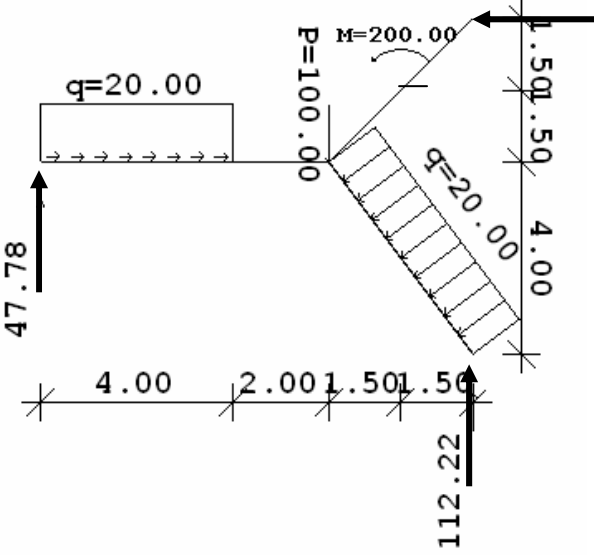


**Napomena:** Za izlazak na usmeni dio ispita potrebno je sakupiti najmanje 50 bodova na pismenom dijelu, ali pod uvjetom da u 2. zadatku treba imati dobar M dijagram.

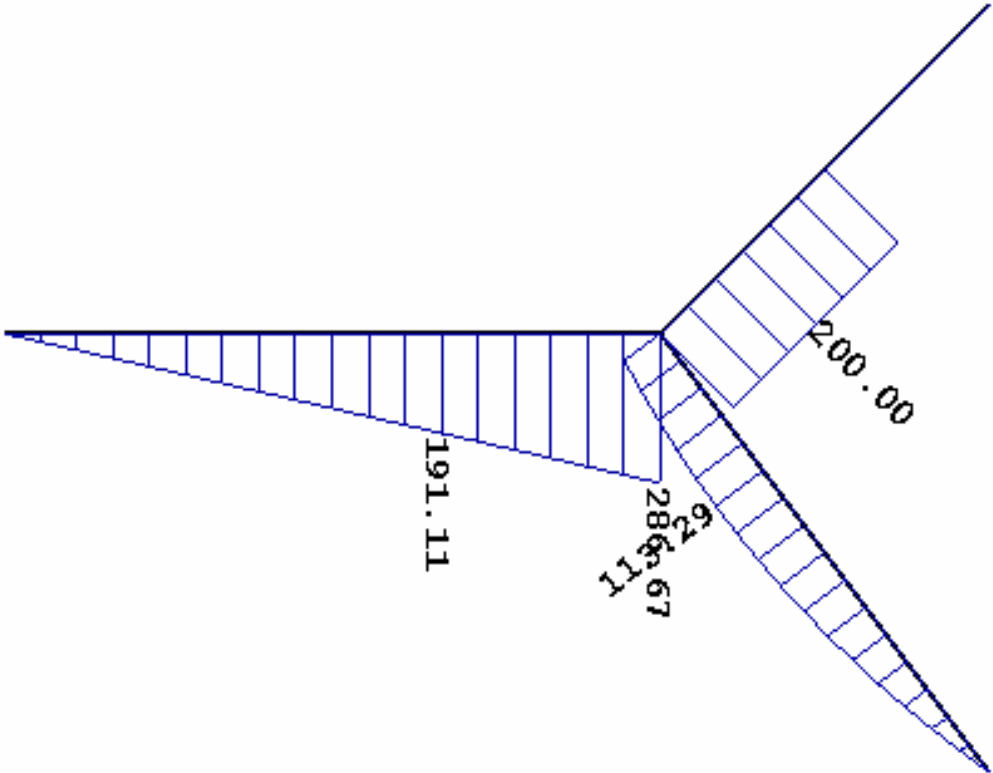
Rješenje za grupu A



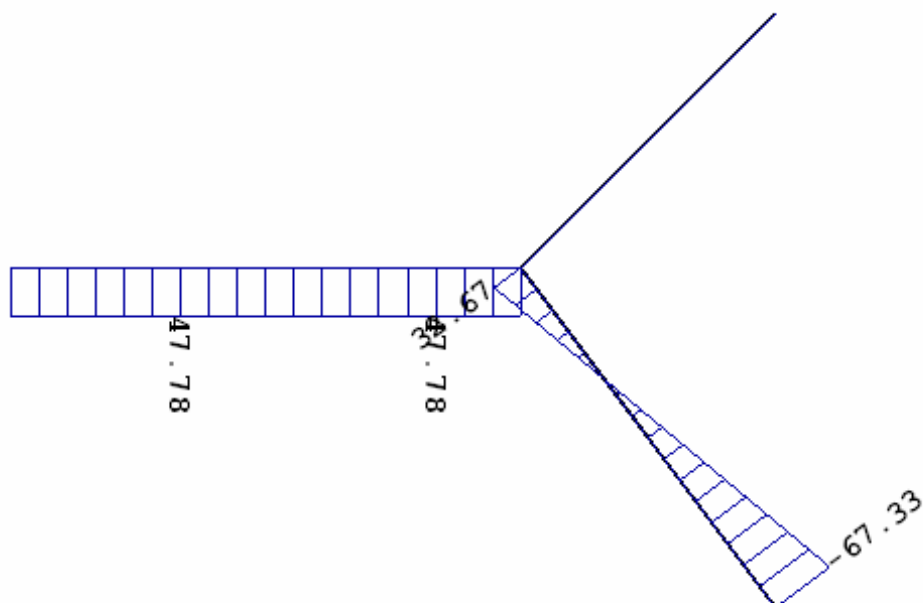
Reakcije



M diagram

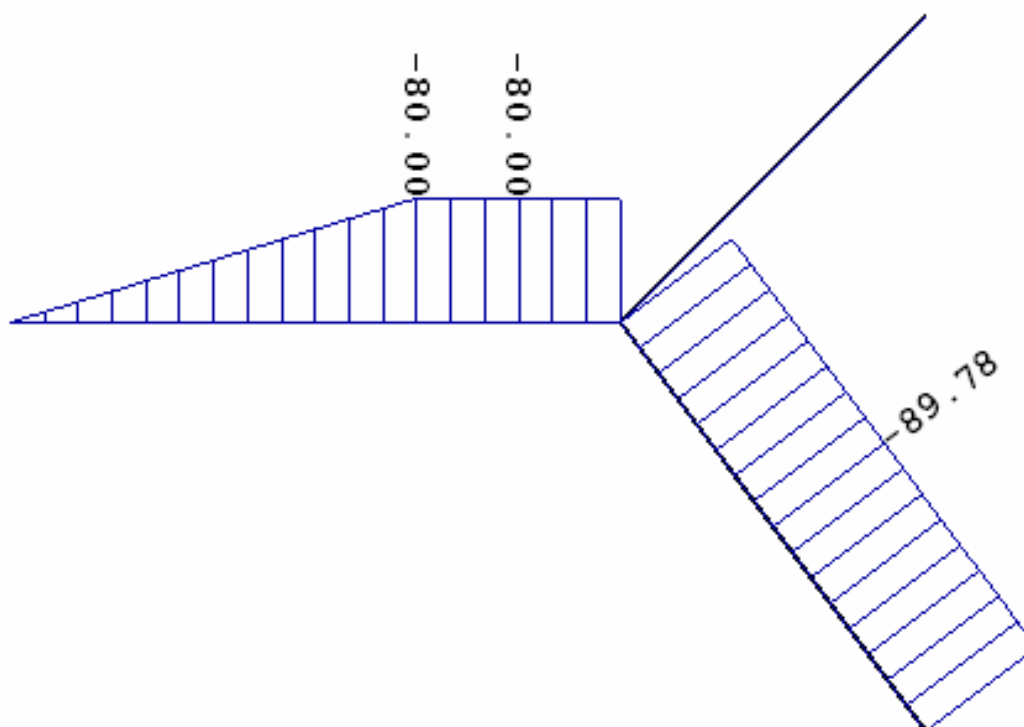


## T dijagram

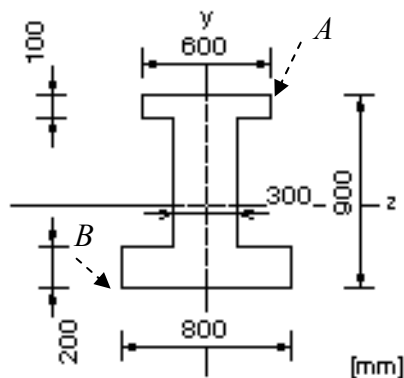


**Napomena:** dijagram treba zrcaliti oko uzdužne osi svakog elementa tako da odgovara konvenciji koju smo naučili u Tehničkoj mehanici

## N dijagram



3. Ako u točki B djeluje vlačno naprezanje  $\sigma_B = 900 \text{ kN/m}^2$ , odredite koliko iznosi sila u točki A koja uzrokuje to naprezanje (20 bodova)



$$Y_T = 392.5 \text{ mm} = 0.393 \text{ m} = Y_B$$

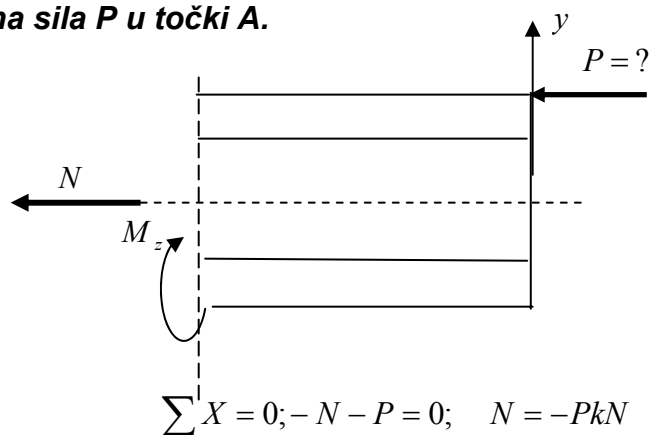
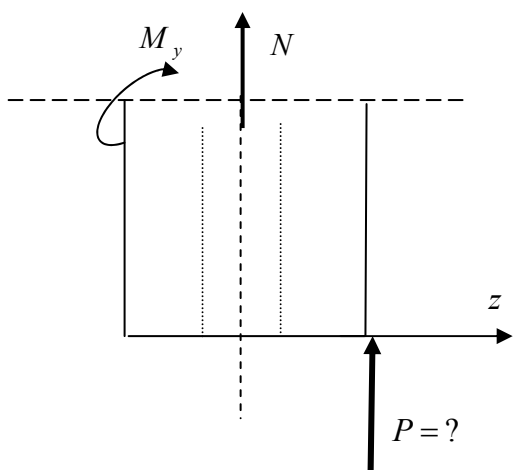
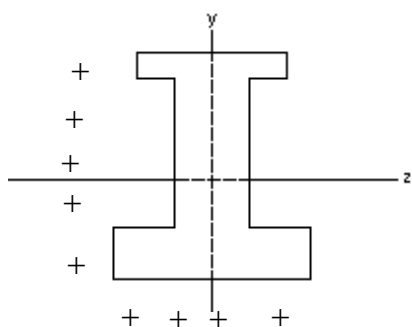
$$Y_A = 507.5 \text{ mm} = 0.507 \text{ m}$$

$$F = 0.4 \text{ m}^2$$

$$I_z = 0.03431 \text{ m}^4$$

$$I_y = 0.011688 \text{ m}^4$$

Pretpostavimo da djeluje tlačna sila  $P$  u točki A.



$$\sum X = 0; -N - P = 0; \quad N = -PkN$$

$$\sum M_z = 0; -M_z + P \cdot y_A = 0; M_z = P \cdot 0.507 \text{ kNm}$$

$$\sum M_y = 0; -M_y + P \cdot z_A = 0; M_y = P \cdot 0.3 \text{ kNm}$$

$$\sigma_B = \pm \frac{N}{F} \pm \frac{M_z}{I_z} y_B + \frac{M_y}{I_y} z_B$$

$$900 = -\frac{P}{0.4} + \frac{0.507P}{0.03431} \cdot 0.393 + \frac{0.30P}{0.011688} \cdot 0.4 =$$

$$900 = (-2.5 + 5.81 + 10.27)P$$

$$900 = 13.58P$$

$$P = \frac{900}{13.58} = 66,3 \text{ kN}$$

U točki A djeluje tlačna sila intenziteta 66,3 kN.