

ZADACI

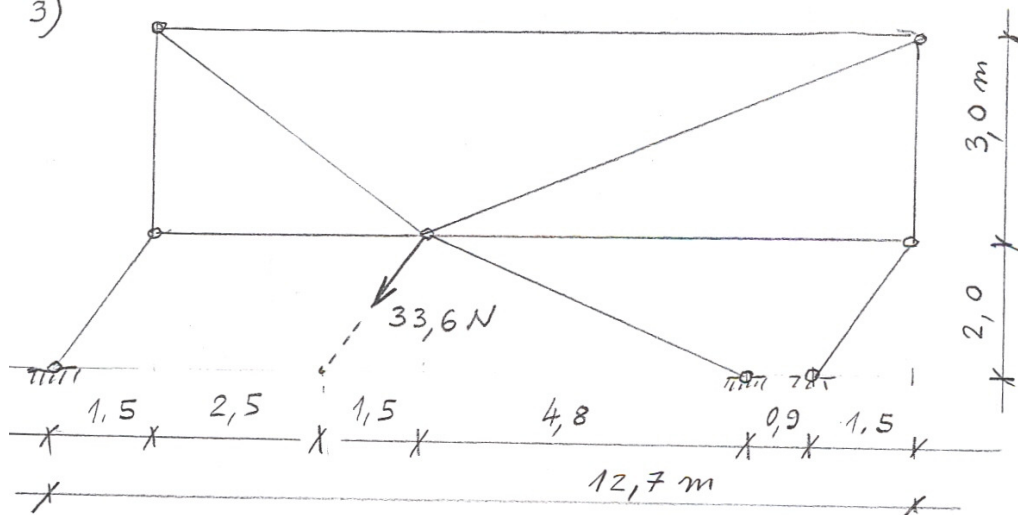
- 1) UZ TIJELO NA KOJE DJELUJE SILA  $F$  DEFINIRAN JE KARTEZIJEV KOORDINATNI SUSTAV. HVATIŠTE SILE SE NALAZI U TOČKI  $A(3,0; 4,0; 5,0)$ . ISHODIŠTEM PROLAZI OS  $u$ , ČIJI JE SMJER ODREĐEN ORJENTIRANIM KUTEVIMA  $\varphi = -50^\circ$ ;  $\psi = +60^\circ$  NADALJE JE ZADANO:  $F_x = -12,0\text{N}$ ;  $F_y = +15,0\text{N}$ , A  $F_z$  TREBA ODREDITI TAKO DA VRIJEDI  $M_u^F = -37,0\text{Nm}$

2)

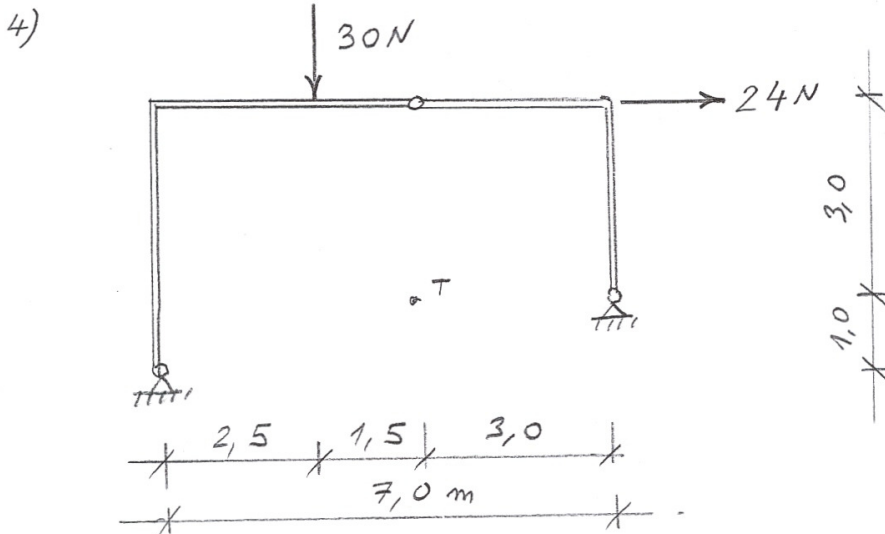


ZA PRIKAZANI RAVAN LIK ZADAN JE POLOŽAJ TEŽIŠTA; TREBA ODREDITI MINIMALNU MJERU  $h$ .

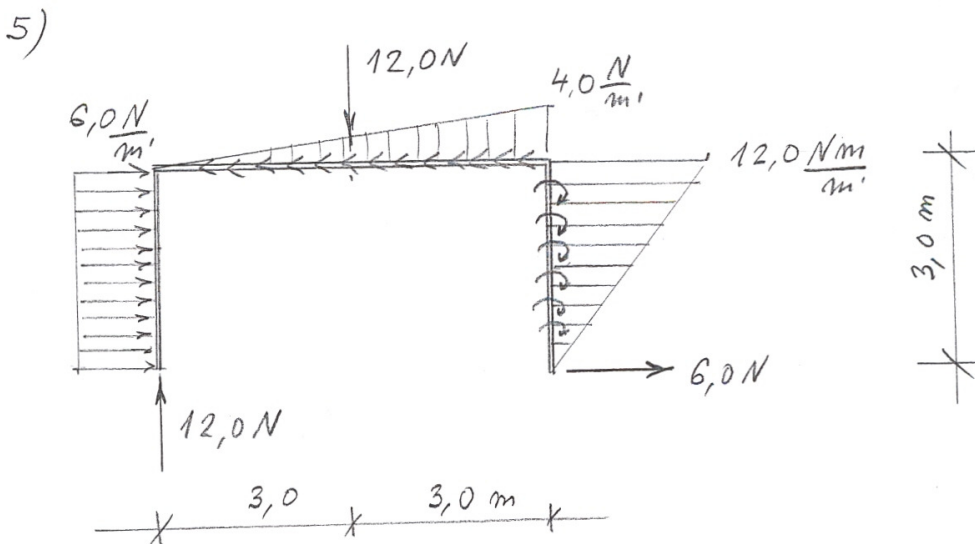
3)



TREBA RIJEŠITI PRIKAZANI REŠETKASTI SUSTAV. (STATIČKA SHEMA, POSTUPAK, STVARNA DJELOVANJA, KONTROLE)



TREBA GRAFIČKI RIJEŠITI PRIKAZANI SUSTAV.  
 TREBA U MJERILU PRIKAZATI STVARNA SJELOVANJA  
 ZA SVAKI DIO ZASEBNO; PRI TOME TREBA U SVAKOM  
 ZGLOBU PRIKAZATI SAMO UKUPNU SILU. IA SVAKI  
 DIO TREBA GRAFOANALITIČKI KONTROLIRATI  $\Sigma M(T)$ .



TREBA ODREDITI PODATKE, PRIKAZATI DETALJNO  
 POSTUPAK ZA SREDNJI PRESJEK, PRIKAZATI  
 $M, T, N$  DIJAGRAME. POZITIVNO SE BODUJU SAMO  
 TOČNI PODACI NA DIJAGRAMIMA.

RJEŠENJA

1)  $e_{0x} = \cos \psi \cdot \cos \psi = +0,321394$

$e_{0y} = \sin \psi \cdot \cos \psi = -0,383022$

$e_{0z} = \sin \psi = +0,866025$  3

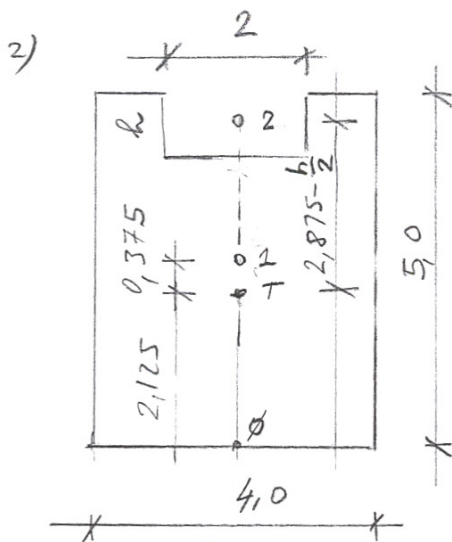
$$\begin{vmatrix} e_{0x} & e_{0y} & e_{0z} \\ 3 & 4 & 5 \\ -12 & +15 & F_z \end{vmatrix} = -37$$
 3

$$F_z (4e_{0x} - 3e_{0y}) - 15 (5e_{0x} - 3e_{0z}) - 12 (5e_{0y} - 4e_{0z}) = -37$$

$F_z = -47,81695$  10

KONTROLA

$$e_{0x} \cdot 4 \cdot F_z + e_{0y} \cdot 5 \cdot (-12) + e_{0z} \cdot 3 \cdot 15 - (-12) \cdot 4 \cdot e_{0z} - 15 \cdot 5 \cdot e_{0x} - F_z \cdot 3 \cdot e_{0y} = -37,000 \checkmark$$
 4



ISHODIŠTE U TEŽIŠTU

$$0,375 \cdot 5 \cdot 4 - (2,875 - \frac{h}{2}) \cdot 2 \cdot h = \phi$$

$$7,5 - 5,75 \cdot h + h^2 = \phi$$
 8

$$h_{1,2} = \frac{5,75}{2} \pm \sqrt{\frac{5,75^2}{4} - 7,5}$$

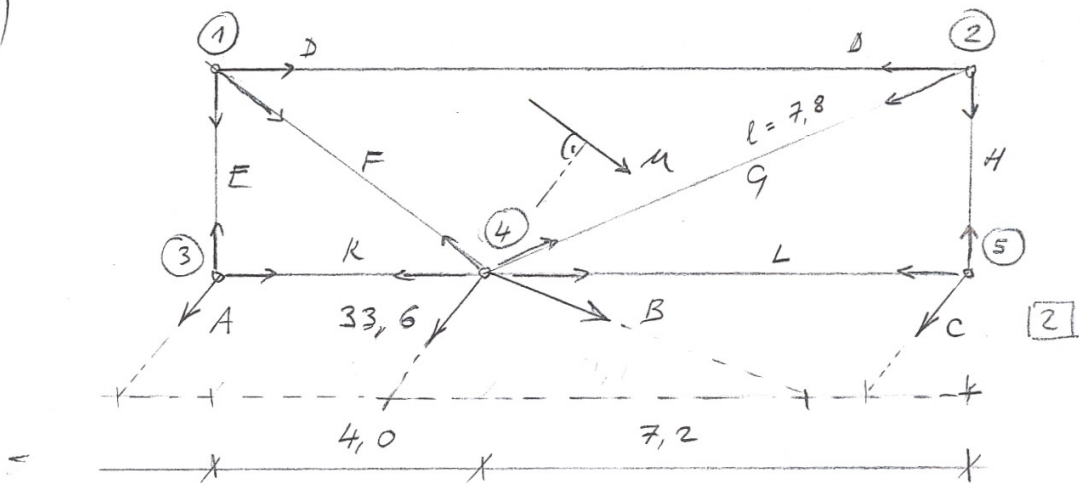
$h_1 = 3,75; \quad h_2 = 2,00$  4

RJEŠENJE:  $h = 2,00$  2

KONTROLA: ISHODIŠTE U  $\phi$

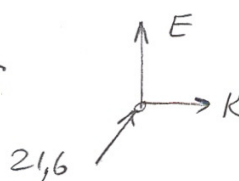
$$X_T = \frac{2,5 \cdot 20 - 4 \cdot 4}{20 - 4} = 2,125 \checkmark$$
 6

3)



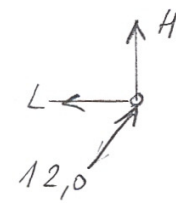
$\sum F_{\mu} = \phi; \quad B = \phi \quad [1]$   
 $\sum M(5) = \phi \quad 11,2 \cdot 0,6 A + 7,2 \cdot 0,6 \cdot 33,6 = \phi; \quad A = -21,6 \quad [2]$   
 $\sum M(3) = \phi \quad -4 \cdot 0,6 \cdot 33,6 - 11,2 \cdot 0,6 \cdot C = \phi; \quad C = -12,0 \quad [2]$

čvor 3



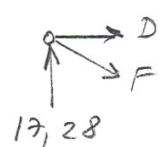
$\sum F_{xi} = \phi; \quad K = -0,6 \cdot 21,6 = -12,96 \text{ N}$   
 $\sum F_{yi} = \phi; \quad E = -0,8 \cdot 21,6 = -17,28 \text{ N} \quad [1]$

čvor 5



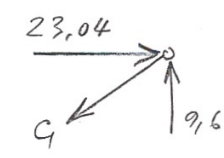
$\sum F_{yi} = \phi; \quad H = -12,0 \cdot 0,8 = -9,6 \text{ N} \quad [1]$   
 $\sum F_{xi} = \phi; \quad L = +0,6 \cdot 12 = +7,2 \text{ N} \quad [1]$

čvor 1



$\sum F_{\mu} = \phi; \quad F = \frac{17,28}{0,6} = 28,8 \text{ N} \quad [1]$   
 $\sum F_{xi} = \phi; \quad D = -0,8 \cdot F = 23,04 \text{ N} \quad [1]$

čvor 2

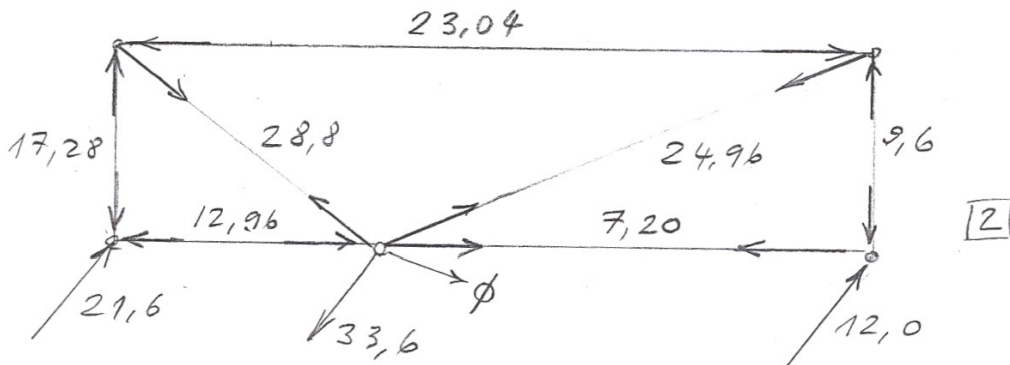


$\sum F_{xi} = \phi; \quad G = \frac{7,8}{7,2} \cdot 23,04 = 24,96 \text{ N} \quad [1]$   
 KONTROLA  $\sum F_{yi} = -G \frac{3}{7,8} + 9,6 = 0,000 \quad [1]$

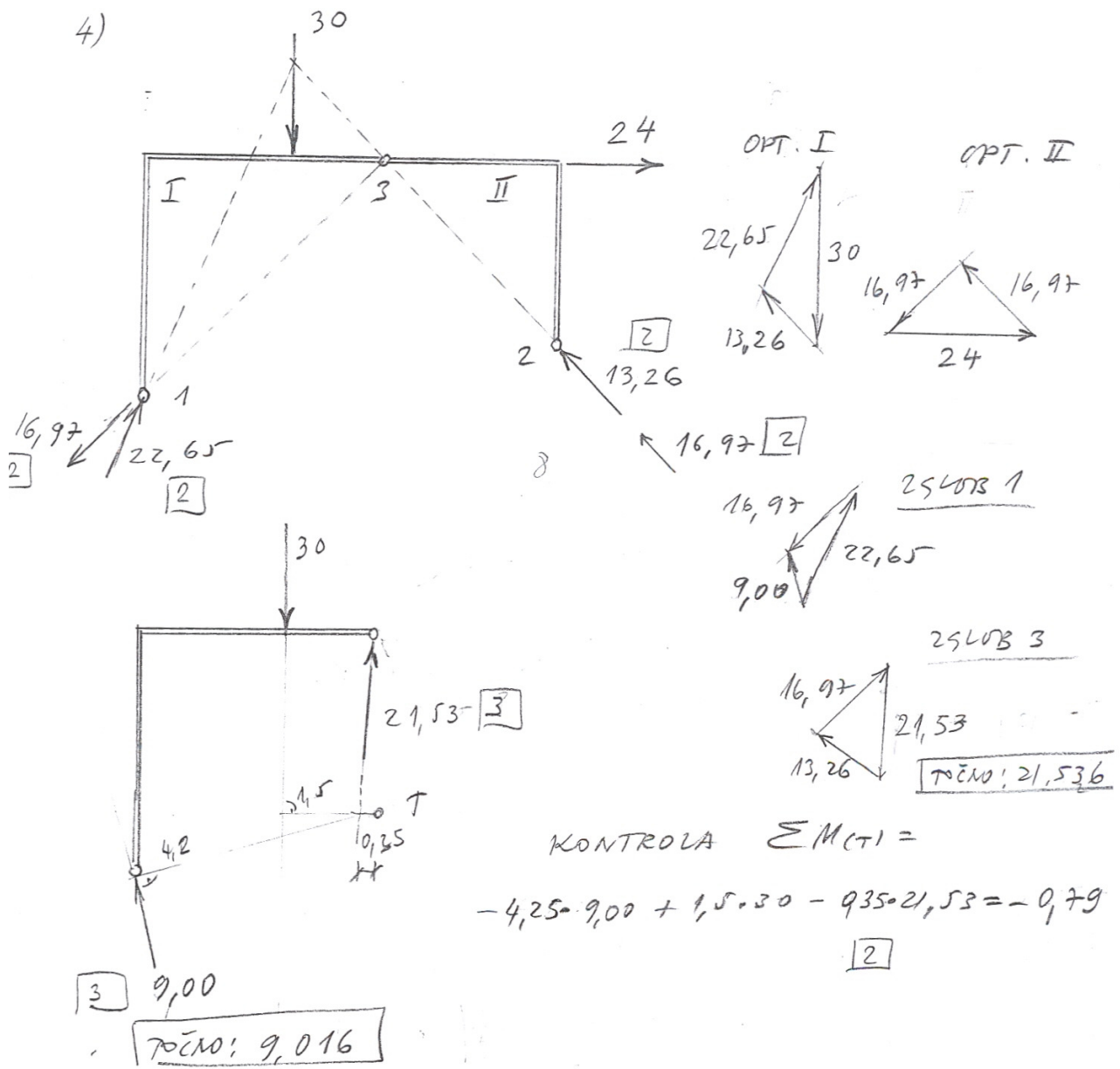
čvor 4  
SAMO KONTROLE

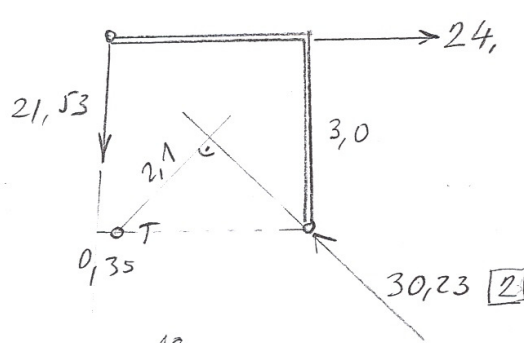
$\sum F_{xi} = -(-12,96) - 0,8 \cdot 28,8 + \frac{7,2}{7,8} \cdot 24,96 + 7,20 - 0,6 \cdot 33,6 = 0,00 \quad [1]$   
 $\sum F_{yi} = 0,6 \cdot 28,8 + \frac{3}{7,8} \cdot 24,96 - 0,8 \cdot 33,6 = 0,00 \quad [1]$

SKICA STVARNIH DJELOVANJA



4)





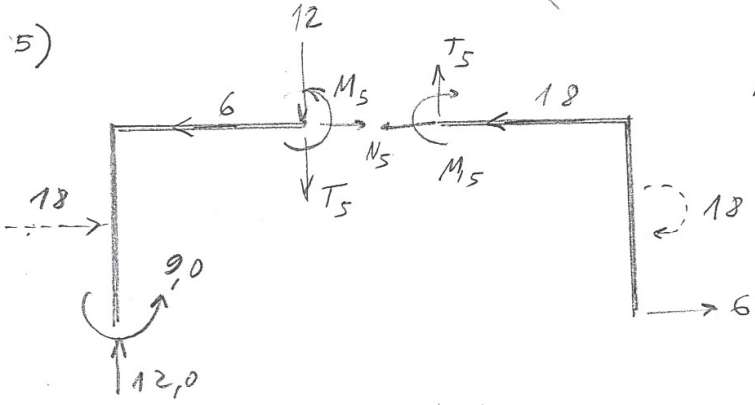
$$\sum M(+)=$$

$$+0,35 \cdot 21,53 + 2,1 \cdot 30,23$$

$$- 3,0 \cdot 24,0 = -0,98$$

2

TOČNO: 30,229

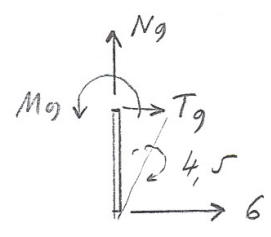
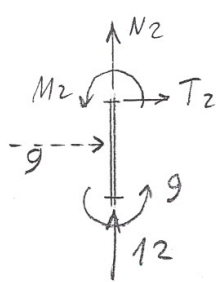


$$M_5 = 3 \cdot 12 - 1,5 \cdot 18 - 9,0$$

$$M_5 = 0$$

$$T_5 = 0$$

$$N_5 = -12$$



$$M_2 = -0,75 \cdot 9 - 9 = -15,75$$

$$T_2 = -9$$

$$N_2 = -12$$

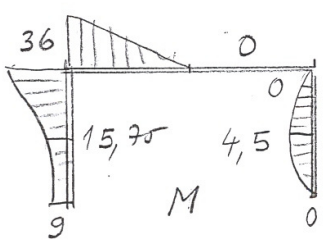
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$$M_9 = 4,5 - 1,5 \cdot 6 = -4,5$$

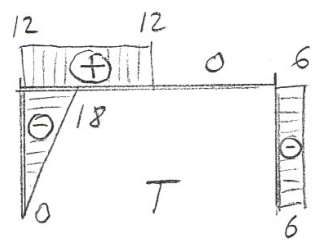
$$T_9 = -6$$

$$N_9 = \phi$$

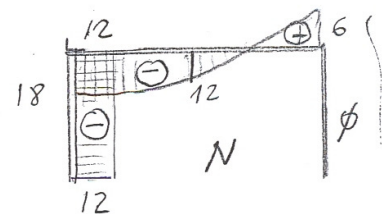
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7



7



6