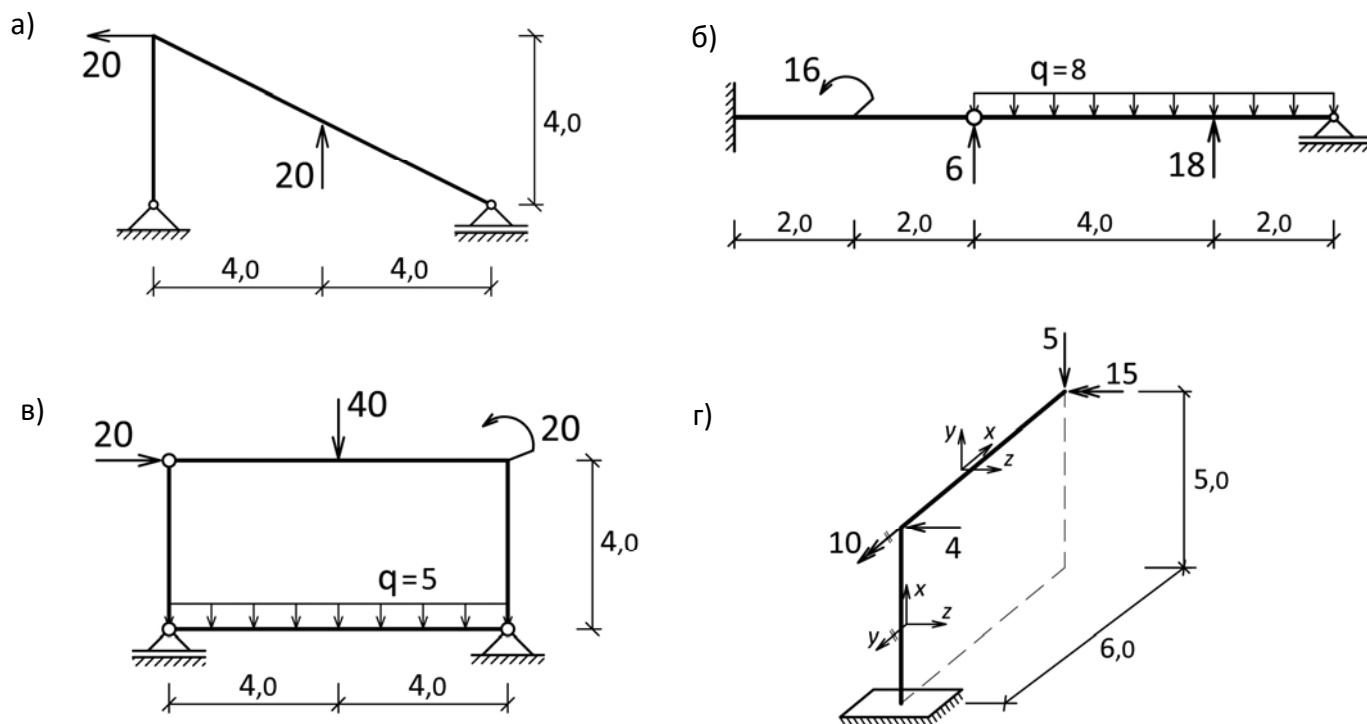


ГРАЂЕВИНСКИ ФАКУЛТЕТ УНИВЕРЗИТЕТА У БЕОГРАДУ
 Усмени (теоријски) део испита из **ТЕХНИЧКЕ МЕХАНИКЕ 1**
 (писмени део одржан 10.09.2021.)

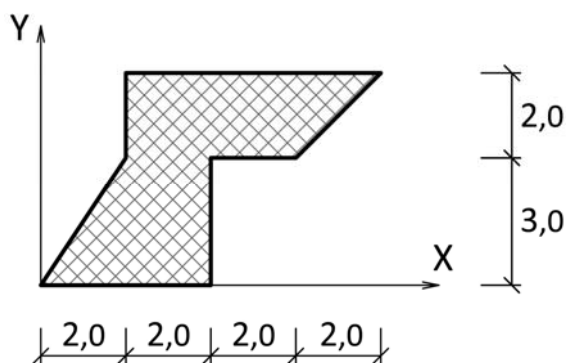
1. ЗАДАТАК (условни 50 %)

Нацртати дијаграме сила у пресеку за приказане носаче.



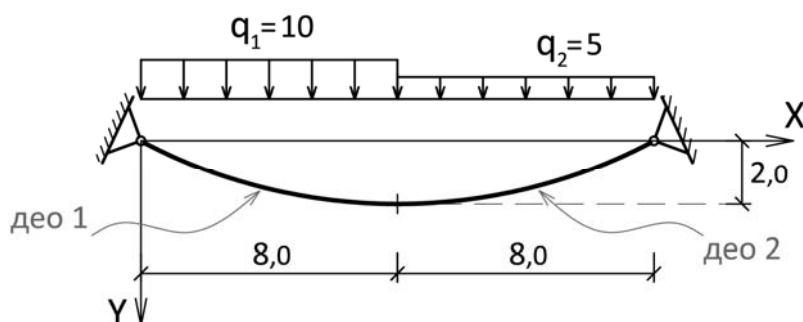
2. ЗАДАТАК (22 %)

- а) Укратко приказати како се одређује средиште система сила са паралелним нападним линијама.
- б) Одредити тежиште сложене равне фигуре приказане на скици.



3. ЗАДАТАК (28 %)

За ланчаницу која је оптерећена као што је приказано на скици, одредити коначну једначину оба дела ланчанице и хоризонталну компоненту силе H .

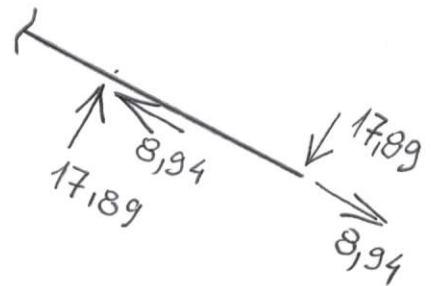
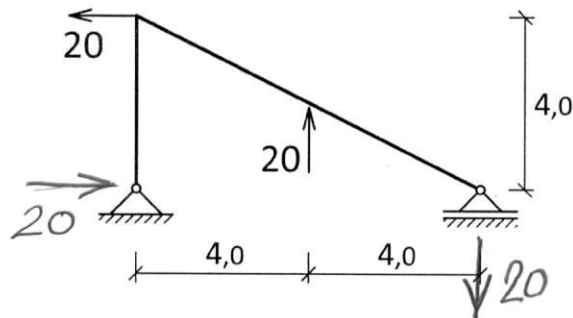


Напомена: У свим задацима димензије за дужине и силе су: m , N .

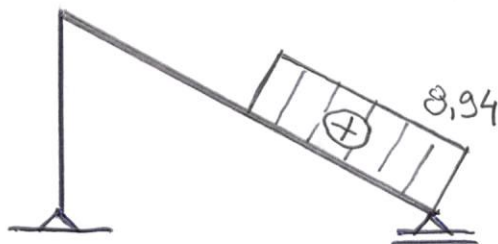
- решења -

1. ЗАДАТАК (условни 50 %)

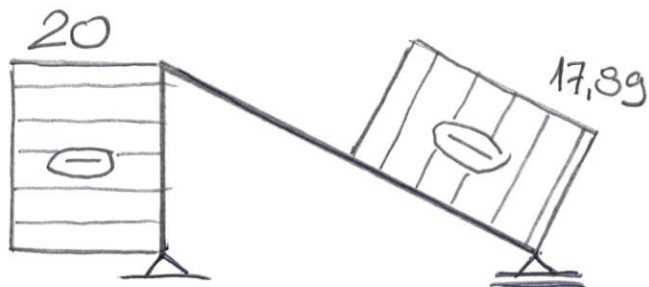
a)



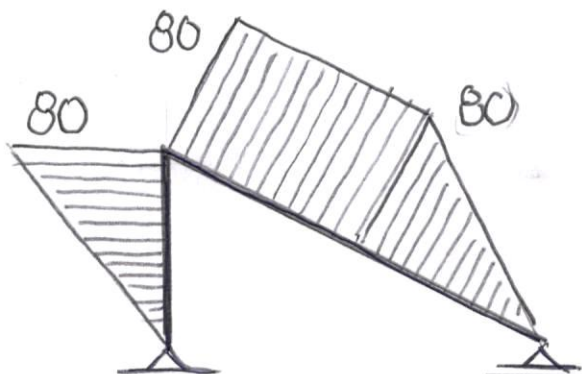
N



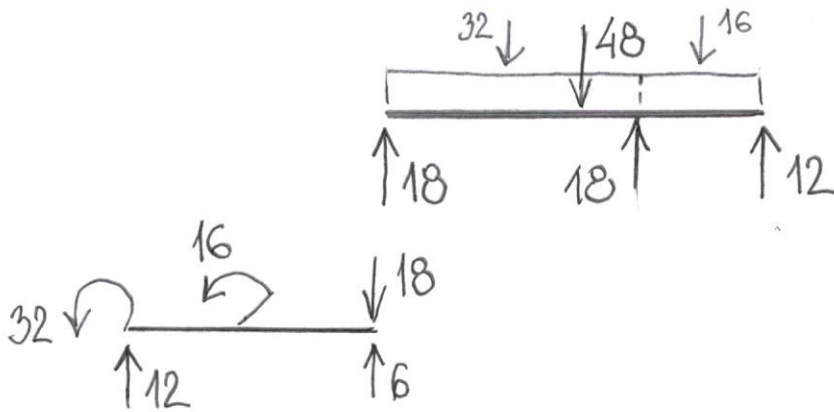
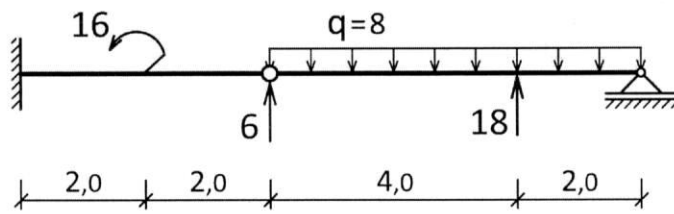
T



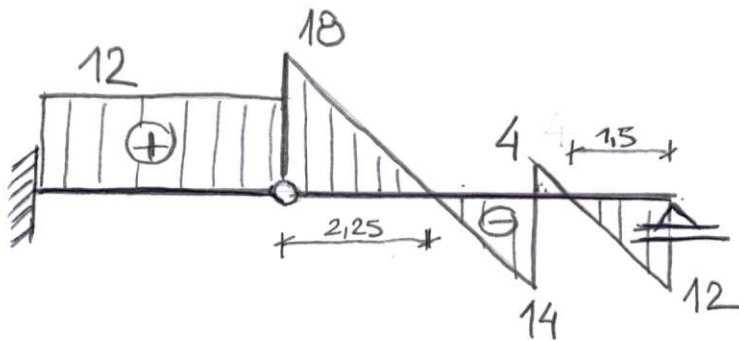
M



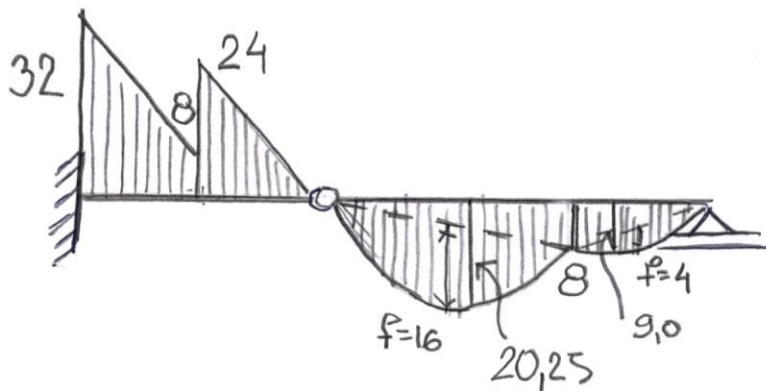
6)



N

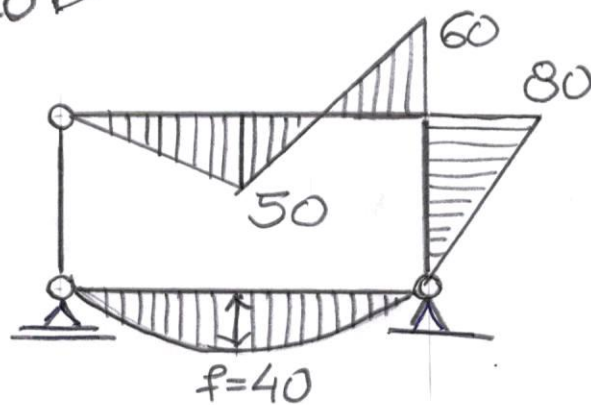
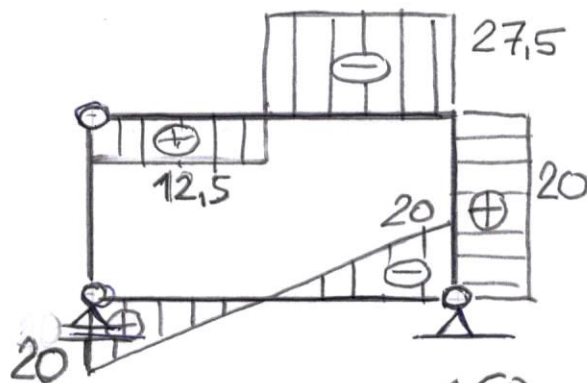
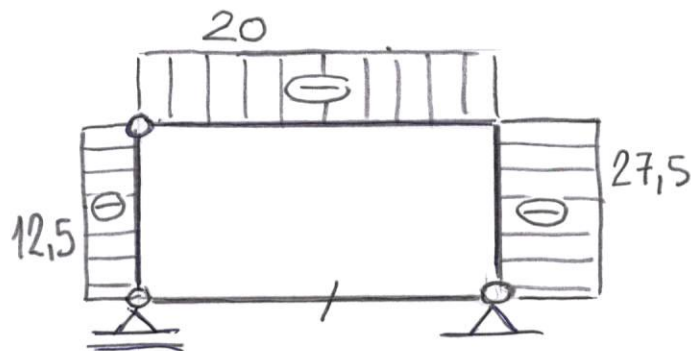
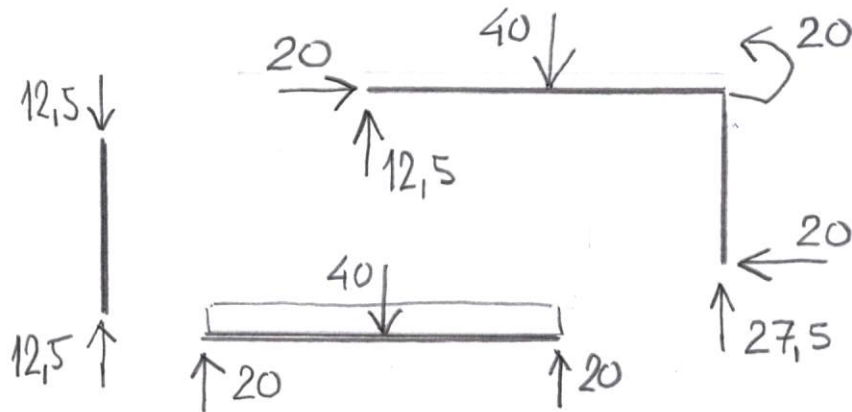
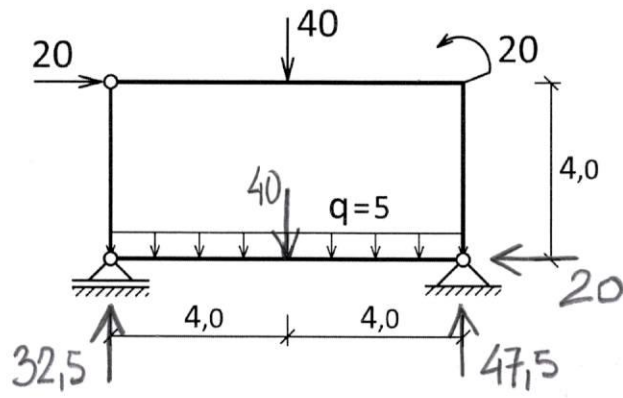


T

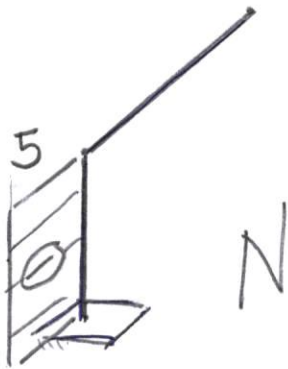
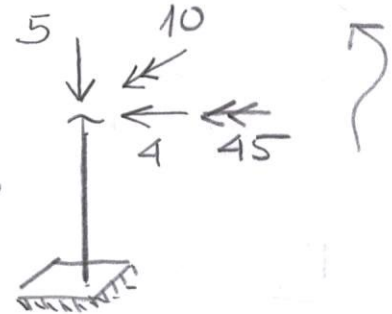
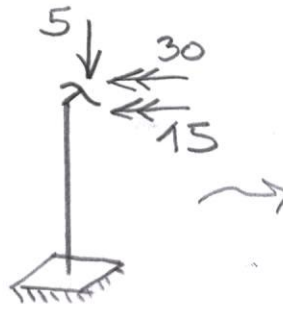
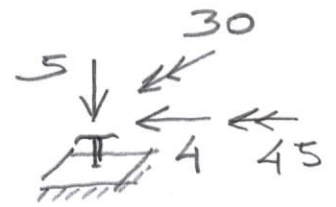
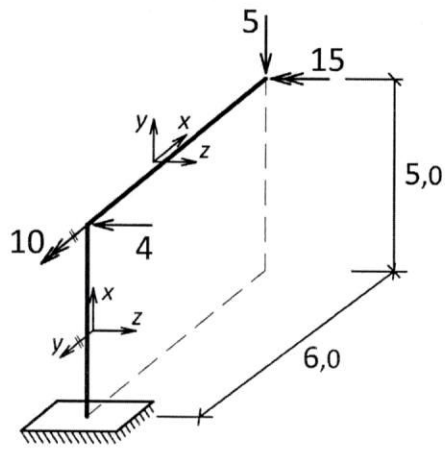


M

B)



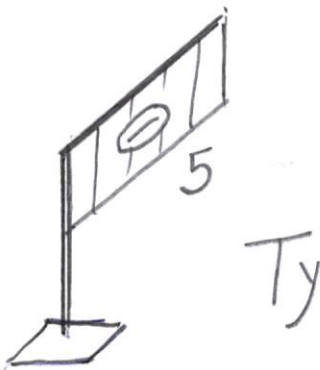
r)



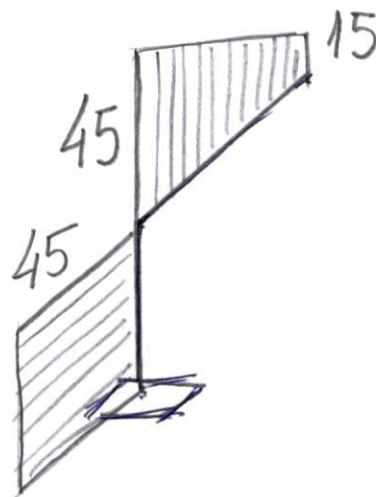
N



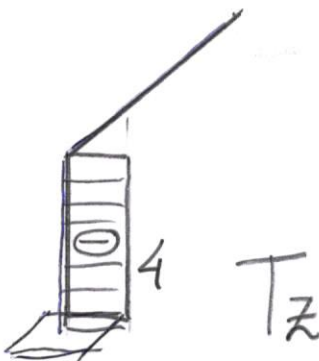
M_T



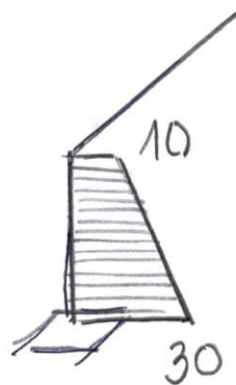
T_y



M_z



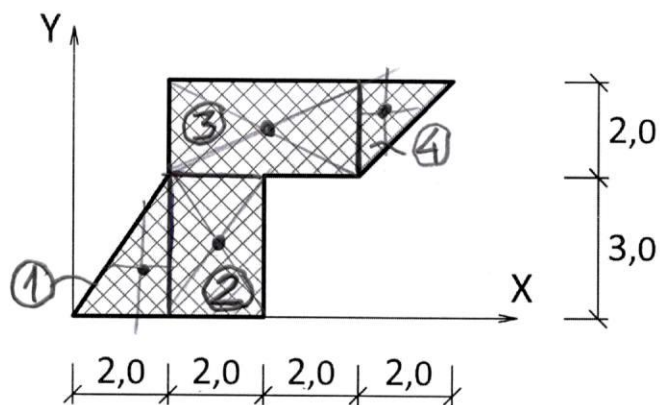
T_z



M_y

2. ЗАДАТАК (22 %)

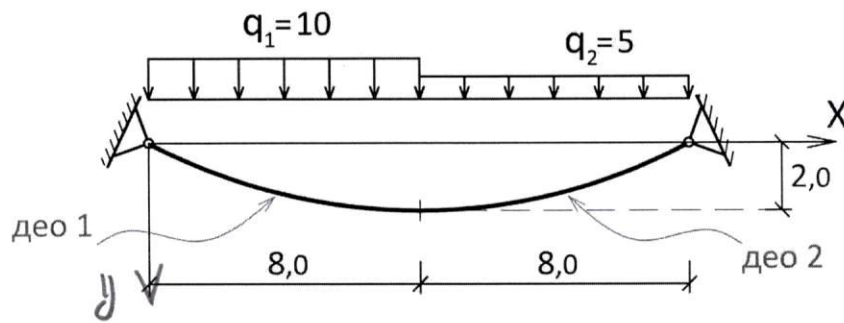
б)



$$X_T = \frac{3 \cdot 1,3 + 6 \cdot 3,0 + 8 \cdot 4,0 + 2 \cdot 6,6}{3 + 6 + 8 + 2} = \frac{67,3}{19} = 3,544$$

$$Y_T = \frac{3 \cdot 1,0 + 6 \cdot 1,5 + 8 \cdot 4,0 + 2 \cdot 4,3}{3 + 6 + 8 + 2} = \frac{52,6}{19} = 2,772$$

3. ЗАДАТАК (28 %)



ДЕО 1:

$$y_1' = -\frac{q_1}{H} x + C_1$$

$$y_1 = -\frac{1}{2} \frac{q_1}{H} x^2 + C_1 x + C_2$$

ДЕО 2:

$$y_2' = -\frac{q_2}{H} x + C_3$$

$$y_2 = -\frac{1}{2} \frac{q_2}{H} x^2 + C_3 x + C_4$$

ГРАН. и ПРЕЛАЗ. УСЛОВИ

$$y_1(0) = 0 : \rightarrow \underline{C_2 = 0}$$

$$y_2(16) = 0 : -\frac{1}{2} \frac{5}{H} 16^2 + C_3 \cdot 16 + C_4 = 0 \quad \dots (2)$$

$$y_1(8) = 2 : -\frac{1}{2} \frac{10}{H} 8^2 + C_1 \cdot 8 + C_2 = 2 \quad \dots (3)$$

$$y_2(8) = 2 : -\frac{1}{2} \frac{5}{H} \cdot 8^2 + C_3 \cdot 8 + C_4 = 2 \quad \dots (4)$$

$$y_1'(8) = y_2'(8) : -\frac{10}{H} \cdot 8 + C_1 = -\frac{5}{H} \cdot 8 + C_3 \quad \dots (5)$$

$$\Rightarrow \underline{C_1 = 0,58\bar{3} = \frac{7}{12}}$$

$$\underline{C_3 = 0,25 = \frac{1}{4}}$$

$$\underline{C_4 = 1,3\bar{3} = \frac{4}{3}}$$

$$\boxed{H = 120}$$

$$\boxed{y_1 = -\frac{1}{24} x^2 + \frac{7}{12} x}$$

$$\boxed{y_2 = -\frac{1}{48} x^2 + \frac{1}{4} x + \frac{4}{3}}$$