

Дано: P, α, β

Знайти: 1) Тиск N_K на поверхню;

2) Зусилля в стержні OA .

О.р. - кулад.

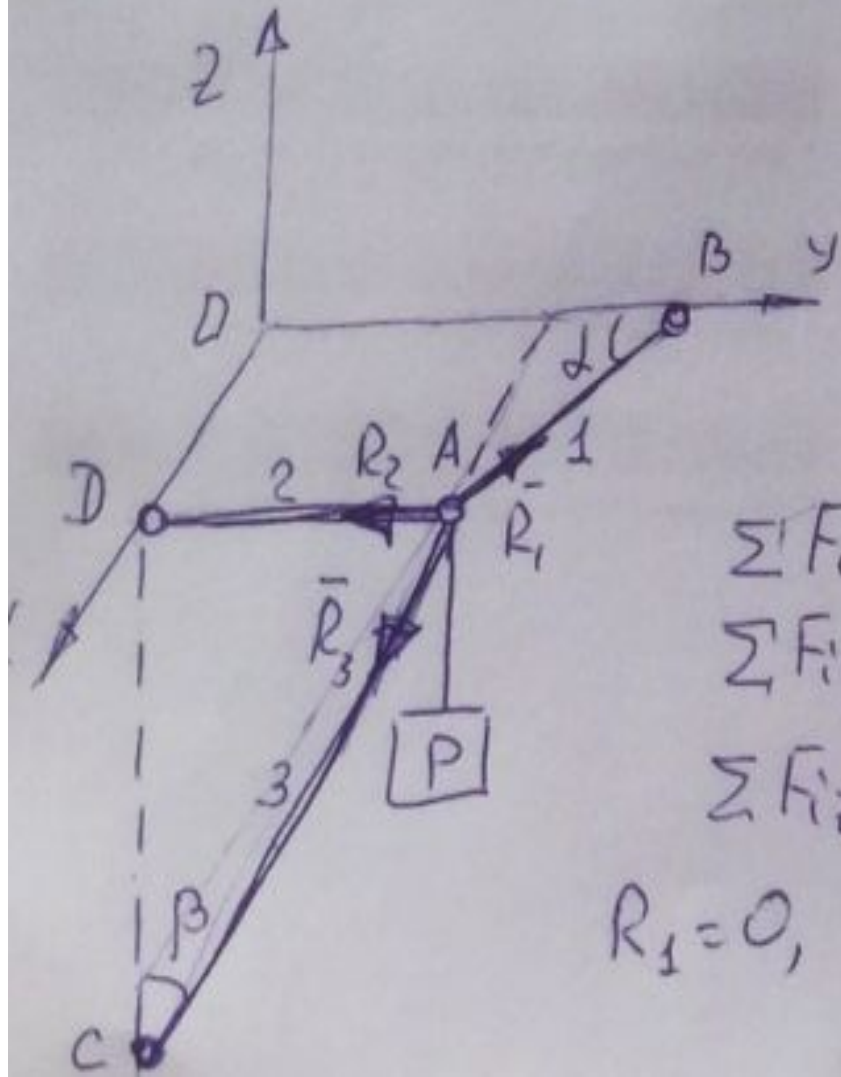
$$\sum F_{ix} = 0, -N_K \sin \alpha + R_{OA} \cos \beta = 0$$

$$\sum F_{iy} = 0, N_K \cos \alpha + R_{OA} \sin \beta - P = 0$$

$$N_K = R_{OA} \frac{\sin \beta}{\sin \alpha};$$

$$R_{OA} \left(\frac{\sin \beta}{\sin \alpha} \cdot \cos \alpha + \sin \beta \right) - P = 0$$

$$R_{OA} = \frac{P}{\sin \beta \operatorname{ctg} \alpha + \sin \beta};$$



Given: P, α, β

$$R_1, R_2, R_3 = 0$$

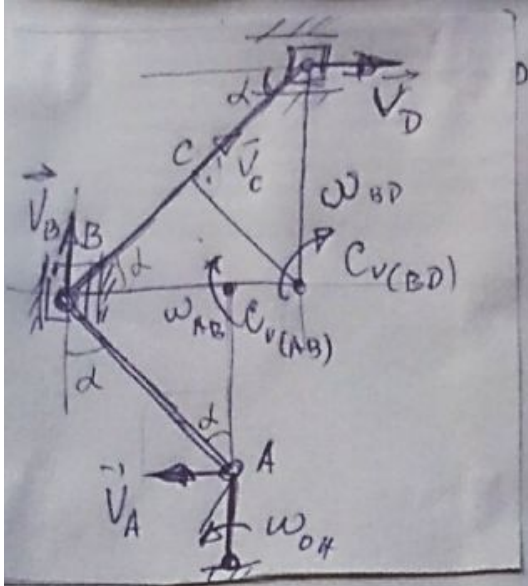
O.p. - by 3on A

$$\sum F_{ix} = 0; -R_1 \sin \alpha = 0$$

$$\sum F_{iy} = 0; R_1 \cos \alpha - R_2 - R_3 \sin \beta = 0$$

$$\sum F_{iz} = 0 - P - R_3 \cos \beta = 0$$

$$R_1 = 0, R_3 = -\frac{P}{\cos \beta}, R_2 = -\left(-\frac{P}{\cos \beta}\right) = \frac{P}{\cos \beta}$$



Demo: $OA = 1\text{m}$

$\alpha = 45^\circ$ $\omega_{OA} = 8\text{c}^{-1}$

$AB = 1\text{m}$, $BC = CD = 0,8\text{m}$

$$V_A = \omega_{OA} \cdot |OA| = 1 \cdot 8 = 8 \text{ m/c}$$

$$V_A = \omega_{AB} |AC_v|, \quad \omega_{AB} = \frac{V_A}{AC_v}$$

$$AC_{v(AB)} = AB \cos \alpha = 1 \cdot \cos 45^\circ = 1 \cdot 0,71 = 0,71 \text{ m.}$$

$$\omega_{AB} = \frac{8}{0,71} = 11,26 \text{ c}^{-1}$$

$$V_B = \omega_{AB} \cdot |BC_{v(AB)}| = 11,26 \cdot 0,71 = 8 \text{ m/c}$$

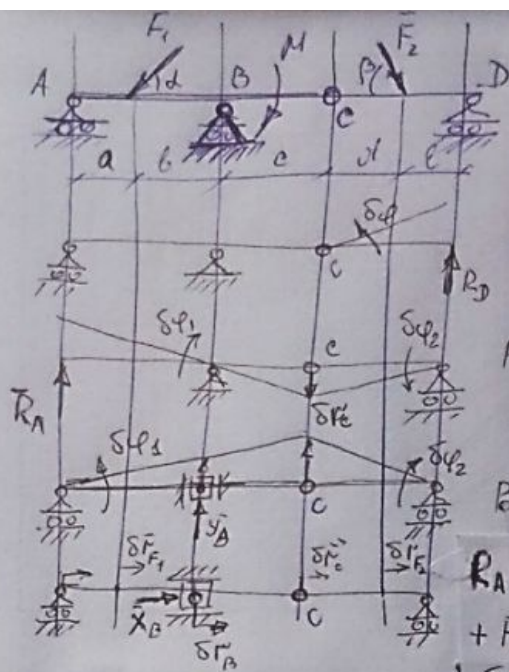
$$V_B = \omega_{BD} \cdot |BC_{v(BD)}|, \quad \omega_{BD} = \frac{V_B}{|BC_{v(BD)}|} = \frac{8}{1,14}$$

$$BC_{v(BD)} = BD \cos \alpha = 1,6 \cdot 0,71 = 1,14 \text{ m}$$

$$\omega_{BD} = \frac{8}{1,14} = 7,02 \text{ c}^{-1}$$

$$V_C = \omega_{BD} |CC_v|; \quad CC_v = BC = 0,8 \text{ m}$$

$$V_C = 7,02 \cdot 0,8 = 5,62 \text{ m/c}$$



Дано: F_1, F_2, d, β
 M, a, b, c, d, l

R_A, R_B, R_D - ?

Выводим R_D

$$\sum M_c(F_i) \cdot \delta \varphi = 0$$

$$R_D \cdot (d+l) \delta \varphi - F_2 \sin \beta \cdot d \cdot \delta \varphi = 0$$

$$R_D = \frac{F_2 \sin \beta \cdot d}{d+l}$$

Выводим R_A

$$R_A(a+b) \delta \varphi_1 - F_1 \sin \alpha \cdot b \cdot \delta \varphi_1 + M \delta \varphi_1 +$$

$$+ F_2 \sin \beta \delta \varphi_2 = 0$$

$$\delta r_c = \delta \varphi_1 \cdot c = \delta \varphi_2 (d+l)$$

$$\delta \varphi_2 = \delta \varphi_1 \frac{c}{d+l}; R_A(a+b) \delta \varphi_1 - F_1 \sin \alpha \cdot b \delta \varphi_1 + M \delta \varphi_1 +$$

$$+ F_2 \sin \beta \delta \varphi_1 \frac{c \cdot l}{d+l} = 0; R_A =$$

Выводим Y_B

$$- F_1 \sin \alpha \cdot a \delta \varphi_1 + Y_B(a+b) \delta \varphi_1 - M \delta \varphi_1 + F_2 \sin \beta \cdot l \cdot \delta \varphi_2 = 0$$

$$\delta r_c = \delta \varphi_1(a+b+c) = \delta \varphi_2(d+l), \delta \varphi_2 = \delta \varphi_1 \frac{a+b+c}{d+l};$$

$$- F_1 \sin \alpha \cdot a \delta \varphi_1 + Y_B(a+b) \delta \varphi_1 - M \delta \varphi_1 - F_2 \sin \beta \cdot l \cdot \delta \varphi_1 \frac{a+b+c}{d+l} = 0$$

$$Y_B =$$

Выводим X_B

$$\sum \vec{F}_i \cdot \delta \vec{r}_i = 0$$

$$- F_1 \cos \alpha \delta r_{F_1} + X_B \delta r_B + F_2 \cos \beta \delta r_{F_2} = 0$$

$$\delta r_c = \delta r_B = \delta r_{F_2} \text{ по ст. } X_B = F_1 \cos \alpha - F_2 \cos \beta$$