

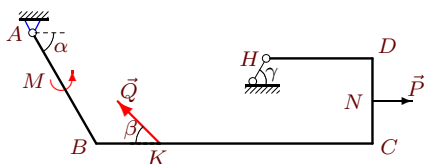
Определение реакций опор рамы

Тяжелая однородная рама расположена в вертикальной плоскости и опирается на неподвижный шарнир A и наклонный невесомый стержень H . К раме приложены горизонтальная сила P , наклонная сила Q и момент M . Учитывая погонный вес рамы ρ , найти реакции опор.

Курсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.31.)

Задача S4.1.

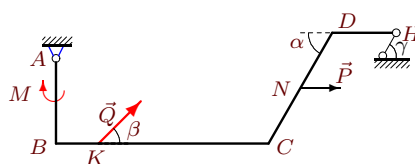
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$\rho = 2 \text{ кН/м}$, $P = 6 \text{ кН}$, $Q = 14 \text{ кН}$,
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 $AB = 6 \text{ м}$, $BC = 13 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 5 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.2.

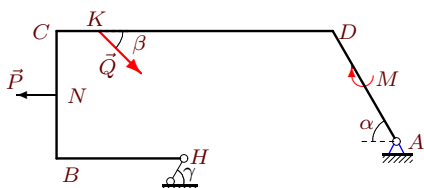
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 $AB = 4 \text{ м}$, $BC = 10 \text{ м}$, $CD = 6 \text{ м}$,
 $DH = 3 \text{ м}$, $BK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.3.

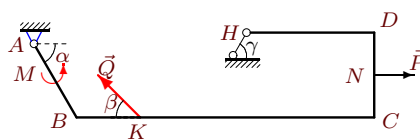
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 $HB = 6 \text{ м}$, $BC = 6 \text{ м}$, $CD = 13 \text{ м}$,
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Задача S4.4.

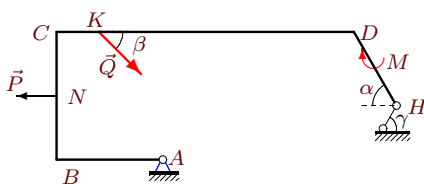
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 $AB = 4 \text{ м}$, $BC = 14 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 6 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.5.

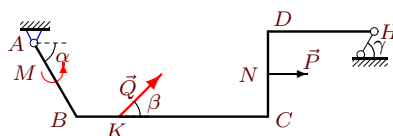
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 $AB = 5 \text{ м}$, $BC = 6 \text{ м}$, $CD = 14 \text{ м}$,
 $DH = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.6.

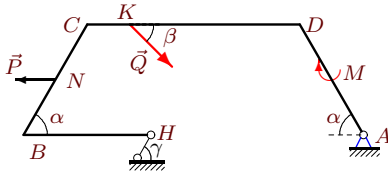
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$\rho = 2 \text{ кН/м}$, $P = 7 \text{ кН}$, $Q = 14 \text{ кН}$,
 $M = 50 \text{ кНм}$, $\alpha = 60^\circ$, $\beta = 45^\circ$, $\gamma = 45^\circ$,
 $AB = 4 \text{ м}$, $BC = 9 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 5 \text{ м}$, $BK = 2 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.7.

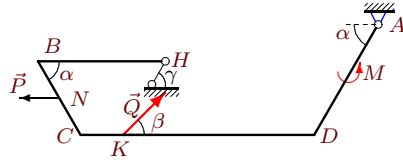
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 $HB = 6 \text{ м}$, $BC = 6 \text{ м}$, $CD = 10 \text{ м}$,
 $DA = 6 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.8.

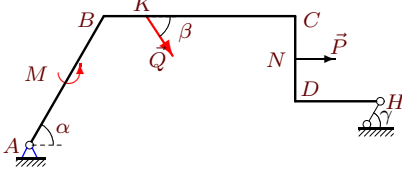
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 $HB = 6 \text{ м}$, $BC = 4 \text{ м}$, $CD = 11 \text{ м}$,
 $DA = 6 \text{ м}$, $CK = 2 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.9.

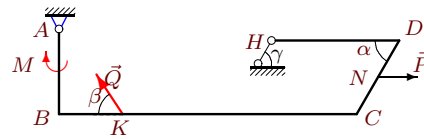
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 $AB = 7 \text{ м}$, $BC = 9 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 4 \text{ м}$, $BK = 2 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.10.

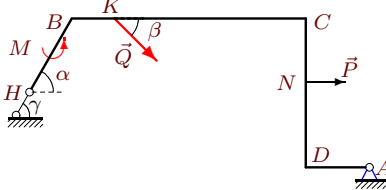
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 $AB = 4 \text{ м}$, $BC = 14 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 6 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.11.

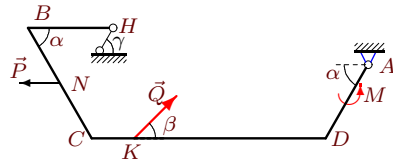
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$\rho = 3 \text{ кН/м}$, $P = 8 \text{ кН}$, $Q = 12 \text{ кН}$,
 $M = 70 \text{ кНм}$, $\alpha = 60^\circ$, $\beta = 45^\circ$, $\gamma = 60^\circ$,
 $HB = 4 \text{ м}$, $BC = 11 \text{ м}$, $CD = 7 \text{ м}$,
 $DA = 3 \text{ м}$, $BK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.12.

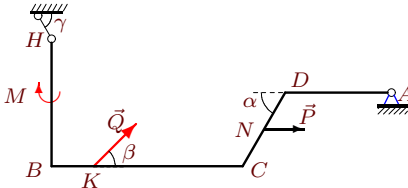
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 $HB = 4 \text{ м}$, $BC = 6 \text{ м}$, $CD = 11 \text{ м}$,
 $DA = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.13.

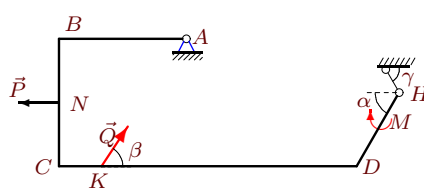
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 $HB = 6 \text{ м}$, $BC = 9 \text{ м}$, $CD = 4 \text{ м}$,
 $DA = 5 \text{ м}$, $BK = 2 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.14.

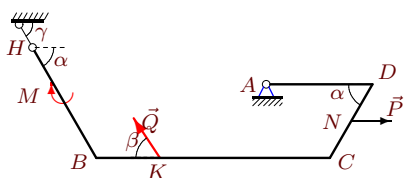
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 $AB = 6 \text{ м}$, $BC = 6 \text{ м}$, $CD = 14 \text{ м}$,
 $DH = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.15.

3



$\rho = 3 \text{ кН/м}$, $P = 9 \text{ кН}$, $Q = 26 \text{ кН}$,
 $M = 25 \text{ кНм}$, $\alpha = 60^\circ$, $\beta = 60^\circ$, $\gamma = 60^\circ$,
 $HB = 6 \text{ м}$, $BC = 11 \text{ м}$, $CD = 4 \text{ м}$,
 $DA = 5 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.16.

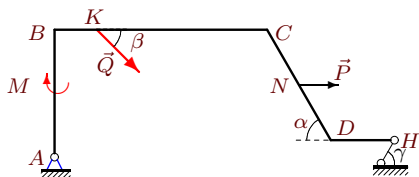
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$\rho = 2 \text{ кН/м}$, $P = 6 \text{ кН}$, $Q = 32 \text{ кН}$,
 $M = 20 \text{ кНм}$, $\alpha = 60^\circ$, $\beta = 30^\circ$, $\gamma = 45^\circ$,
 $AB = 6 \text{ м}$, $BC = 14 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 4 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.17.

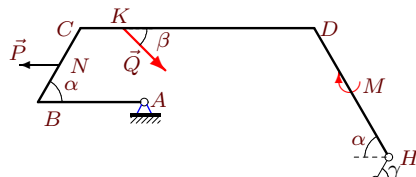
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$\rho = 2 \text{ кН/м}$, $P = 6 \text{ кН}$, $Q = 28 \text{ кН}$,
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 $AB = 6 \text{ м}$, $BC = 10 \text{ м}$, $CD = 6 \text{ м}$,
 $DH = 3 \text{ м}$, $BK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.18.

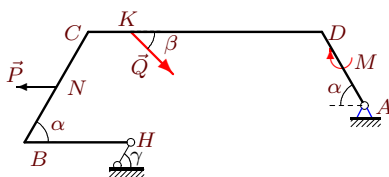
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$\rho = 1 \text{ кН/м}$, $P = 5 \text{ кН}$, $Q = 22 \text{ кН}$,
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 $AB = 5 \text{ м}$, $BC = 4 \text{ м}$, $CD = 11 \text{ м}$,
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Задача S4.19.

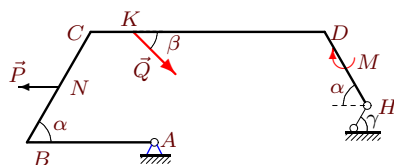
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 $DA = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.20.

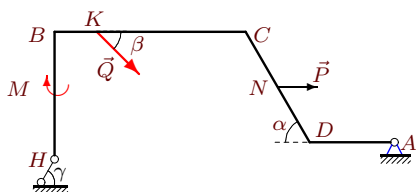
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$\rho = 2 \text{ кН/м}$, $P = 7 \text{ кН}$, $Q = 22 \text{ кН}$,
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 $AB = 6 \text{ м}$, $BC = 6 \text{ м}$, $CD = 11 \text{ м}$,
 $DH = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.21.

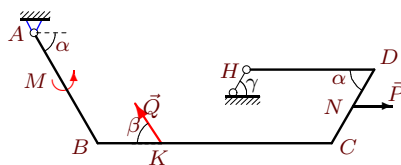
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$\rho = 3 \text{ кН/м}$, $P = 8 \text{ кН}$, $Q = 28 \text{ кН}$,
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 $HB = 6 \text{ м}$, $BC = 9 \text{ м}$, $CD = 6 \text{ м}$,
 $DA = 4 \text{ м}$, $BK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.22.

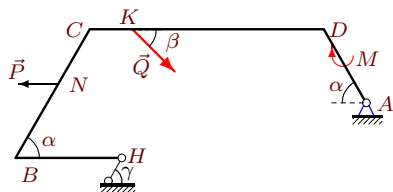
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Задача S4.23.

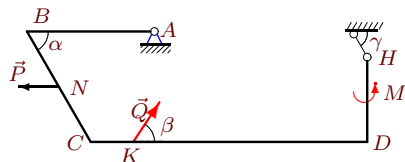
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Задача S4.24.

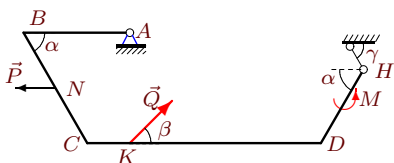
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Задача S4.25.

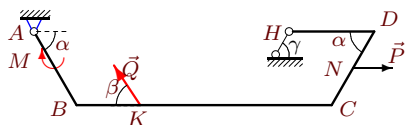
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 $DH = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.26.

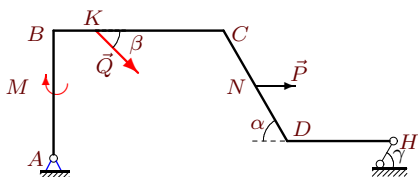
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 $DH = 4 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.27.

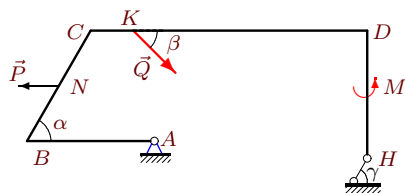
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 $DH = 5 \text{ м}$, $BK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.28.

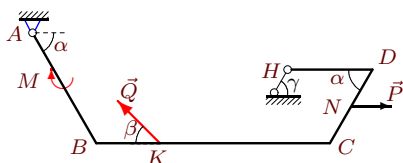
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 $DH = 6 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

Задача S4.29.

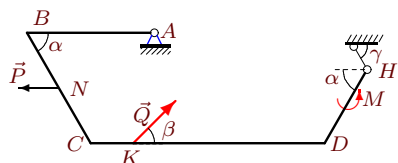
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 $AB = 6 \text{ м}$, $BC = 11 \text{ м}$, $CD = 4 \text{ м}$,
 $DH = 4 \text{ м}$, $BK = 3 \text{ м}$, $CN = 2 \text{ м}$.

Задача S4.30.

3



$\rho = 2 \text{ кН/м}$, $P = 7 \text{ кН}$, $Q = 17 \text{ кН}$,
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 $AB = 6 \text{ м}$, $BC = 6 \text{ м}$, $CD = 11 \text{ м}$,
 $DH = 4 \text{ м}$, $CK = 2 \text{ м}$, $CN = 3 \text{ м}$.

S4 Ответы.
Определение реакций опор рамы

08.04.2012

	$M_A(Q)$	$M_A(P)$	$\Sigma_k M_A(G_k)$	h	X_A	Y_A	R_H
1	-21.000	19.177	-528.0	8.624	-33.218	9.658	55.638
2	144.250	8.412	-162.5	6.964	-33.130	-2.825	3.567
3	87.500	15.373	919.5	-8.258	-83.697	5.909	120.772
4	15.205	10.249	-544.0	6.692	-46.608	-3.407	70.015
5	-118.277	15.000	-25.5	3.304	-60.401	23.241	43.518
6	73.891	10.249	-348.0	10.935	-30.729	20.271	19.558
7	98.495	20.785	762.0	-8.660	-58.408	15.343	98.875
8	-81.788	-27.713	721.5	-7.794	-47.771	-6.799	87.501
9	-93.531	-28.435	-192.3	6.464	-51.078	12.408	43.968
10	19.737	18.144	-472.0	7.450	-34.602	-15.681	60.956
11	42.426	-32.000	537.0	-15.624	-36.244	49.263	39.517
12	-52.500	-6.062	688.5	-11.258	-42.272	10.659	62.171
13	-116.000	12.124	708.0	-12.588	-9.113	17.659	46.004
14	-12.995	-21.000	4.0	2.804	6.898	-2.272	16.048
15	-157.617	15.588	168.0	-8.660	4.056	55.386	0.112
16	-118.277	25.608	-428.0	10.278	-15.483	2.805	52.602
17	-173.492	-20.412	-325.0	10.745	-65.712	28.537	50.153
18	-55.000	8.660	-67.3	8.000	-27.973	29.963	16.074
19	65.000	6.062	723.0	-8.660	-59.918	14.094	88.804
20	-65.277	18.187	-37.0	5.846	-21.146	56.967	17.804
21	174.307	-20.785	721.5	-13.454	-59.388	40.086	63.178
22	49.363	27.713	-481.0	8.296	-28.667	7.378	42.663
23	127.888	6.928	779.3	-8.660	-60.301	9.064	102.661
24	22.517	-20.785	-81.0	6.225	4.824	43.417	4.701
25	81.000	-12.990	-45.0	4.000	-22.065	23.626	-13.252
26	62.354	13.856	-432.0	8.485	-27.316	-4.100	44.287
27	-210.669	-20.412	-313.0	10.745	-72.565	29.880	52.496
28	-32.638	18.187	-121.0	7.639	-8.688	61.869	11.186
29	-33.000	20.785	-437.0	9.710	-21.117	4.831	48.323
30	50.441	-18.187	-37.0	5.846	-10.494	47.453	-7.741

S4 файл о4s3B