

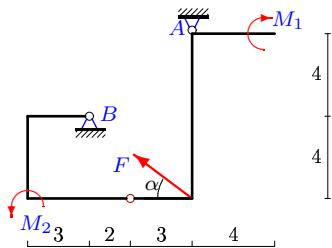
Тяжелая составная рама из двух частей

Плоская рама, состоящая из двух шарнирно соединенных частей, расположена в вертикальной плоскости. Задан погонный вес ρ стержней рамы. Определить реакции опор рамы (в кН).

Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова. – М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.54.)

Задача S-36.1.

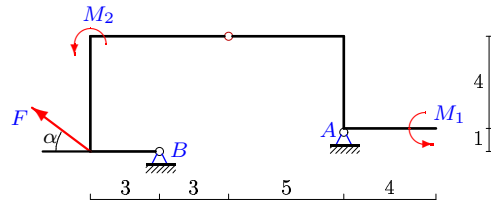
19



$F = 5 \text{ кН}$, $M_1 = 16.5 \text{ кНм}$, $M_2 = 49 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.2.

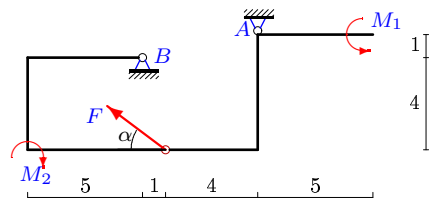
19



$F = 15 \text{ кН}$, $M_1 = 134.5 \text{ кНм}$, $M_2 = 9.5 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.3.

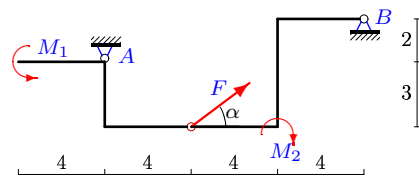
19



$F = 10 \text{ кН}$, $M_1 = 139.5 \text{ кНм}$, $M_2 = 44.5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.4.

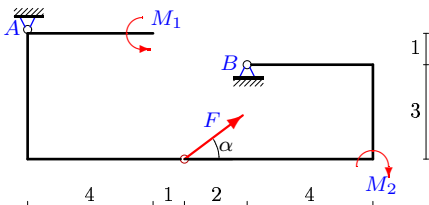
19



$F = 5 \text{ кН}$, $M_1 = 0 \text{ кНм}$, $M_2 = 136 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.5.

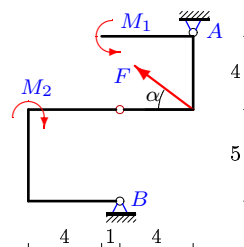
19



$F = 5 \text{ кН}$, $M_1 = 1.5 \text{ кНм}$, $M_2 = 29 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.6.

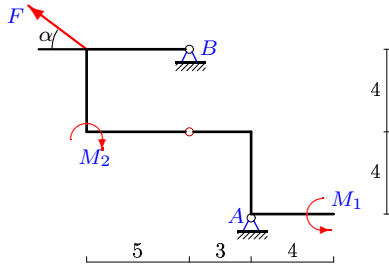
19



$F = 10 \text{ кН}$, $M_1 = 110.5 \text{ кНм}$, $M_2 = 210 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.7.

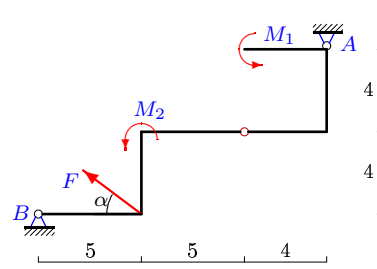
19



$F = 15 \text{ кН}$, $M_1 = 49 \text{ кНМ}$, $M_2 = 33 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.8.

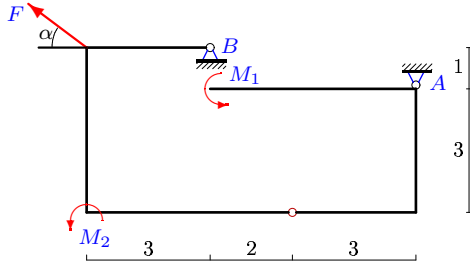
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$F = 5 \text{ кН}$, $M_1 = 8 \text{ кНМ}$, $M_2 = 175 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.9.

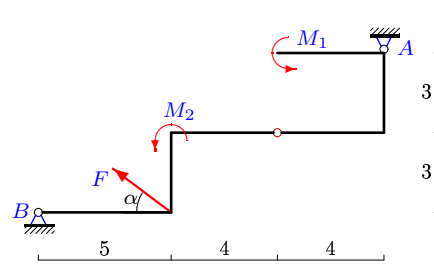
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$F = 5 \text{ кН}$, $M_1 = 14 \text{ кНМ}$, $M_2 = 15 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.10.

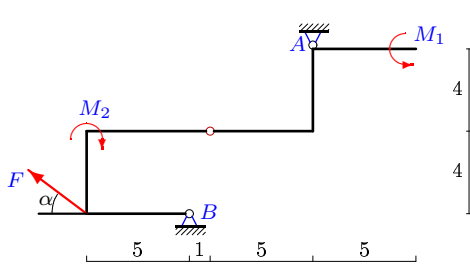
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$F = 10 \text{ кН}$, $M_1 = 13 \text{ кНМ}$, $M_2 = 124,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.11.

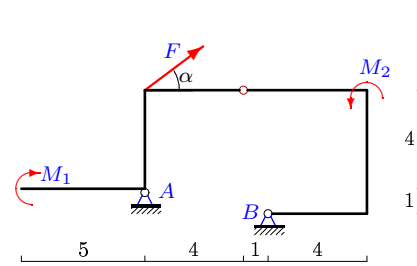
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$F = 15 \text{ кН}$, $M_1 = 172 \text{ кНМ}$, $M_2 = 32 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.12.

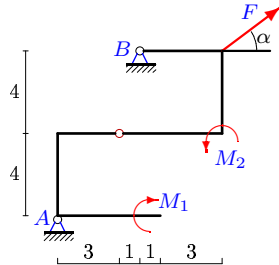
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$F = 5 \text{ кН}$, $M_1 = 125 \text{ кНМ}$, $M_2 = 68 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.13.

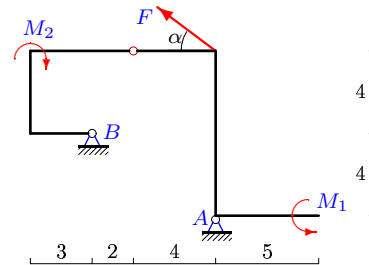
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$F = 10 \text{ кН}$, $M_1 = 49 \text{ кНМ}$, $M_2 = 34,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.14.

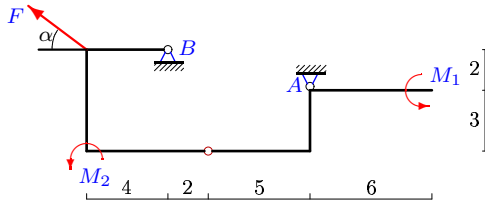
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$F = 15 \text{ кН}$, $M_1 = 173 \text{ кНМ}$, $M_2 = 68 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.15.

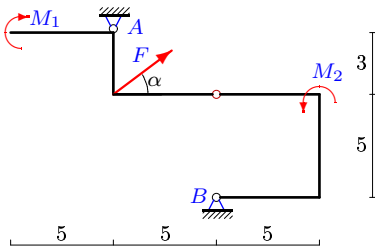
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$F = 5 \text{ кН}$, $M_1 = 89 \text{ кНм}$, $M_2 = 31 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

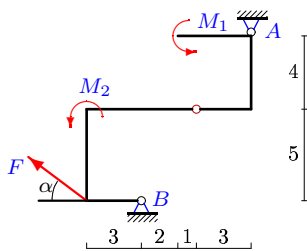
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$F = 15 \text{ кН}$, $M_1 = 110 \text{ кНм}$, $M_2 = 160 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

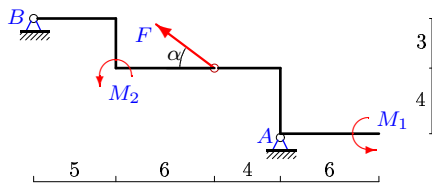
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$F = 15 \text{ кН}$, $M_1 = 47 \text{ кНм}$, $M_2 = 51 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

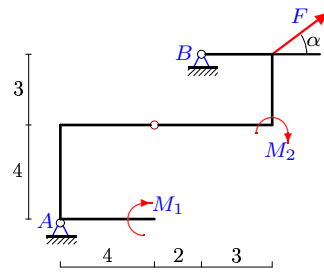
19



$F = 15 \text{ кН}$, $M_1 = 262 \text{ кНм}$, $M_2 = 593,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

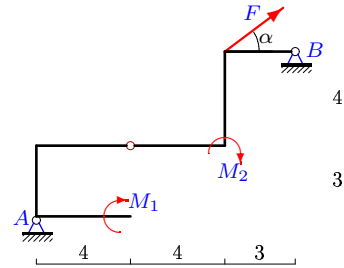
19



$F = 15 \text{ кН}$, $M_1 = 56 \text{ кНм}$, $M_2 = 47 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

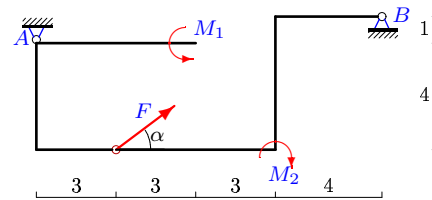
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$F = 15 \text{ кН}$, $M_1 = 33 \text{ кНм}$, $M_2 = 86,5 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

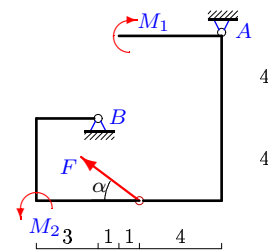
19



$F = 15 \text{ кН}$, $M_1 = 60,5 \text{ кНм}$, $M_2 = 625 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

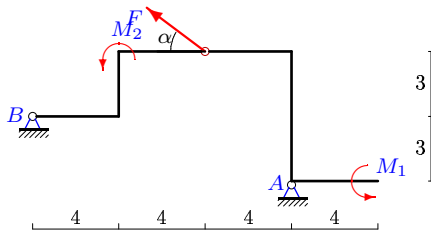
19



$F = 10 \text{ кН}$, $M_1 = 16,5 \text{ кНм}$, $M_2 = 67 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

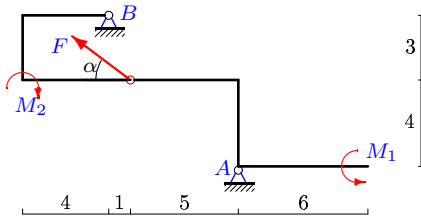
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$F = 5 \text{ кН}$, $M_1 = 116 \text{ кНМ}$, $M_2 = 120 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

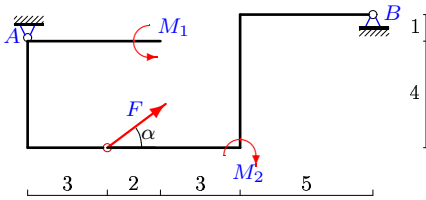
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$F = 5 \text{ кН}$, $M_1 = 219,5 \text{ кНМ}$, $M_2 = 17,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

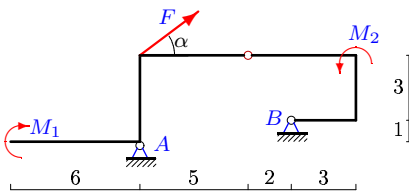
19



$F = 10 \text{ кН}$, $M_1 = 36 \text{ кНМ}$, $M_2 = 175 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

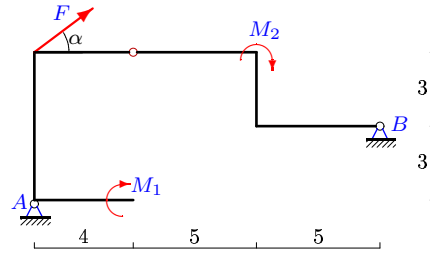
19



$F = 15 \text{ кН}$, $M_1 = 242,5 \text{ кНМ}$, $M_2 = 35 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

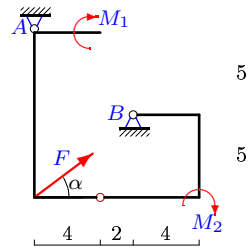
19



$F = 15 \text{ кН}$, $M_1 = 148 \text{ кНМ}$, $M_2 = 7 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

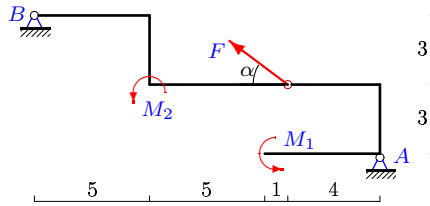
19



$F = 10 \text{ кН}$, $M_1 = 8 \text{ кНМ}$, $M_2 = 72 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

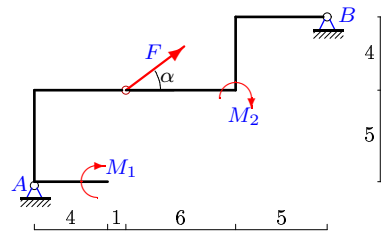
19



$F = 15 \text{ кН}$, $M_1 = 97 \text{ кНМ}$, $M_2 = 331 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

19



$F = 5 \text{ кН}$, $M_1 = 169 \text{ кНМ}$, $M_2 = 417 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

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Ответы.
 Тяжелая составная рама из двух частей

13.02.2015

№	X_A	Y_A	X_B	Y_B	$\sum M_C = 0$	$\sum M_B = 0$
1	-7	0	11	24	$-8X_A + 3Y_A - 56 = 0,$	$-4X_A + 5Y_A - 28 = 0$
2	-11	-6	23	24	$4X_A + 5Y_A + 74 = 0,$	$X_A + 8Y_A + 37 = 0$
3	-6	3	14	78	$-5X_A + 4Y_A - 42 = 0,$	$X_A + 5Y_A - 21 = 0$
4	8	5	-12	16	$-3X_A - 4Y_A + 44 = 0,$	$2X_A - 12Y_A + 44 = 0$
5	9	2	-13	21	$-4X_A - 5Y_A + 46 = 0,$	$X_A - 7Y_A + 23 = 0$
6	-4	-14	12	92	$-4X_A + 4Y_A + 40 = 0,$	$-9X_A + 4Y_A + 20 = 0$
7	-3	12	15	29	$4X_A + 3Y_A - 24 = 0,$	$8X_A + 3Y_A - 12 = 0$
8	-10	-4	14	27	$-4X_A + 4Y_A - 24 = 0,$	$-8X_A + 14Y_A - 24 = 0$
9	-2	4	6	39	$-3X_A + 3Y_A - 18 = 0,$	$X_A + 5Y_A - 18 = 0$
10	-9	-3	17	20	$-3X_A + 4Y_A - 15 = 0,$	$-6X_A + 13Y_A - 15 = 0$
11	-7	-12	19	61	$-4X_A + 5Y_A + 32 = 0,$	$-8X_A + 6Y_A + 16 = 0$
12	1	-5	-5	56	$4X_A - 4Y_A - 24 = 0,$	$X_A - 5Y_A - 24 = 0$
13	1	4	-9	65	$4X_A - 3Y_A + 8 = 0,$	$8X_A - 4Y_A + 8 = 0$
14	-8	0	20	49	$8X_A + 4Y_A + 64 = 0,$	$4X_A + 6Y_A + 32 = 0$
15	-9	7	13	48	$-3X_A + 5Y_A - 62 = 0,$	$2X_A + 7Y_A - 31 = 0$
16	8	10	-20	27	$4X_A - 4Y_A + 8 = 0,$	$7X_A - 6Y_A + 4 = 0$
17	0	-5	-12	52	$-3X_A - 5Y_A - 25 = 0,$	$-8X_A - 5Y_A - 25 = 0$
18	7	4	-19	9	$3X_A - 4Y_A - 5 = 0,$	$7X_A - 11Y_A - 5 = 0$
19	-9	-14	21	55	$-4X_A + 3Y_A + 6 = 0,$	$-9X_A + 6Y_A + 3 = 0$
20	23	6	-35	69	$-4X_A - 3Y_A + 110 = 0,$	$X_A - 13Y_A + 55 = 0$
21	-26	10	38	65	$4X_A + 4Y_A + 64 = 0,$	$7X_A + 15Y_A + 32 = 0$
22	-8	0	16	23	$-8X_A + 4Y_A - 64 = 0,$	$-4X_A + 6Y_A - 32 = 0$
23	-8	-3	12	25	$6X_A + 4Y_A + 60 = 0,$	$3X_A + 12Y_A + 60 = 0$
24	24	0	-36	18	$6X_A - 4Y_A - 144 = 0,$	$3X_A - 14Y_A - 72 = 0$
25	-7	10	11	68	$4X_A + 5Y_A - 22 = 0,$	$7X_A + 6Y_A - 11 = 0$
26	8	0	-16	60	$-10X_A - 4Y_A + 80 = 0,$	$-5X_A - 6Y_A + 40 = 0$
27	10	5	-18	16	$-4X_A - 3Y_A + 55 = 0,$	$X_A - 13Y_A + 55 = 0$
28	-26	9	38	34	$3X_A + 4Y_A + 42 = 0,$	$6X_A + 15Y_A + 21 = 0$
29	9	-2	-21	71	$4X_A - 5Y_A - 46 = 0,$	$X_A - 7Y_A - 23 = 0$
30	27	13	-31	42	$5X_A - 5Y_A - 70 = 0,$	$9X_A - 16Y_A - 35 = 0$

S-36 файл о36s19A