

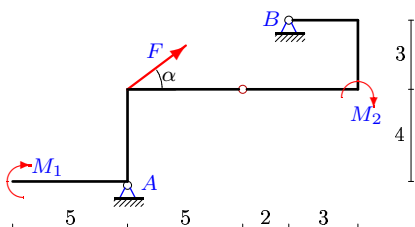
Тяжелая составная рама из двух частей

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.

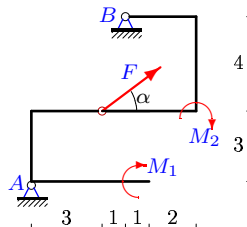
13



$$F = 10 \text{ кН}, M_1 = 96 \text{ кНм}, M_2 = 43 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.2.

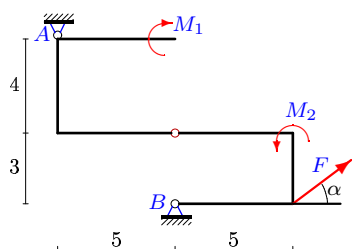
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$$F = 5 \text{ кН}, M_1 = 7 \text{ кНм}, M_2 = 3,5 \text{ кНм}, \\ \rho = 1 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.3.

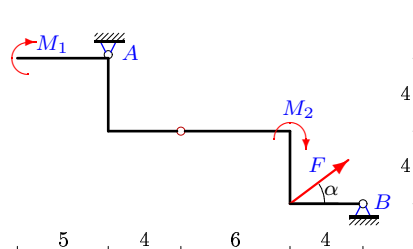
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$$F = 5 \text{ кН}, M_1 = 165 \text{ кНм}, M_2 = 120 \text{ кНм}, \\ \rho = 3 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.4.

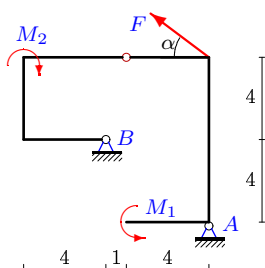
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$$F = 10 \text{ кН}, M_1 = 65 \text{ кНм}, M_2 = 392 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.5.

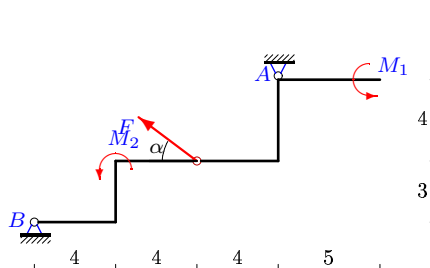
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$$F = 15 \text{ кН}, M_1 = 36 \text{ кНм}, M_2 = 72,5 \text{ кНм}, \\ \rho = 1 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.6.

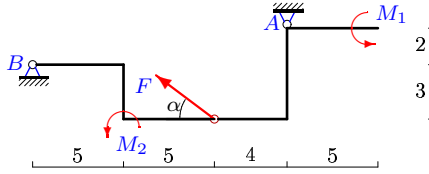
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$$F = 5 \text{ кН}, M_1 = 149,5 \text{ кНм}, M_2 = 408 \text{ кНм}, \\ \rho = 3 \text{ кН/м}, \cos \alpha = 0,8.$$

Задача S-36.7.

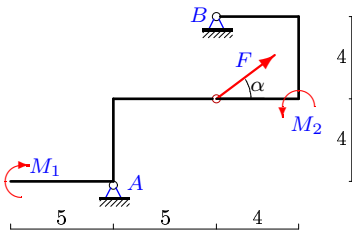
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$F = 5 \text{ кН}, M_1 = 59 \text{ кНм}, M_2 = 392 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.9.

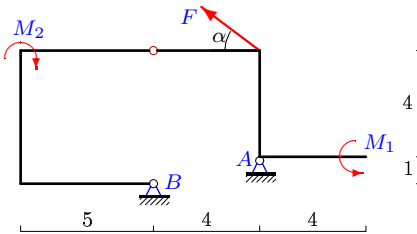
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$F = 5 \text{ кН}, M_1 = 120 \text{ кНм}, M_2 = 48 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.11.

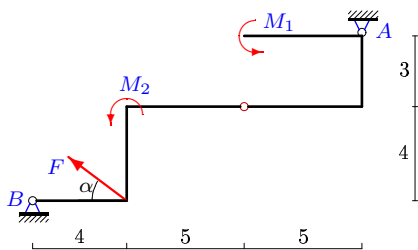
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$F = 5 \text{ кН}, M_1 = 124 \text{ кНм}, M_2 = 140 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.13.

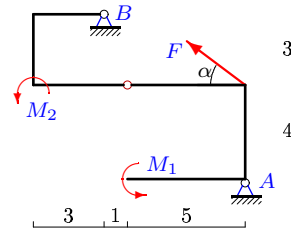
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$F = 15 \text{ кН}, M_1 = 73 \text{ кНм}, M_2 = 311 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.8.

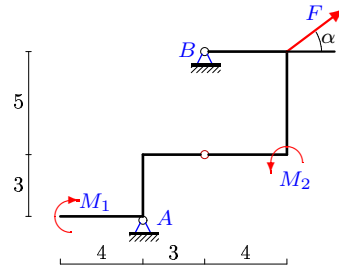
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$F = 5 \text{ кН}, M_1 = 64 \text{ кНм}, M_2 = 2 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.10.

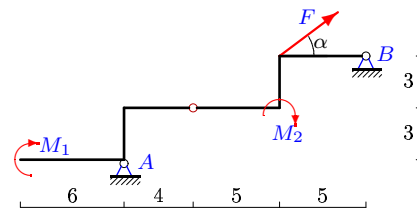
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$F = 15 \text{ кН}, M_1 = 18,5 \text{ кНм}, M_2 = 0 \text{ кНм},$
 $\rho = 1 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.12.

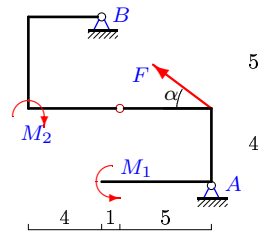
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$F = 15 \text{ кН}, M_1 = 160 \text{ кНм}, M_2 = 327 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.14.

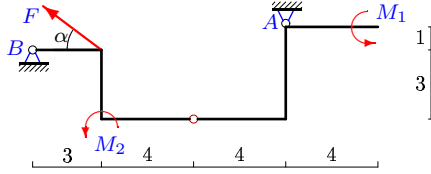
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$F = 5 \text{ кН}, M_1 = 32 \text{ кНм}, M_2 = 3 \text{ кНм},$
 $\rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$

Задача S-36.15.

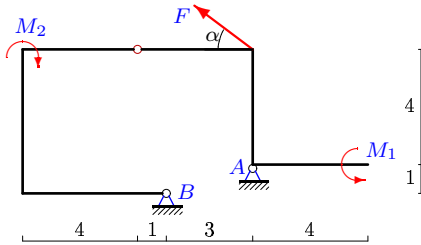
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$F = 15 \text{ кН}$, $M_1 = 8 \text{ кНМ}$, $M_2 = 90.5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

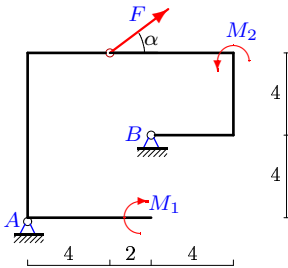
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$F = 10 \text{ кН}$, $M_1 = 40 \text{ кНМ}$, $M_2 = 95.5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

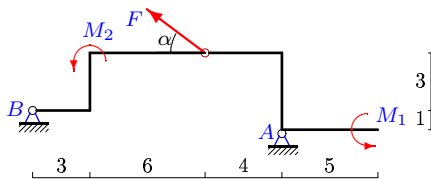
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$F = 15 \text{ кН}$, $M_1 = 202 \text{ кНМ}$, $M_2 = 80 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

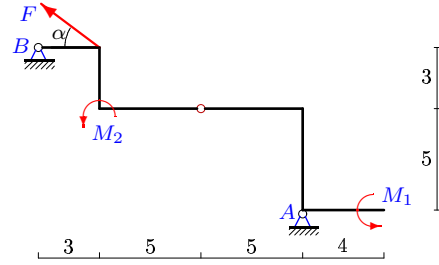
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$F = 10 \text{ кН}$, $M_1 = 209 \text{ кНМ}$, $M_2 = 207 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

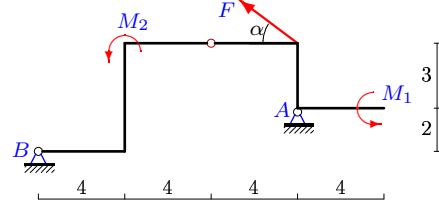
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$F = 15 \text{ кН}$, $M_1 = 156 \text{ кНМ}$, $M_2 = 279 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

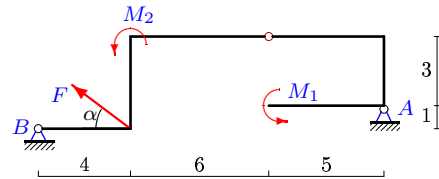
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$F = 15 \text{ кН}$, $M_1 = 52 \text{ кНМ}$, $M_2 = 8 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

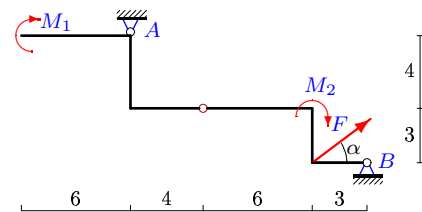
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$F = 10 \text{ кН}$, $M_1 = 180 \text{ кНМ}$, $M_2 = 318 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

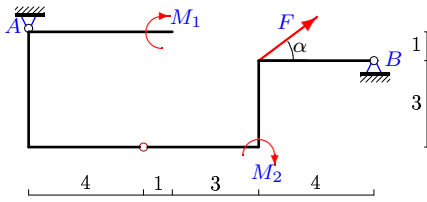
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$F = 15 \text{ кН}$, $M_1 = 150 \text{ кНМ}$, $M_2 = 523.5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

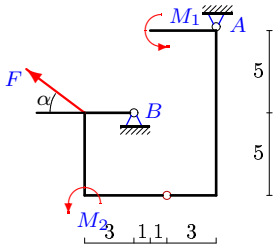
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$F = 15 \text{ кН}$, $M_1 = 19 \text{ кНм}$, $M_2 = 260 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

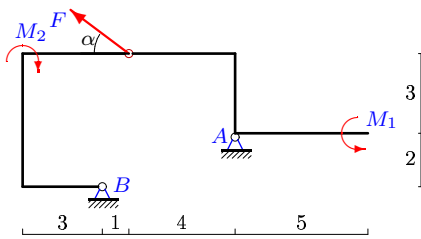
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$F = 10 \text{ кН}$, $M_1 = 7 \text{ кНм}$, $M_2 = 77 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

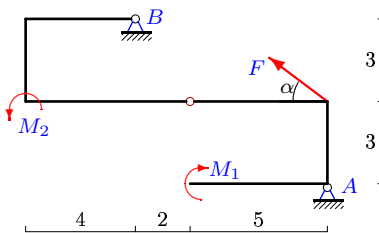
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$F = 15 \text{ кН}$, $M_1 = 128 \text{ кНм}$, $M_2 = 92 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

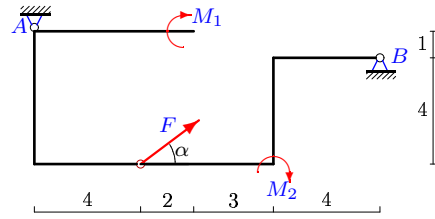
13



$F = 10 \text{ кН}$, $M_1 = 8 \text{ кНм}$, $M_2 = 21 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

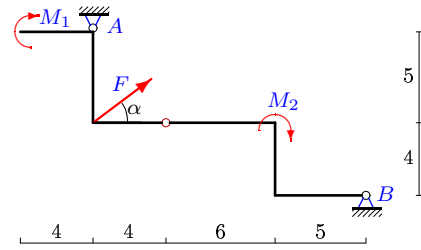
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$F = 10 \text{ кН}$, $M_1 = 41 \text{ кНм}$, $M_2 = 552,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

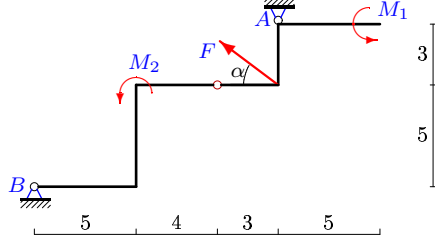
13



$F = 10 \text{ кН}$, $M_1 = 2 \text{ кНм}$, $M_2 = 388 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

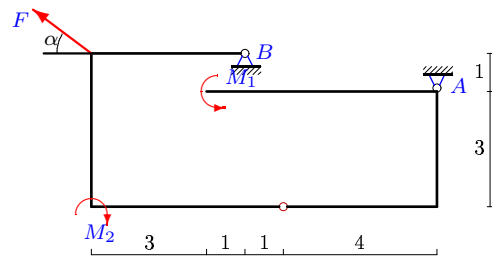
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$F = 5 \text{ кН}$, $M_1 = 61 \text{ кНм}$, $M_2 = 282 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

13



$F = 5 \text{ кН}$, $M_1 = 33 \text{ кНм}$, $M_2 = 25 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

S-36

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	9	10	-17	34	$4X_A - 5Y_A + 14 = 0,$	$7X_A - 7Y_A + 7 = 0$
2	1	4	-5	15	$3X_A - 3Y_A + 9 = 0,$	$7X_A - 4Y_A + 9 = 0$
3	5	-10	-9	88	$-4X_A - 5Y_A - 30 = 0,$	$-7X_A - 5Y_A - 15 = 0$
4	24	-12	-32	60	$-4X_A - 4Y_A + 48 = 0,$	$-8X_A - 14Y_A + 24 = 0$
5	-1	-4	13	24	$8X_A + 4Y_A + 24 = 0,$	$4X_A + 5Y_A + 24 = 0$
6	-8	-3	12	72	$-4X_A + 4Y_A - 20 = 0,$	$-7X_A + 12Y_A - 20 = 0$
7	-10	3	14	48	$-5X_A + 4Y_A - 62 = 0,$	$-2X_A + 14Y_A - 62 = 0$
8	-1	3	5	42	$4X_A + 5Y_A - 11 = 0,$	$7X_A + 6Y_A - 11 = 0$
9	0	4	-4	45	$4X_A - 5Y_A + 20 = 0,$	$8X_A - 5Y_A + 20 = 0$
10	0	5	-12	9	$3X_A - 3Y_A + 15 = 0,$	$8X_A - 3Y_A + 15 = 0$
11	-4	-6	8	57	$4X_A + 4Y_A + 40 = 0,$	$X_A + 4Y_A + 20 = 0$
12	24	9	-36	34	$3X_A - 4Y_A - 36 = 0,$	$6X_A - 14Y_A - 18 = 0$
13	-9	-4	21	47	$-3X_A + 5Y_A - 7 = 0,$	$-7X_A + 14Y_A - 7 = 0$
14	-7	14	11	41	$4X_A + 5Y_A - 42 = 0,$	$9X_A + 6Y_A - 21 = 0$
15	-7	3	19	10	$-4X_A + 4Y_A - 40 = 0,$	$X_A + 11Y_A - 40 = 0$
16	-8	3	20	38	$5X_A + 5Y_A + 25 = 0,$	$8X_A + 13Y_A + 25 = 0$
17	1	-5	7	25	$4X_A + 4Y_A + 16 = 0,$	$X_A + 3Y_A + 16 = 0$
18	-8	-5	20	20	$3X_A + 4Y_A + 44 = 0,$	$-2X_A + 12Y_A + 44 = 0$
19	8	0	-20	87	$8X_A - 4Y_A - 64 = 0,$	$4X_A - 6Y_A - 32 = 0$
20	-25	-5	33	53	$3X_A + 5Y_A + 100 = 0,$	$X_A + 15Y_A + 50 = 0$
21	-22	-2	30	46	$4X_A + 4Y_A + 96 = 0,$	$X_A + 13Y_A + 48 = 0$
22	22	-10	-34	79	$-4X_A - 4Y_A + 48 = 0,$	$-7X_A - 13Y_A + 24 = 0$
23	8	3	-20	36	$-4X_A - 4Y_A + 44 = 0,$	$X_A - 12Y_A + 44 = 0$
24	9	4	-17	74	$-5X_A - 4Y_A + 61 = 0,$	$X_A - 13Y_A + 61 = 0$
25	-7	0	15	54	$-10X_A + 3Y_A - 70 = 0,$	$-5X_A + 5Y_A - 35 = 0$
26	26	-13	-34	63	$-5X_A - 4Y_A + 78 = 0,$	$-9X_A - 15Y_A + 39 = 0$
27	-1	-5	13	44	$3X_A + 4Y_A + 23 = 0,$	$-2X_A + 5Y_A + 23 = 0$
28	-9	-5	13	52	$-3X_A + 3Y_A - 12 = 0,$	$-8X_A + 12Y_A - 12 = 0$
29	-9	9	17	11	$3X_A + 5Y_A - 18 = 0,$	$6X_A + 7Y_A - 9 = 0$
30	-1	4	5	45	$-3X_A + 4Y_A - 19 = 0,$	$X_A + 5Y_A - 19 = 0$