

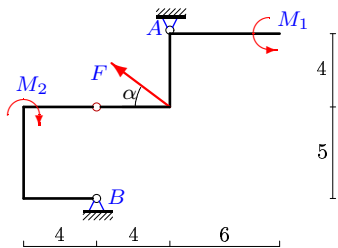
Тяжелая составная рама из двух частей

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.

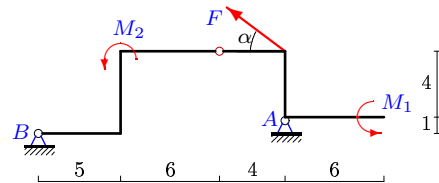
18



$F = 10$ кН, $M_1 = 128$ кНм, $M_2 = 112$ кНм,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.2.

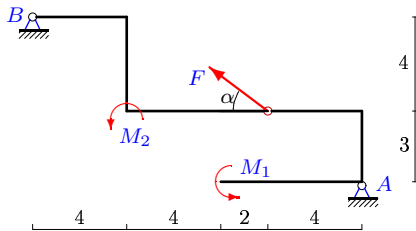
18



$F = 10$ кН, $M_1 = 236$ кНм, $M_2 = 309$ кНм,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.3.

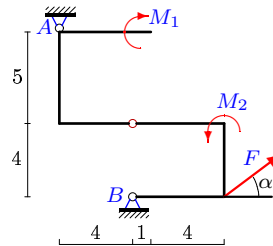
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$F = 15$ кН, $M_1 = 80$ кНм, $M_2 = 336$ кНм,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.4.

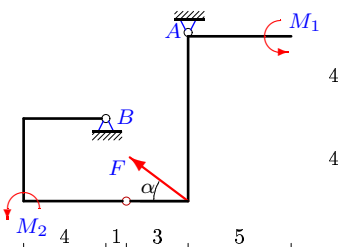
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$F = 15$ кН, $M_1 = 122,5$ кНм, $M_2 = 90$ кНм,
 $\rho = 3$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.5.

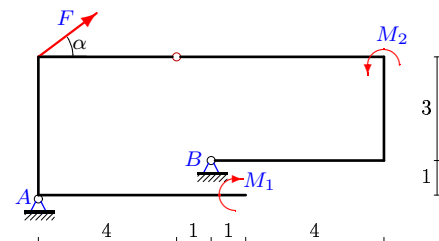
18



$F = 5$ кН, $M_1 = 63$ кНм, $M_2 = 2$ кНм,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.6.

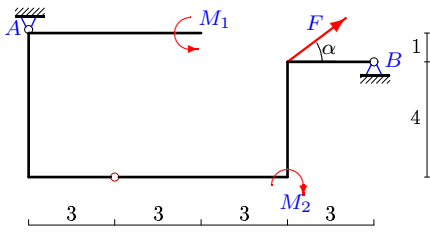
18



$F = 10$ кН, $M_1 = 68$ кНм, $M_2 = 97$ кНм,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.7.

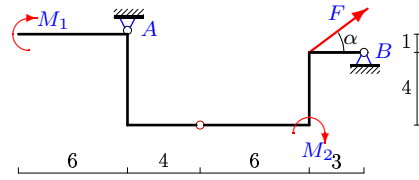
18



$F = 5 \text{ кН}$, $M_1 = 55.5 \text{ кНм}$, $M_2 = 583.5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.8.

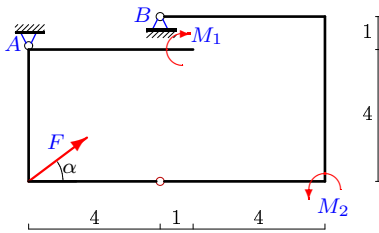
18



$F = 10 \text{ кН}$, $M_1 = 88 \text{ кНм}$, $M_2 = 605.5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.9.

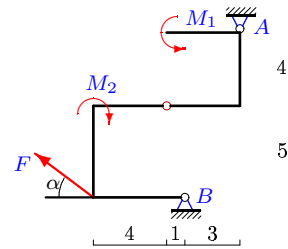
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$F = 5 \text{ кН}$, $M_1 = 62.5 \text{ кНм}$, $M_2 = 130 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.10.

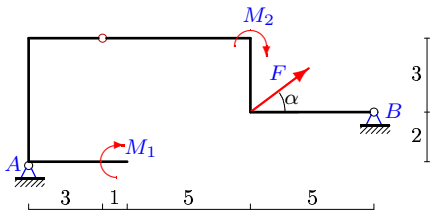
18



$F = 10 \text{ кН}$, $M_1 = 88 \text{ кНм}$, $M_2 = 93 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.11.

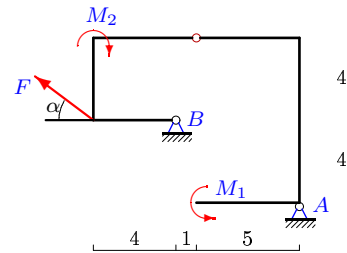
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$F = 5 \text{ кН}$, $M_1 = 175 \text{ кНм}$, $M_2 = 336 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.12.

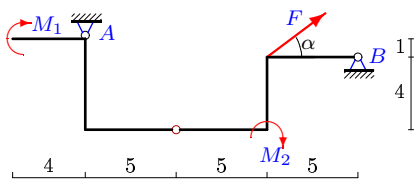
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$F = 5 \text{ кН}$, $M_1 = 186 \text{ кНм}$, $M_2 = 43 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.13.

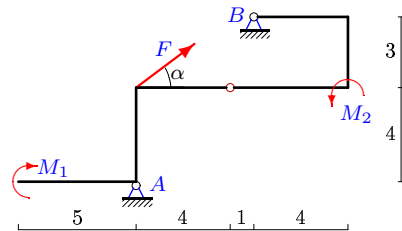
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$F = 5 \text{ кН}$, $M_1 = 61 \text{ кНм}$, $M_2 = 405 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.14.

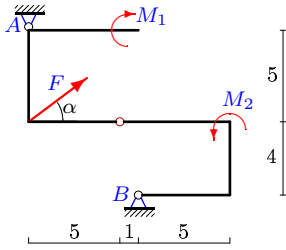
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$F = 5 \text{ кН}$, $M_1 = 93 \text{ кНм}$, $M_2 = 20 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.15.

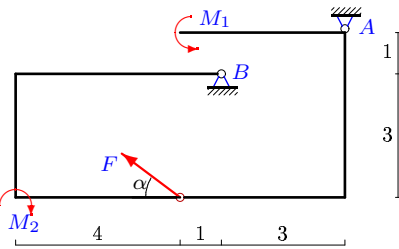
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$F = 10 \text{ кН}$, $M_1 = 148.5 \text{ кНМ}$, $M_2 = 138.5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

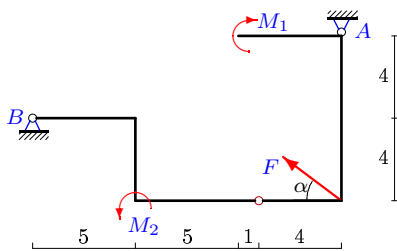
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$F = 10 \text{ кН}$, $M_1 = 24 \text{ кНМ}$, $M_2 = 21.5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

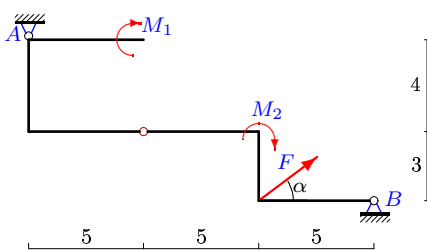
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$F = 10 \text{ кН}$, $M_1 = 137 \text{ кНМ}$, $M_2 = 605 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

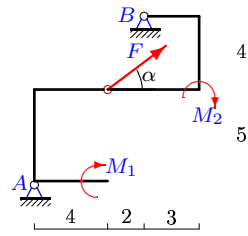
18



$F = 15 \text{ кН}$, $M_1 = 65 \text{ кНМ}$, $M_2 = 365 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

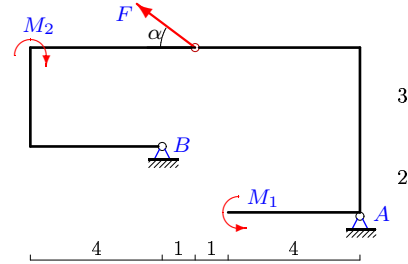
18



$F = 15 \text{ кН}$, $M_1 = 60 \text{ кНМ}$, $M_2 = 50 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

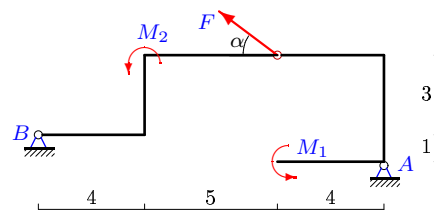
18



$F = 5 \text{ кН}$, $M_1 = 139 \text{ кНМ}$, $M_2 = 62 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

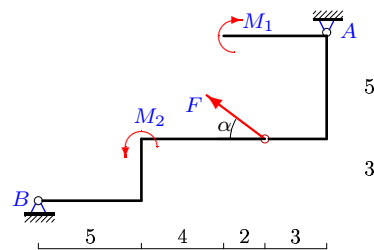
18



$F = 5 \text{ кН}$, $M_1 = 160 \text{ кНМ}$, $M_2 = 234 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

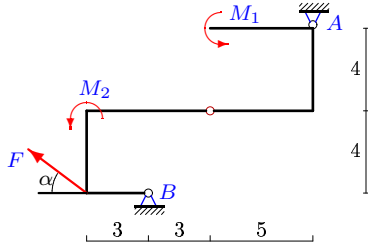
18



$F = 15 \text{ кН}$, $M_1 = 26 \text{ кНМ}$, $M_2 = 566.5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

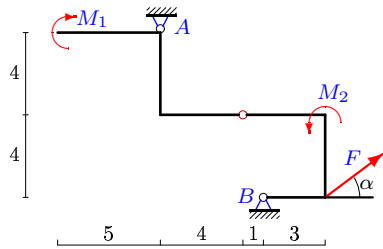
18



$F = 10 \text{ кН}$, $M_1 = 106 \text{ кНм}$, $M_2 = 61 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

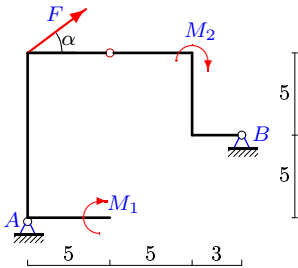
18



$F = 5 \text{ кН}$, $M_1 = 181,5 \text{ кНм}$, $M_2 = 13,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

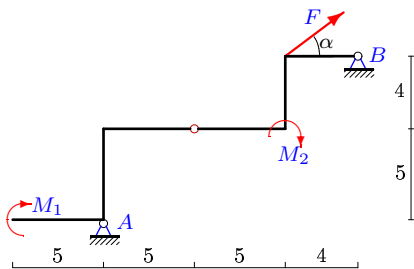
18



$F = 15 \text{ кН}$, $M_1 = 390 \text{ кНм}$, $M_2 = 384 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

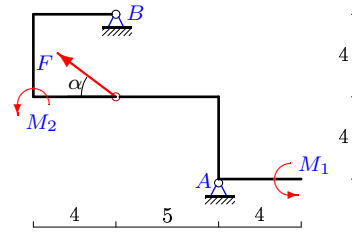
18



$F = 15 \text{ кН}$, $M_1 = 250 \text{ кНм}$, $M_2 = 538,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

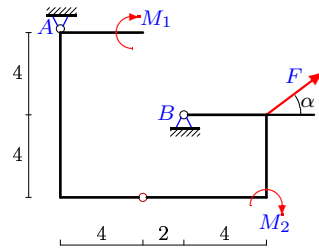
18



$F = 15 \text{ кН}$, $M_1 = 40,5 \text{ кНм}$, $M_2 = 16 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

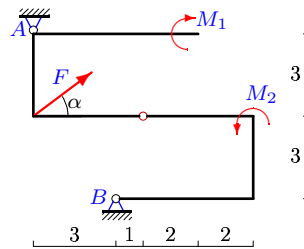
18



$F = 5 \text{ кН}$, $M_1 = 32 \text{ кНм}$, $M_2 = 48 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

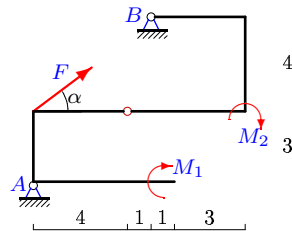
18



$F = 5 \text{ кН}$, $M_1 = 55 \text{ кНм}$, $M_2 = 114 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

18



$F = 15 \text{ кН}$, $M_1 = 3 \text{ кНм}$, $M_2 = 2 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

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	0	-5	8	53	$-4X_A + 4Y_A + 20 = 0,$	$-9X_A + 4Y_A + 20 = 0$
2	-26	-6	34	60	$4X_A + 4Y_A + 128 = 0,$	$X_A + 15Y_A + 64 = 0$
3	-24	11	36	34	$3X_A + 4Y_A + 28 = 0,$	$7X_A + 14Y_A + 14 = 0$
4	0	-4	-12	79	$-5X_A - 4Y_A - 16 = 0,$	$-9X_A - 4Y_A - 16 = 0$
5	-5	0	9	55	$-8X_A + 3Y_A - 40 = 0,$	$-4X_A + 4Y_A - 20 = 0$
6	6	-2	-14	52	$4X_A - 4Y_A - 32 = 0,$	$X_A - 5Y_A - 16 = 0$
7	21	3	-25	75	$-5X_A - 3Y_A + 114 = 0,$	$X_A - 12Y_A + 57 = 0$
8	22	3	-30	75	$-5X_A - 4Y_A + 122 = 0,$	$X_A - 13Y_A + 61 = 0$
9	0	5	-4	76	$-4X_A - 4Y_A + 20 = 0,$	$X_A - 4Y_A + 20 = 0$
10	1	-5	7	51	$-4X_A + 4Y_A + 24 = 0,$	$-9X_A + 3Y_A + 24 = 0$
11	25	-1	-29	50	$5X_A - 3Y_A - 128 = 0,$	$2X_A - 14Y_A - 64 = 0$
12	-7	0	11	59	$8X_A + 5Y_A + 56 = 0,$	$4X_A + 6Y_A + 28 = 0$
13	10	4	-14	49	$-5X_A - 5Y_A + 70 = 0,$	$X_A - 15Y_A + 70 = 0$
14	1	3	-5	44	$4X_A - 4Y_A + 8 = 0,$	$7X_A - 5Y_A + 8 = 0$
15	7	-13	-15	100	$-5X_A - 5Y_A - 30 = 0,$	$-9X_A - 6Y_A - 15 = 0$
16	8	13	-20	28	$5X_A - 4Y_A + 12 = 0,$	$9X_A - 6Y_A + 6 = 0$
17	1	3	7	15	$-4X_A + 4Y_A - 8 = 0,$	$X_A + 3Y_A - 8 = 0$
18	-7	-1	11	50	$5X_A + 5Y_A + 40 = 0,$	$2X_A + 6Y_A + 20 = 0$
19	-26	0	34	58	$-8X_A + 4Y_A - 208 = 0,$	$-4X_A + 15Y_A - 104 = 0$
20	-22	-2	26	47	$4X_A + 4Y_A + 96 = 0,$	$X_A + 13Y_A + 48 = 0$
21	10	-3	-22	48	$-4X_A - 5Y_A + 25 = 0,$	$-7X_A - 15Y_A + 25 = 0$
22	-25	-11	37	83	$-5X_A + 3Y_A - 92 = 0,$	$-8X_A + 14Y_A - 46 = 0$
23	-11	-12	19	60	$-4X_A + 5Y_A + 16 = 0,$	$-8X_A + 8Y_A + 8 = 0$
24	0	4	12	12	$4X_A + 5Y_A - 20 = 0,$	$8X_A + 5Y_A - 20 = 0$
25	1	-4	-5	73	$-4X_A - 4Y_A - 12 = 0,$	$-8X_A - 5Y_A - 12 = 0$
26	8	0	-12	57	$-8X_A - 4Y_A + 64 = 0,$	$-4X_A - 6Y_A + 32 = 0$
27	21	0	-33	90	$10X_A - 5Y_A - 210 = 0,$	$5X_A - 13Y_A - 105 = 0$
28	-1	-3	-3	50	$-3X_A - 4Y_A - 15 = 0,$	$-6X_A - 3Y_A - 15 = 0$
29	9	4	-21	71	$5X_A - 5Y_A - 25 = 0,$	$9X_A - 14Y_A - 25 = 0$
30	1	4	-13	39	$3X_A - 4Y_A + 13 = 0,$	$7X_A - 5Y_A + 13 = 0$