

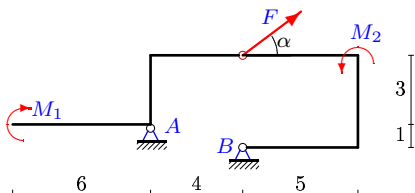
Тяжелая составная рама из двух частей

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.

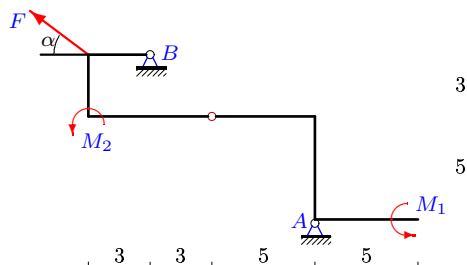
16



$F = 5 \text{ кН}$, $M_1 = 140 \text{ кНм}$, $M_2 = 106 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.2.

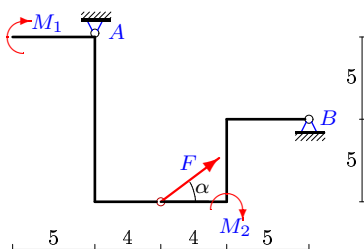
16



$F = 15 \text{ кН}$, $M_1 = 225 \text{ кНм}$, $M_2 = 121,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.3.

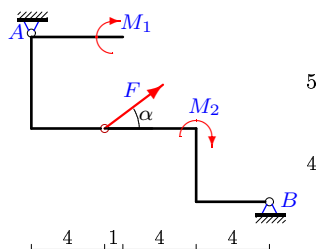
16



$F = 5 \text{ кН}$, $M_1 = 131,5 \text{ кНм}$, $M_2 = 702,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.4.

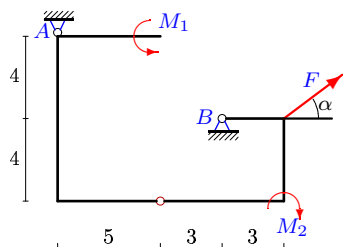
16



$F = 10 \text{ кН}$, $M_1 = 42 \text{ кНм}$, $M_2 = 279 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.5.

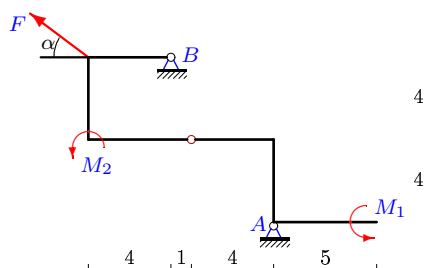
16



$F = 15 \text{ кН}$, $M_1 = 23 \text{ кНм}$, $M_2 = 108,5 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.6.

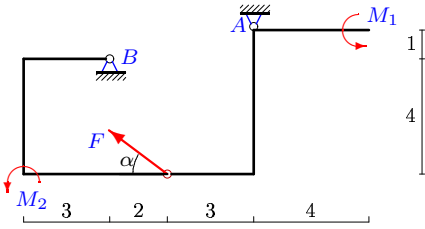
16



$F = 15 \text{ кН}$, $M_1 = 89 \text{ кНм}$, $M_2 = 11 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.7.

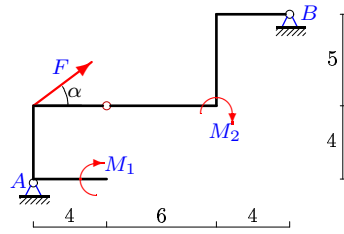
16



$F = 10 \text{ кН}$, $M_1 = 57 \text{ кНМ}$, $M_2 = 30 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.8.

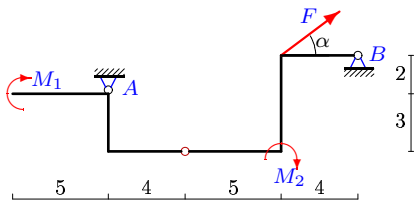
16



$F = 10 \text{ кН}$, $M_1 = 80 \text{ кНМ}$, $M_2 = 340 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.9.

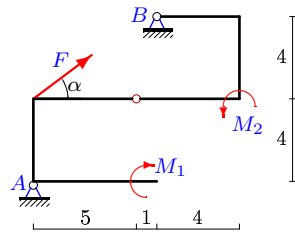
16



$F = 15 \text{ кН}$, $M_1 = 5,5 \text{ кНМ}$, $M_2 = 132,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.10.

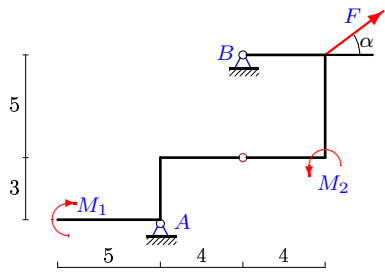
16



$F = 10 \text{ кН}$, $M_1 = 87,5 \text{ кНМ}$, $M_2 = 23,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.11.

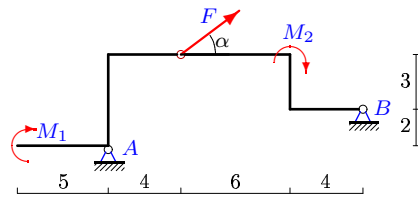
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$F = 15 \text{ кН}$, $M_1 = 85 \text{ кНМ}$, $M_2 = 36 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.12.

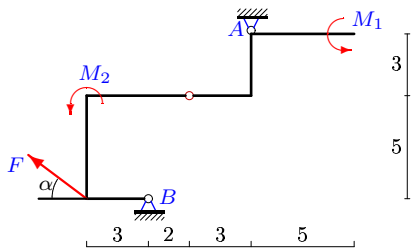
16



$F = 15 \text{ кН}$, $M_1 = 305,5 \text{ кНМ}$, $M_2 = 418 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.13.

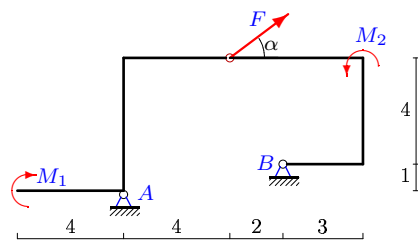
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$F = 5 \text{ кН}$, $M_1 = 100 \text{ кНМ}$, $M_2 = 0 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.14.

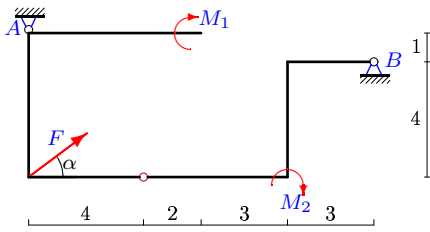
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$F = 15 \text{ кН}$, $M_1 = 130 \text{ кНМ}$, $M_2 = 52 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.15.

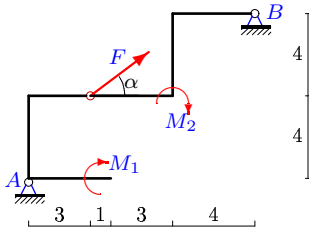
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$F = 10 \text{ кН}$, $M_1 = 22 \text{ кНМ}$, $M_2 = 476 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

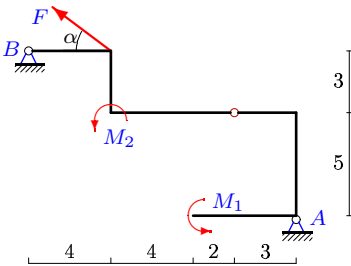
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$F = 10 \text{ кН}$, $M_1 = 40,5 \text{ кНМ}$, $M_2 = 120 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

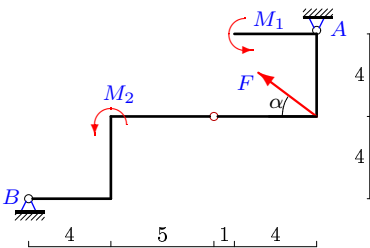
16



$F = 5 \text{ кН}$, $M_1 = 148 \text{ кНМ}$, $M_2 = 523 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

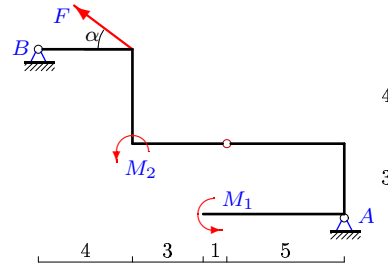
16



$F = 5 \text{ кН}$, $M_1 = 42 \text{ кНМ}$, $M_2 = 320 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

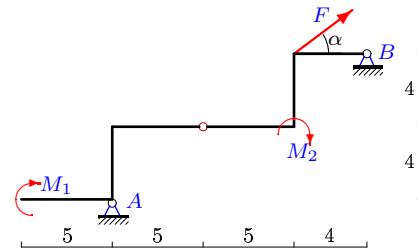
16



$F = 15 \text{ кН}$, $M_1 = 83 \text{ кНМ}$, $M_2 = 284 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

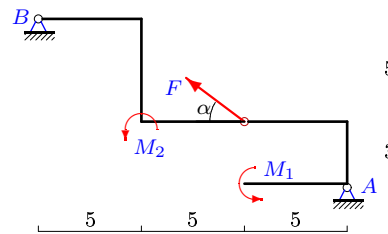
16



$F = 5 \text{ кН}$, $M_1 = 172 \text{ кНМ}$, $M_2 = 337 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

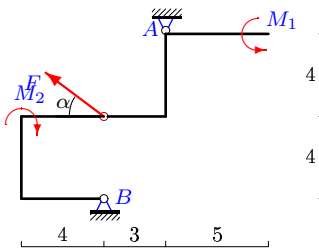
16



$F = 5 \text{ кН}$, $M_1 = 90 \text{ кНМ}$, $M_2 = 395 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

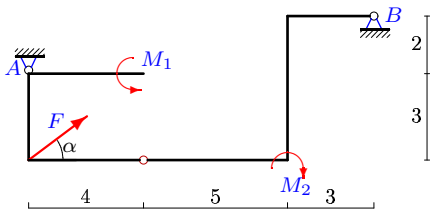
16



$F = 10 \text{ кН}$, $M_1 = 144 \text{ кНМ}$, $M_2 = 128 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

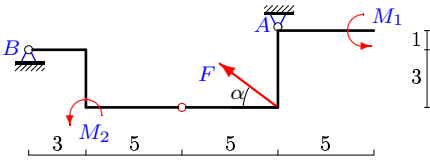
16



$F = 5 \text{ кН}$, $M_1 = 72 \text{ кНм}$, $M_2 = 175 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

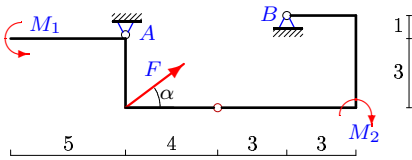
16



$F = 10 \text{ кН}$, $M_1 = 63 \text{ кНм}$, $M_2 = 282 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

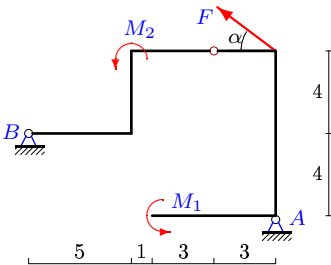
16



$F = 5 \text{ кН}$, $M_1 = 9,5 \text{ кНм}$, $M_2 = 51,5 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

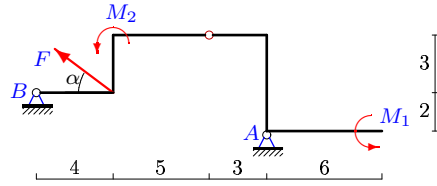
16



$F = 10 \text{ кН}$, $M_1 = 123 \text{ кНм}$, $M_2 = 341 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

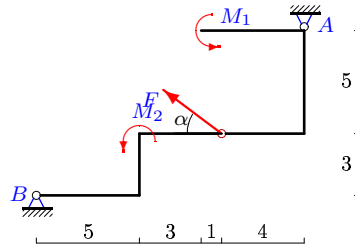
16



$F = 10 \text{ кН}$, $M_1 = 220,5 \text{ кНм}$, $M_2 = 511,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

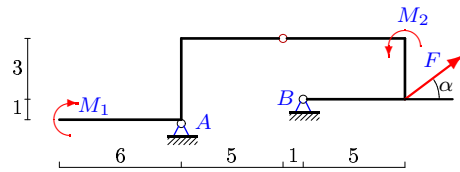
16



$F = 15 \text{ кН}$, $M_1 = 38 \text{ кНм}$, $M_2 = 246 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

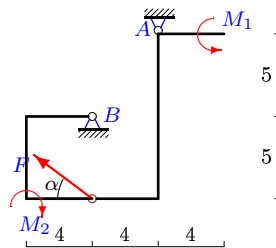
16



$F = 10 \text{ кН}$, $M_1 = 279,5 \text{ кНм}$, $M_2 = 62,5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

16



$F = 15 \text{ кН}$, $M_1 = 124 \text{ кНм}$, $M_2 = 12 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

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	-4	-4	55	$3X_A - 4Y_A - 16 = 0,$	$X_A - 4Y_A - 16 = 0$
2	-11	11	23	61	$5X_A + 5Y_A + 0 = 0,$	$8X_A + 8Y_A + 0 = 0$
3	9	5	-13	91	$-10X_A - 4Y_A + 110 = 0,$	$-5X_A - 13Y_A + 110 = 0$
4	9	-4	-17	52	$-5X_A - 4Y_A + 29 = 0,$	$-9X_A - 13Y_A + 29 = 0$
5	11	0	-23	22	$-8X_A - 5Y_A + 88 = 0,$	$-4X_A - 8Y_A + 44 = 0$
6	-6	12	18	31	$4X_A + 4Y_A - 24 = 0,$	$8X_A + 5Y_A - 12 = 0$
7	-2	4	10	38	$-5X_A + 3Y_A - 22 = 0,$	$X_A + 5Y_A - 22 = 0$
8	24	14	-32	34	$4X_A - 4Y_A - 40 = 0,$	$9X_A - 14Y_A - 20 = 0$
9	9	5	-21	12	$-3X_A - 4Y_A + 47 = 0,$	$2X_A - 13Y_A + 47 = 0$
10	1	4	-9	74	$4X_A - 5Y_A + 16 = 0,$	$8X_A - 6Y_A + 16 = 0$
11	0	5	-12	36	$3X_A - 4Y_A + 20 = 0,$	$8X_A - 4Y_A + 20 = 0$
12	24	-1	-36	73	$5X_A - 4Y_A - 124 = 0,$	$2X_A - 14Y_A - 62 = 0$
13	-7	-13	11	58	$-3X_A + 3Y_A + 18 = 0,$	$-8X_A + 5Y_A + 9 = 0$
14	2	-4	-14	45	$5X_A - 4Y_A - 26 = 0,$	$X_A - 6Y_A - 26 = 0$
15	8	4	-16	71	$-5X_A - 4Y_A + 56 = 0,$	$X_A - 12Y_A + 56 = 0$
16	-8	4	20	39	$3X_A + 5Y_A + 4 = 0,$	$7X_A + 13Y_A + 4 = 0$
17	8	4	-16	13	$4X_A - 3Y_A - 20 = 0,$	$8X_A - 11Y_A - 20 = 0$
18	23	12	-27	39	$4X_A - 5Y_A - 32 = 0,$	$8X_A - 14Y_A - 16 = 0$
19	-23	11	27	64	$5X_A + 3Y_A + 82 = 0,$	$8X_A + 13Y_A + 41 = 0$
20	-25	13	29	40	$3X_A + 5Y_A + 10 = 0,$	$8X_A + 15Y_A + 5 = 0$
21	-23	-12	27	61	$-4X_A + 5Y_A - 32 = 0,$	$-8X_A + 14Y_A - 16 = 0$
22	0	-4	8	70	$-4X_A + 3Y_A + 12 = 0,$	$-8X_A + 3Y_A + 12 = 0$
23	20	7	-24	14	$-3X_A - 4Y_A + 88 = 0,$	$2X_A - 12Y_A + 44 = 0$
24	-9	-3	17	75	$5X_A + 3Y_A + 54 = 0,$	$2X_A + 12Y_A + 54 = 0$
25	-8	3	16	41	$-4X_A + 5Y_A - 47 = 0,$	$X_A + 13Y_A - 47 = 0$
26	-9	-3	21	46	$-5X_A + 4Y_A - 33 = 0,$	$-8X_A + 13Y_A - 33 = 0$
27	10	5	-14	17	$-3X_A - 4Y_A + 50 = 0,$	$X_A - 7Y_A + 25 = 0$
28	7	-2	-15	83	$4X_A - 5Y_A - 38 = 0,$	$X_A - 6Y_A - 19 = 0$
29	-9	-4	17	58	$8X_A + 3Y_A + 84 = 0,$	$4X_A + 12Y_A + 84 = 0$
30	0	5	12	48	$-10X_A + 4Y_A - 20 = 0,$	$-5X_A + 4Y_A - 20 = 0$

S-36 файл о36s16A