

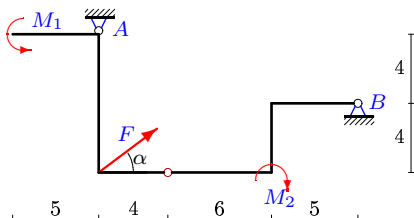
## Тяжелая составная рама из двух частей

Плоская рама, состоящая из двух шарнирно соединенных частей, расположена в вертикальной плоскости. Задан погонный вес  $\rho$  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.**

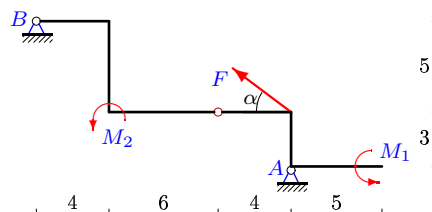
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$F = 10$  кН,  $M_1 = 159.5$  кНм,  $M_2 = 337.5$  кНм,  
 $\rho = 1$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.2.**

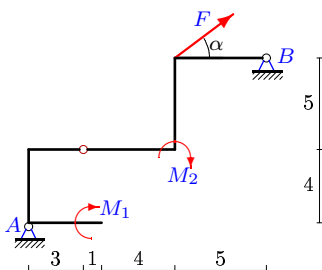
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$F = 15$  кН,  $M_1 = 89$  кНм,  $M_2 = 340$  кНм,  
 $\rho = 2$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.3.**

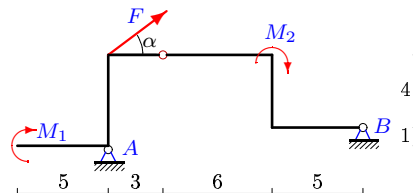
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$F = 10$  кН,  $M_1 = 66$  кНм,  $M_2 = 340$  кНм,  
 $\rho = 2$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.4.**

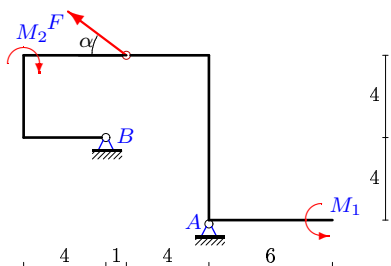
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$F = 10$  кН,  $M_1 = 210$  кНм,  $M_2 = 282$  кНм,  
 $\rho = 2$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.5.**

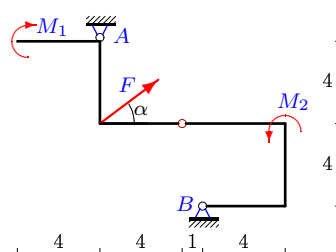
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$F = 10$  кН,  $M_1 = 294$  кНм,  $M_2 = 102.5$  кНм,  
 $\rho = 3$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.6.**

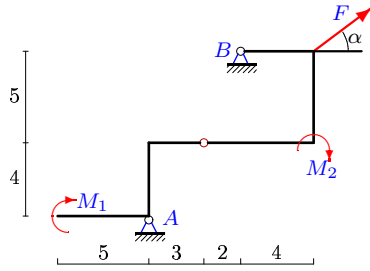
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$F = 10$  кН,  $M_1 = 48$  кНм,  $M_2 = 69.5$  кНм,  
 $\rho = 1$  кН/м,  $\cos \alpha = 0,8$ .

Задача S-36.7.

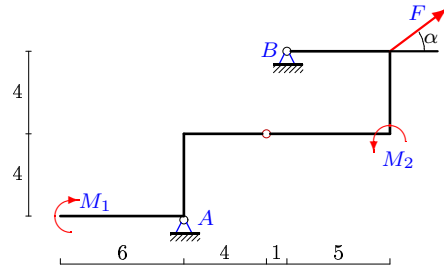
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$F = 10 \text{ кН}$ ,  $M_1 = 118 \text{ кНМ}$ ,  $M_2 = 1 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.8.

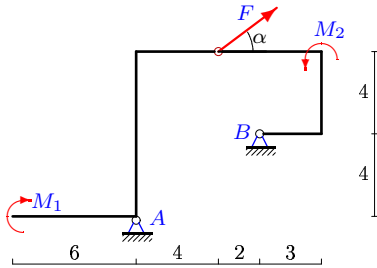
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$F = 15 \text{ кН}$ ,  $M_1 = 108 \text{ кНМ}$ ,  $M_2 = 4 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.9.

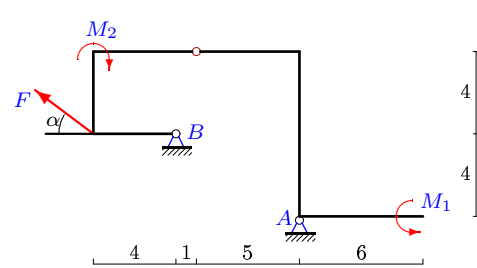
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$F = 5 \text{ кН}$ ,  $M_1 = 228 \text{ кНМ}$ ,  $M_2 = 20 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.10.

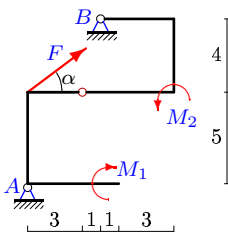
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$F = 5 \text{ кН}$ ,  $M_1 = 229 \text{ кНМ}$ ,  $M_2 = 13 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.11.

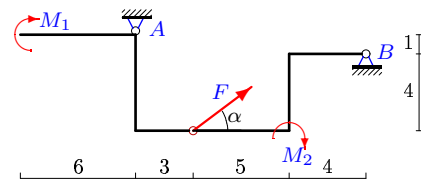
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$F = 10 \text{ кН}$ ,  $M_1 = 19 \text{ кНМ}$ ,  $M_2 = 11 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.12.

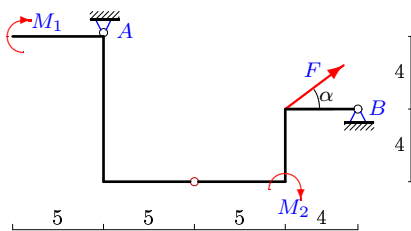
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$F = 15 \text{ кН}$ ,  $M_1 = 52,5 \text{ кНМ}$ ,  $M_2 = 571,5 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.13.

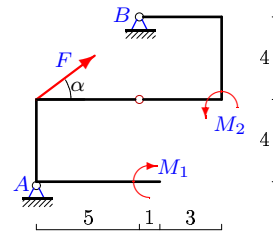
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$F = 15 \text{ кН}$ ,  $M_1 = 88 \text{ кНМ}$ ,  $M_2 = 401 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.14.

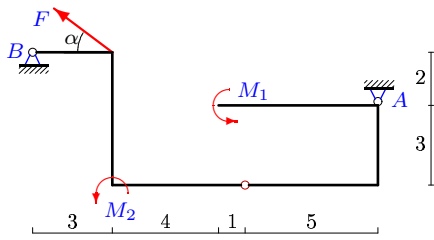
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$F = 10 \text{ кН}$ ,  $M_1 = 83,5 \text{ кНМ}$ ,  $M_2 = 64 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.15.

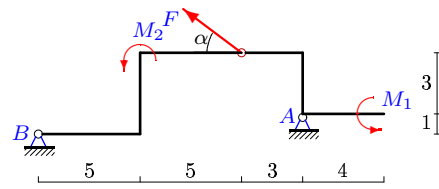
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$F = 10 \text{ кН}$ ,  $M_1 = 30 \text{ кНМ}$ ,  $M_2 = 300 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.16.

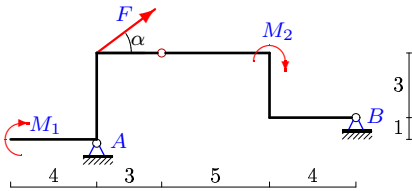
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$F = 10 \text{ кН}$ ,  $M_1 = 117,5 \text{ кНМ}$ ,  $M_2 = 36 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.17.

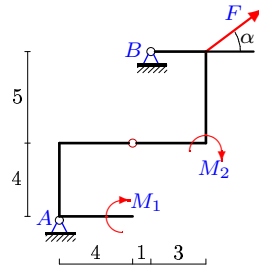
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$F = 15 \text{ кН}$ ,  $M_1 = 136 \text{ кНМ}$ ,  $M_2 = 141 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.18.

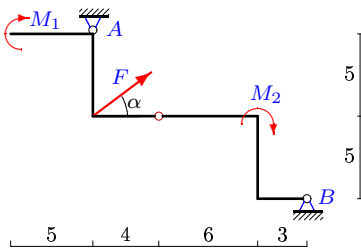
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$F = 15 \text{ кН}$ ,  $M_1 = 16 \text{ кНМ}$ ,  $M_2 = 15,5 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.19.

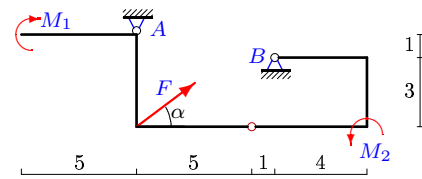
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$F = 5 \text{ кН}$ ,  $M_1 = 59 \text{ кНМ}$ ,  $M_2 = 341 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.20.

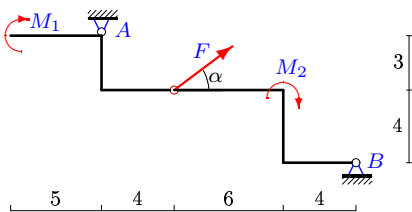
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$F = 10 \text{ кН}$ ,  $M_1 = 142 \text{ кНМ}$ ,  $M_2 = 3,5 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.21.

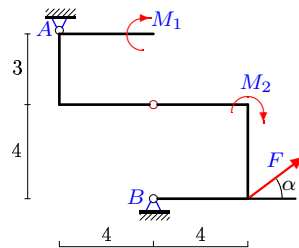
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$F = 15 \text{ кН}$ ,  $M_1 = 24,5 \text{ кНМ}$ ,  $M_2 = 62 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.22.

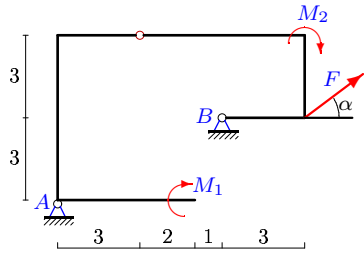
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$F = 15 \text{ кН}$ ,  $M_1 = 44 \text{ кНМ}$ ,  $M_2 = 4 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.23.**

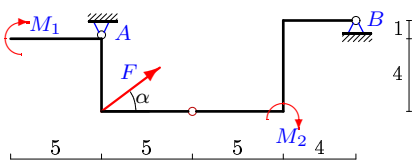
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$F = 10 \text{ кН}$ ,  $M_1 = 79 \text{ кНм}$ ,  $M_2 = 19.5 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.25.**

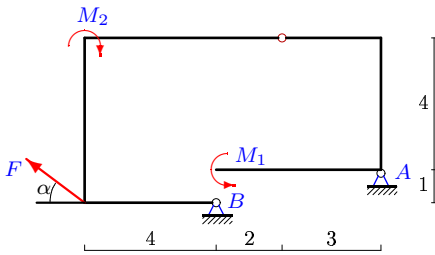
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$F = 15 \text{ кН}$ ,  $M_1 = 34 \text{ кНм}$ ,  $M_2 = 352 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.27.**

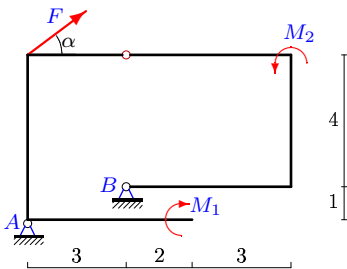
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$F = 15 \text{ кН}$ ,  $M_1 = 84 \text{ кНм}$ ,  $M_2 = 7 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.29.**

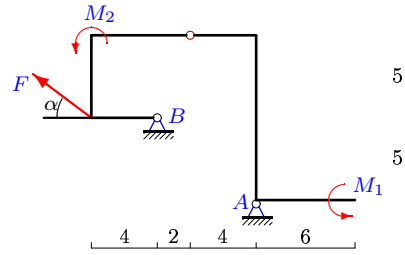
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$F = 5 \text{ кН}$ ,  $M_1 = 69 \text{ кНм}$ ,  $M_2 = 151 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.24.**

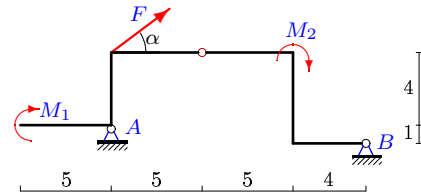
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$F = 15 \text{ кН}$ ,  $M_1 = 350 \text{ кНм}$ ,  $M_2 = 14 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.26.**

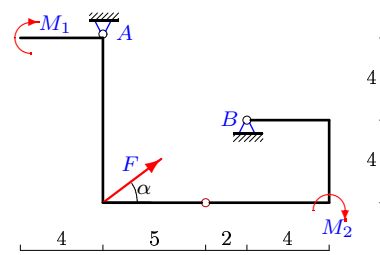
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$F = 10 \text{ кН}$ ,  $M_1 = 162 \text{ кНм}$ ,  $M_2 = 31.5 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.28.**

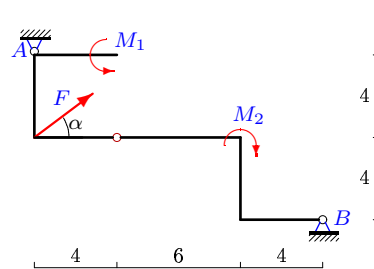
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$F = 15 \text{ кН}$ ,  $M_1 = 44 \text{ кНм}$ ,  $M_2 = 74 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.30.**

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$F = 10 \text{ кН}$ ,  $M_1 = 8 \text{ кНм}$ ,  $M_2 = 304 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

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	26	0	-34	26	$-8X_A - 4Y_A + 208 = 0,$	$-4X_A - 15Y_A + 104 = 0$
2	-24	13	36	32	$3X_A + 4Y_A + 20 = 0,$	$8X_A + 14Y_A + 10 = 0$
3	10	5	-18	41	$4X_A - 3Y_A - 25 = 0,$	$9X_A - 13Y_A - 25 = 0$
4	25	-3	-33	53	$5X_A - 3Y_A - 134 = 0,$	$X_A - 14Y_A - 67 = 0$
5	-6	0	14	87	$8X_A + 4Y_A + 48 = 0,$	$4X_A + 5Y_A + 24 = 0$
6	6	-12	-14	31	$-4X_A - 4Y_A - 24 = 0,$	$-8X_A - 5Y_A - 12 = 0$
7	7	14	-15	61	$4X_A - 3Y_A + 14 = 0,$	$9X_A - 5Y_A + 7 = 0$
8	6	12	-18	37	$4X_A - 4Y_A + 24 = 0,$	$8X_A - 5Y_A + 12 = 0$
9	8	0	-12	57	$8X_A - 4Y_A - 64 = 0,$	$4X_A - 6Y_A - 32 = 0$
10	-1	-4	5	65	$8X_A + 5Y_A + 28 = 0,$	$4X_A + 6Y_A + 28 = 0$
11	1	4	-9	42	$5X_A - 3Y_A + 7 = 0,$	$9X_A - 4Y_A + 7 = 0$
12	21	3	-33	69	$-5X_A - 3Y_A + 114 = 0,$	$X_A - 12Y_A + 57 = 0$
13	9	4	-21	49	$-8X_A - 5Y_A + 92 = 0,$	$-4X_A - 14Y_A + 92 = 0$
14	0	4	-8	71	$4X_A - 5Y_A + 20 = 0,$	$8X_A - 5Y_A + 20 = 0$
15	-8	5	16	43	$-3X_A + 5Y_A - 49 = 0,$	$2X_A + 13Y_A - 49 = 0$
16	-23	-5	31	23	$3X_A + 3Y_A + 84 = 0,$	$X_A + 13Y_A + 42 = 0$
17	21	-2	-33	39	$4X_A - 3Y_A - 90 = 0,$	$X_A - 12Y_A - 45 = 0$
18	1	5	-13	10	$4X_A - 4Y_A + 16 = 0,$	$9X_A - 5Y_A + 16 = 0$
19	22	-15	-26	68	$-5X_A - 4Y_A + 50 = 0,$	$-10X_A - 13Y_A + 25 = 0$
20	7	2	-15	70	$-4X_A - 5Y_A + 38 = 0,$	$X_A - 6Y_A + 19 = 0$
21	24	-11	-36	28	$-3X_A - 4Y_A + 28 = 0,$	$-7X_A - 14Y_A + 14 = 0$
22	0	-4	-12	18	$-3X_A - 4Y_A - 16 = 0,$	$-7X_A - 4Y_A - 16 = 0$
23	9	0	-17	20	$6X_A - 3Y_A - 54 = 0,$	$3X_A - 6Y_A - 27 = 0$
24	-8	0	20	96	$10X_A + 4Y_A + 80 = 0,$	$5X_A + 6Y_A + 40 = 0$
25	9	5	-21	42	$-4X_A - 5Y_A + 61 = 0,$	$X_A - 14Y_A + 61 = 0$
26	23	-6	-31	28	$4X_A - 5Y_A - 122 = 0,$	$X_A - 14Y_A - 61 = 0$
27	-7	-6	19	51	$4X_A + 3Y_A + 46 = 0,$	$X_A + 5Y_A + 23 = 0$
28	9	0	-21	53	$-8X_A - 5Y_A + 72 = 0,$	$-4X_A - 7Y_A + 36 = 0$
29	0	-4	-4	82	$5X_A - 3Y_A - 12 = 0,$	$X_A - 3Y_A - 12 = 0$
30	24	-12	-32	58	$-4X_A - 4Y_A + 48 = 0,$	$-8X_A - 14Y_A + 24 = 0$

S-36 файл о36s15A