

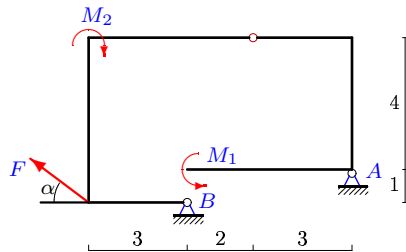
## Тяжелая составная рама из двух частей

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.**

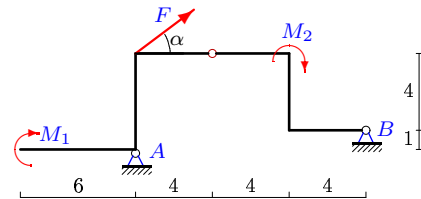
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$F = 10$  кН,  $M_1 = 84$  кНм,  $M_2 = 1$  кНм,  
 $\rho = 2$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.2.**

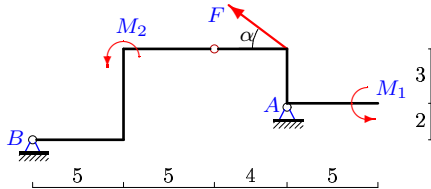
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$F = 15$  кН,  $M_1 = 230$  кНм,  $M_2 = 384$  кНм,  
 $\rho = 3$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.3.**

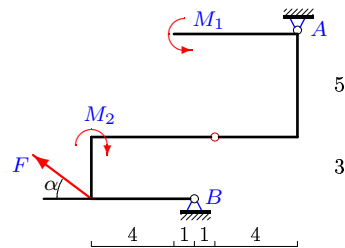
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$F = 5$  кН,  $M_1 = 143$  кНм,  $M_2 = 340$  кНм,  
 $\rho = 2$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.4.**

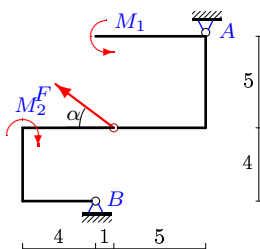
14



$F = 10$  кН,  $M_1 = 116$  кНм,  $M_2 = 50,5$  кНм,  
 $\rho = 3$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.5.**

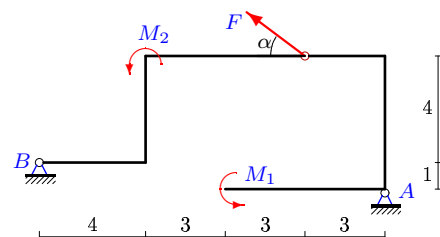
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$F = 10$  кН,  $M_1 = 178,5$  кНм,  $M_2 = 99,5$  кНм,  
 $\rho = 3$  кН/м,  $\cos \alpha = 0,8$ .

**Задача S-36.6.**

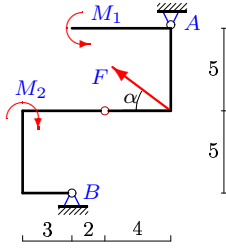
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$F = 10$  кН,  $M_1 = 182,5$  кНм,  $M_2 = 464$  кНм,  
 $\rho = 3$  кН/м,  $\cos \alpha = 0,8$ .

Задача S-36.7.

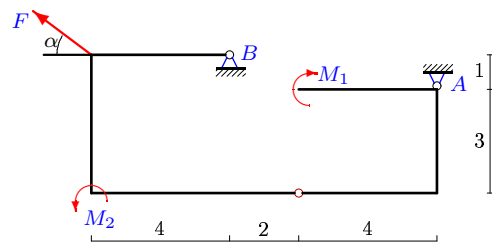
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$F = 15 \text{ кН}$ ,  $M_1 = 86 \text{ кНМ}$ ,  $M_2 = 64 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.8.

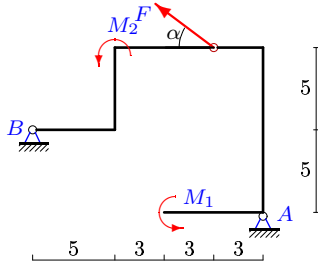
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$F = 10 \text{ кН}$ ,  $M_1 = 16 \text{ кНМ}$ ,  $M_2 = 38 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.9.

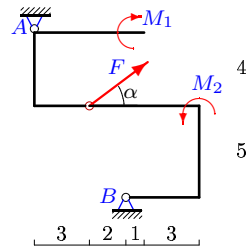
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$F = 10 \text{ кН}$ ,  $M_1 = 353,5 \text{ кНМ}$ ,  $M_2 = 652,5 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.10.

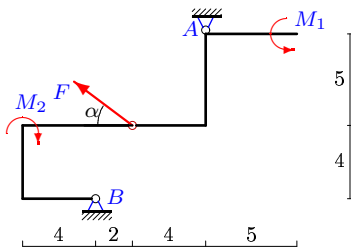
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$F = 5 \text{ кН}$ ,  $M_1 = 47 \text{ кНМ}$ ,  $M_2 = 49 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.11.

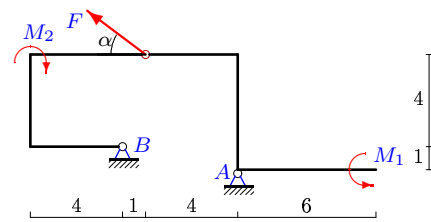
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$F = 10 \text{ кН}$ ,  $M_1 = 193,5 \text{ кНМ}$ ,  $M_2 = 56 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.12.

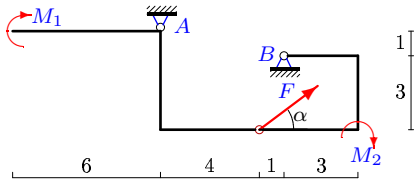
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$F = 15 \text{ кН}$ ,  $M_1 = 252 \text{ кНМ}$ ,  $M_2 = 127,5 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.13.

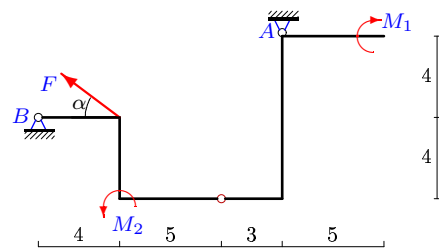
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$F = 5 \text{ кН}$ ,  $M_1 = 116 \text{ кНМ}$ ,  $M_2 = 2 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.14.

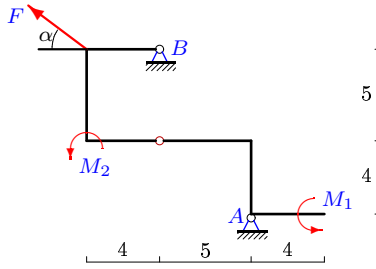
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$F = 5 \text{ кН}$ ,  $M_1 = 56 \text{ кНМ}$ ,  $M_2 = 473 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.15.**

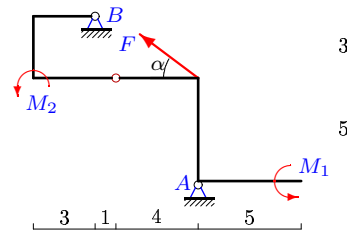
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$F = 15 \text{ кН}$ ,  $M_1 = 35.5 \text{ кНм}$ ,  $M_2 = 0 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.16.**

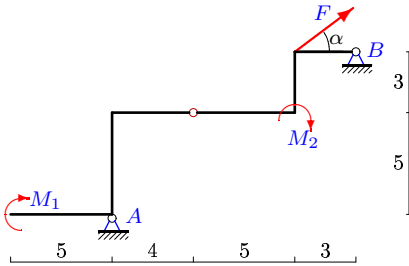
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$F = 5 \text{ кН}$ ,  $M_1 = 102 \text{ кНм}$ ,  $M_2 = 2 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.17.**

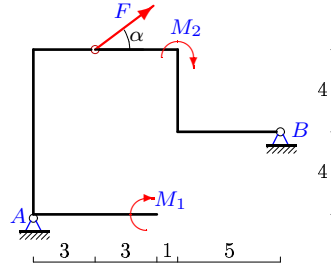
14



$F = 15 \text{ кН}$ ,  $M_1 = 149 \text{ кНм}$ ,  $M_2 = 279 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.18.**

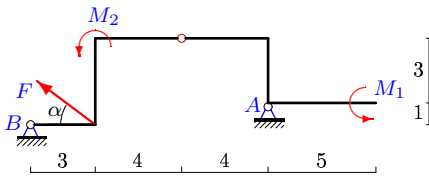
14



$F = 15 \text{ кН}$ ,  $M_1 = 169.5 \text{ кНм}$ ,  $M_2 = 511.5 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.19.**

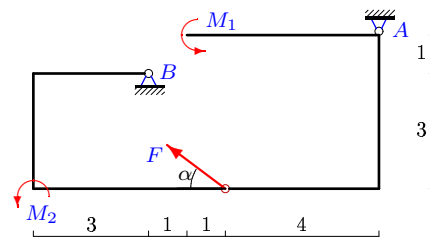
14



$F = 5 \text{ кН}$ ,  $M_1 = 142 \text{ кНм}$ ,  $M_2 = 232 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.20.**

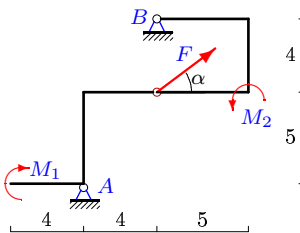
14



$F = 15 \text{ кН}$ ,  $M_1 = 54.5 \text{ кНм}$ ,  $M_2 = 68 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.21.**

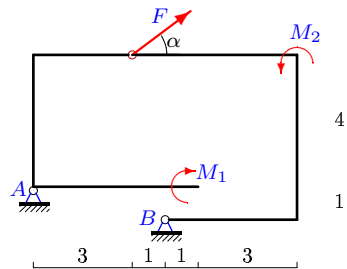
14



$F = 5 \text{ кН}$ ,  $M_1 = 72 \text{ кНм}$ ,  $M_2 = 58 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача S-36.22.**

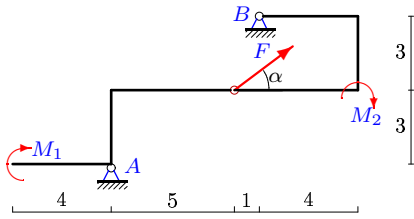
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$F = 5 \text{ кН}$ ,  $M_1 = 57 \text{ кНм}$ ,  $M_2 = 65.5 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.23.

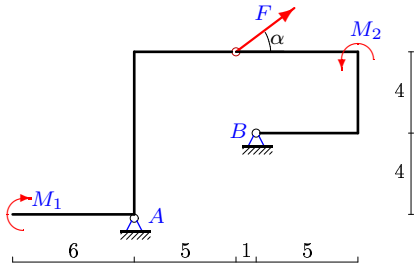
14



$F = 15 \text{ кН}$ ,  $M_1 = 43.5 \text{ кНм}$ ,  $M_2 = 11.5 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.25.

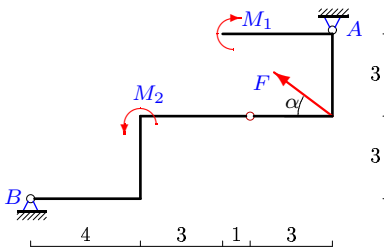
14



$F = 5 \text{ кН}$ ,  $M_1 = 357.5 \text{ кНм}$ ,  $M_2 = 123.5 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.27.

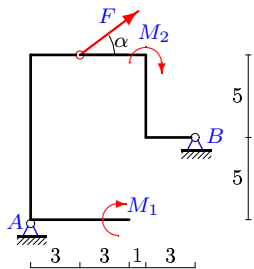
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$F = 5 \text{ кН}$ ,  $M_1 = 6.5 \text{ кНм}$ ,  $M_2 = 88 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.29.

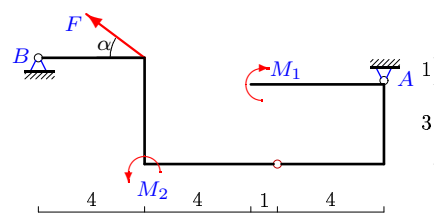
14



$F = 5 \text{ кН}$ ,  $M_1 = 188.5 \text{ кНм}$ ,  $M_2 = 476.5 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.24.

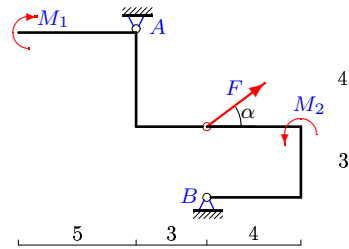
14



$F = 5 \text{ кН}$ ,  $M_1 = 31 \text{ кНм}$ ,  $M_2 = 360 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.26.

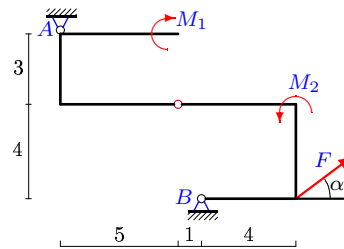
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$F = 15 \text{ кН}$ ,  $M_1 = 97 \text{ кНм}$ ,  $M_2 = 92 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.28.

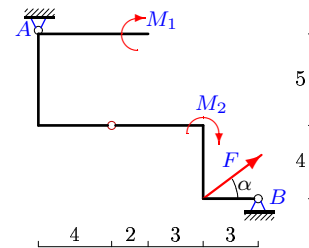
14



$F = 10 \text{ кН}$ ,  $M_1 = 74 \text{ кНм}$ ,  $M_2 = 11.5 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача S-36.30.

14



$F = 15 \text{ кН}$ ,  $M_1 = 78 \text{ кНм}$ ,  $M_2 = 465 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

S-36

Отвѣты.  
 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	-6	15	50	$4X_A + 3Y_A + 46 = 0,$	$X_A + 5Y_A + 23 = 0$
2	8	-4	-20	76	$5X_A - 4Y_A - 56 = 0,$	$X_A - 12Y_A - 56 = 0$
3	-10	-5	14	56	$3X_A + 4Y_A + 50 = 0,$	$-2X_A + 14Y_A + 50 = 0$
4	-6	-11	14	92	$-5X_A + 4Y_A + 14 = 0,$	$-8X_A + 5Y_A + 7 = 0$
5	-7	-13	15	94	$-5X_A + 5Y_A + 30 = 0,$	$-9X_A + 6Y_A + 15 = 0$
6	-23	-3	31	81	$5X_A + 3Y_A + 124 = 0,$	$X_A + 13Y_A + 62 = 0$
7	-8	-15	20	90	$-5X_A + 4Y_A + 20 = 0,$	$-10X_A + 6Y_A + 10 = 0$
8	-8	5	16	14	$-3X_A + 4Y_A - 44 = 0,$	$X_A + 6Y_A - 22 = 0$
9	-25	0	33	99	$10X_A + 3Y_A + 250 = 0,$	$5X_A + 14Y_A + 125 = 0$
10	7	-14	-11	67	$-4X_A - 3Y_A - 14 = 0,$	$-9X_A - 5Y_A - 7 = 0$
11	-8	-13	16	91	$-5X_A + 4Y_A + 12 = 0,$	$-9X_A + 6Y_A + 6 = 0$
12	-6	-3	18	78	$5X_A + 4Y_A + 42 = 0,$	$X_A + 5Y_A + 21 = 0$
13	1	3	-5	42	$-4X_A - 4Y_A + 16 = 0,$	$X_A - 5Y_A + 16 = 0$
14	-21	0	25	55	$-8X_A + 3Y_A - 168 = 0,$	$-4X_A + 12Y_A - 84 = 0$
15	0	5	12	12	$4X_A + 5Y_A - 25 = 0,$	$9X_A + 5Y_A - 25 = 0$
16	-1	3	5	42	$5X_A + 4Y_A - 7 = 0,$	$8X_A + 5Y_A - 7 = 0$
17	8	3	-20	38	$5X_A - 4Y_A - 28 = 0,$	$8X_A - 12Y_A - 28 = 0$
18	9	-4	-21	85	$8X_A - 3Y_A - 84 = 0,$	$4X_A - 12Y_A - 84 = 0$
19	-7	-4	11	47	$3X_A + 4Y_A + 37 = 0,$	$X_A + 11Y_A + 37 = 0$
20	-8	2	20	61	$-4X_A + 4Y_A - 40 = 0,$	$X_A + 6Y_A - 20 = 0$
21	4	13	-8	38	$5X_A - 4Y_A + 32 = 0,$	$9X_A - 4Y_A + 16 = 0$
22	5	-6	-9	29	$4X_A - 3Y_A - 38 = 0,$	$X_A - 4Y_A - 19 = 0$
23	1	3	-13	12	$3X_A - 5Y_A + 12 = 0,$	$6X_A - 6Y_A + 12 = 0$
24	-22	5	26	42	$-3X_A + 4Y_A - 86 = 0,$	$X_A + 13Y_A - 43 = 0$
25	7	0	-11	99	$8X_A - 5Y_A - 56 = 0,$	$4X_A - 6Y_A - 28 = 0$
26	0	-3	-12	40	$-4X_A - 3Y_A - 9 = 0,$	$-7X_A - 3Y_A - 9 = 0$
27	-8	-3	12	21	$-3X_A + 3Y_A - 15 = 0,$	$-6X_A + 11Y_A - 15 = 0$
28	7	-11	-15	31	$-3X_A - 5Y_A - 34 = 0,$	$-7X_A - 6Y_A - 17 = 0$
29	7	-5	-11	95	$10X_A - 3Y_A - 85 = 0,$	$5X_A - 10Y_A - 85 = 0$
30	8	-4	-20	76	$-5X_A - 4Y_A + 24 = 0,$	$-9X_A - 12Y_A + 24 = 0$

S-36 файл о36s14A