

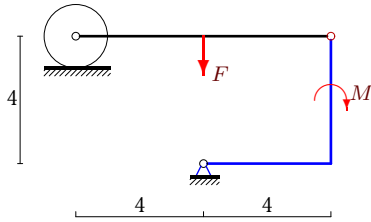
Трение качения

Механическая система состоит из невесомого уголка, невесомого стержня и цилиндра весом P радиусом R . Стержень, ось цилиндра и уголок соединены шарнирно. Цилиндр может кататься без проскальзывания с трением качения δ . В каких пределах меняется момент M при условии равновесия системы?

Кирсанов М.Н. **Решбник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.80.)

Задача S-18.1.

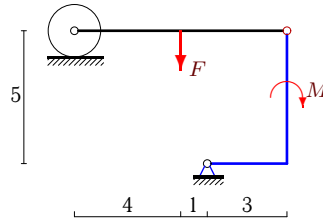
6



$$P = 5 \text{ Н}, F = 40 \text{ Н}, R = 1 \text{ м}, \delta = 1 \text{ см}$$

Задача S-18.2.

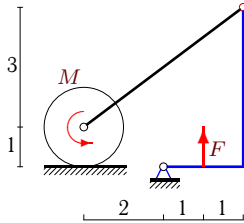
6



$$P = 1 \text{ Н}, F = 18 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.3.

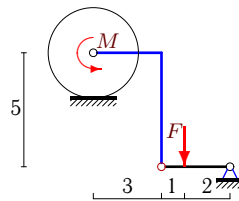
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$$P = 1000 \text{ Н}, F = 500 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.4.

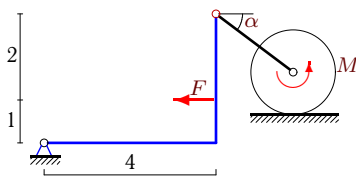
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$$P = 80 \text{ Н}, F = 30 \text{ Н}, R = 2 \text{ м}, \delta = 1 \text{ см}$$

Задача S-18.5.

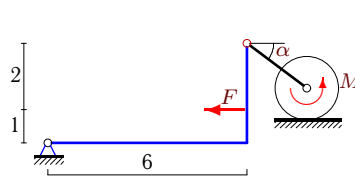
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$$P = 203 \text{ Н}, F = 24 \text{ Н}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,8.$$

Задача S-18.6.

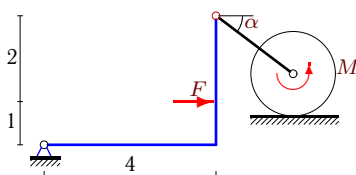
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$$P = 203 \text{ Н}, F = 30 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$$

Задача S-18.7.

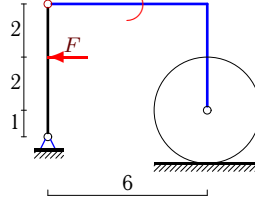
6



$$P = 97 \text{ Н}, F = 24 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$$

Задача S-18.8.

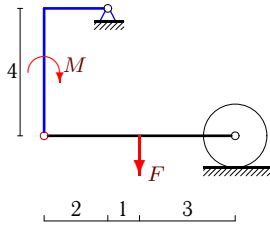
6



$$P = 612 \text{ Н}, F = 10 \text{ Н}, R = 2 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.9.

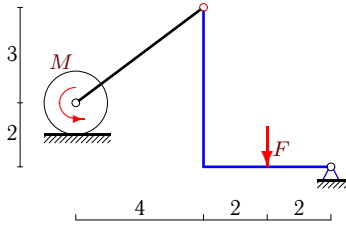
6



$P = 25 \text{ H}, F = 50 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.11.

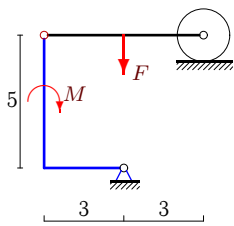
6



$P = 320 \text{ H}, F = 160 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.13.

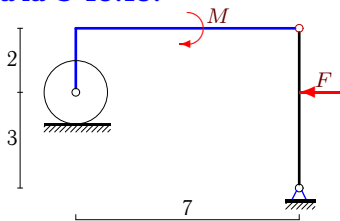
6



$P = 10 \text{ H}, F = 20 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.15.

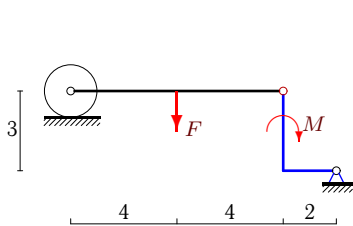
6



$P = 308 \text{ H}, F = 5 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.17.

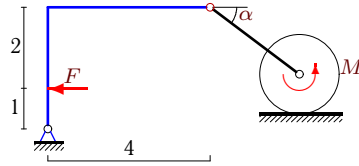
6



$P = 30 \text{ H}, F = 140 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.10.

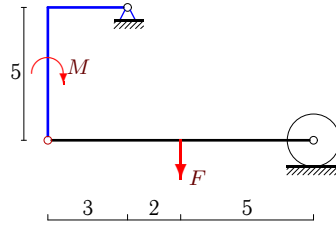
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$P = 103 \text{ H}, F = 24 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.12.

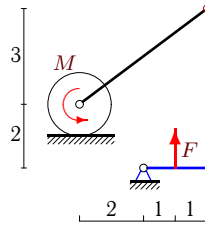
6



$P = 10 \text{ H}, F = 20 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.14.

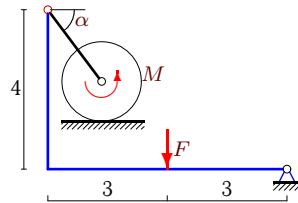
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$P = F = 700 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.16.

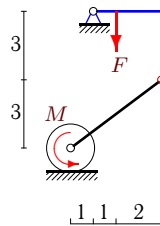
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$P = 188 \text{ H}, F = 12 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.18.

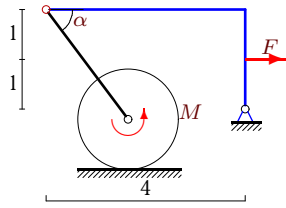
6



$P = 420 \text{ H}, F = 210 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.19.

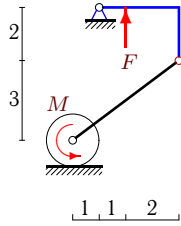
6



$P = 104 \text{ H}, F = 10 \text{ H}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.21.

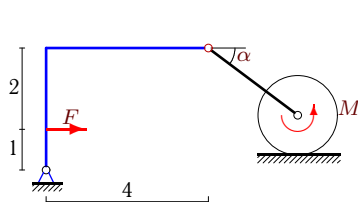
6



$P = F = 425 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.23.

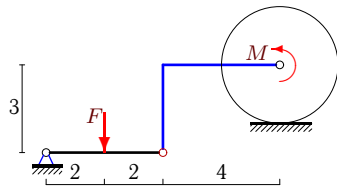
6



$P = 97 \text{ H}, F = 24 \text{ H}, R = 1 \text{ м},$
 $\delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.25.

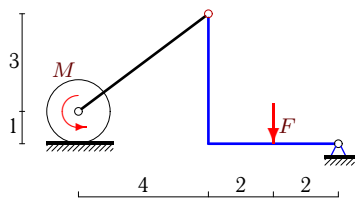
6



$P = 44 \text{ H}, F = 12 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.27.

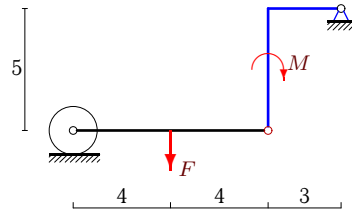
6



$P = 1400 \text{ H}, F = 700 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.20.

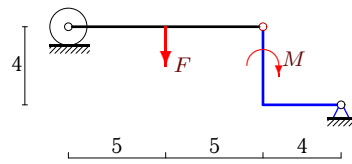
6



$P = 8 \text{ H}, F = 24 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.22.

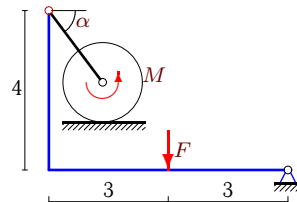
6



$P = 5 \text{ H}, F = 40 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.24.

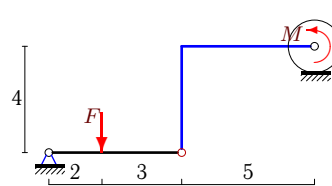
6



$P = 88 \text{ H}, F = 12 \text{ H}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.26.

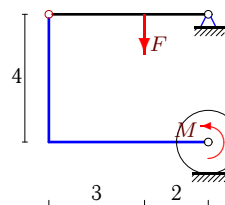
6



$P = 92 \text{ H}, F = 20 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.28.

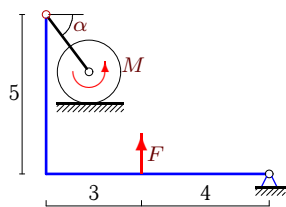
6



$P = 23 \text{ H}, F = 5 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.29.

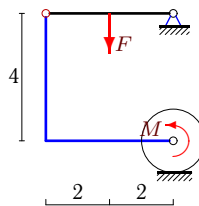
6



$P = 216 \text{ Н}, F = 13 \text{ Н}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.30.

6



$P = 46 \text{ Н}, F = 8 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$

S-18 Ответы.
Трение качения

05.05.2013

№	M_{min}	M_{max}
1	-79	-81
2	-26	-28
3	-223	-177
4	23	25
5	-6	-2
6	-8	0
7	2	6
8	$-\infty$	48
9	48	52
10	-6	-2
11	-47	-33
12	29	31
13	31	29
14	-217	-183
15	$-\infty$	62
16	7	11
17	143	137
18	-49	-31
19	-4	-2
20	35	37
21	93	107
22	82	78
23	2	6
24	8	10
25	-17	-15
26	-11	-9
27	-231	-169
28	2	3
29	-14	-10
30	3	5