

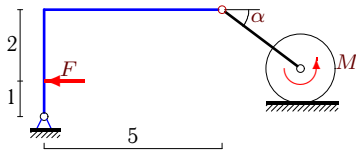
Трение качения

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.

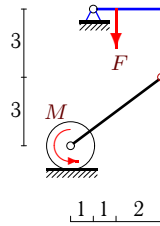
11



$P = 103 \text{ Н}, F = 27 \text{ Н}, R = 1 \text{ м},$
 $\delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.2.

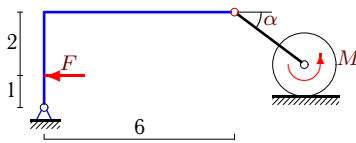
11



$P = F = 525 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.3.

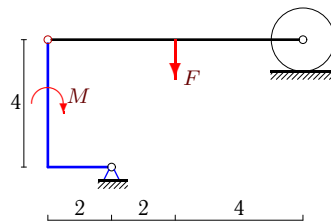
11



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

Задача S-18.4.

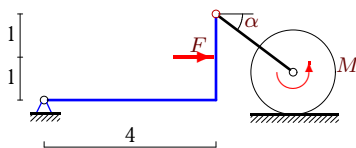
11



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

Задача S-18.5.

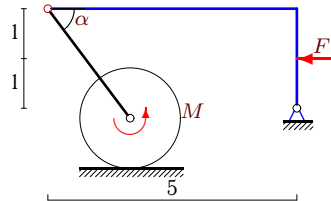
11



$P = 97 \text{ Н}, F = 20 \text{ Н}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.6.

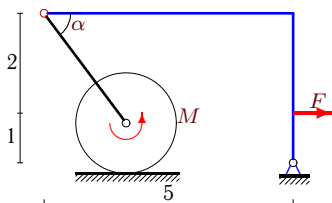
11



$P = 196 \text{ Н}, F = 14 \text{ Н}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.7.

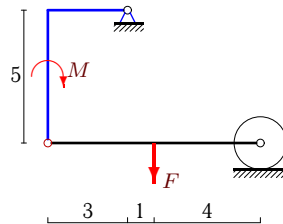
11



$P = 104 \text{ Н}, F = 11 \text{ Н}, R = 1 \text{ м},$
 $\delta = 2 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.8.

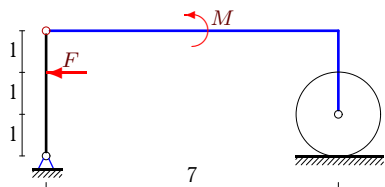
11



$P = 4 \text{ Н}, F = 32 \text{ Н}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.9.

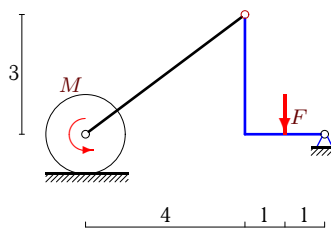
11



$P = 210 \text{ H}, F = 3 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.10.

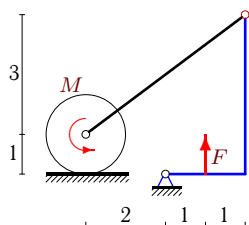
11



$P = F = 900 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.11.

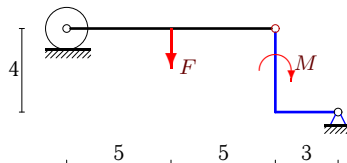
11



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

Задача S-18.12.

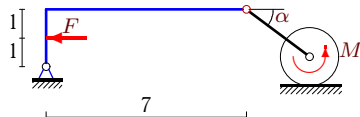
11



$P = 25 \text{ H}, F = 50 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.13.

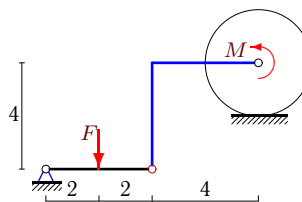
11



$P = 203 \text{ H}, F = 29 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.14.

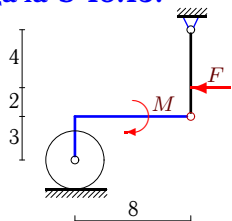
11



$P = 84 \text{ H}, F = 32 \text{ H}, R = 2 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.15.

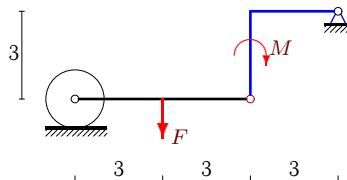
11



$P = 811 \text{ H}, F = 12 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.16.

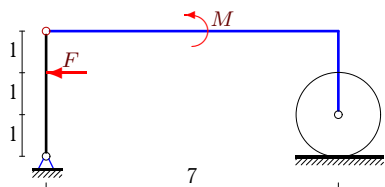
11



$P = 40 \text{ H}, F = 120 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.17.

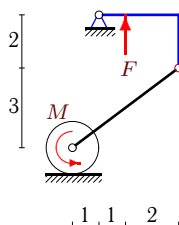
11



$P = 206 \text{ H}, F = 3 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.18.

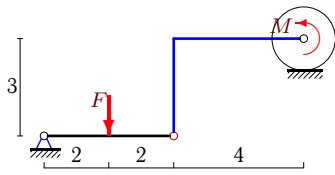
11



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

Задача S-18.19.

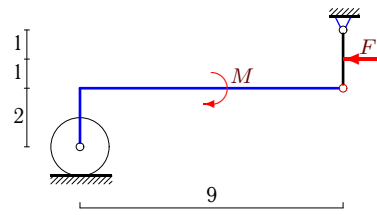
11



$P = 94 \text{ H}, F = 12 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.20.

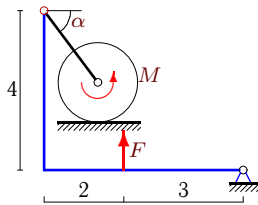
11



$P = 113 \text{ H}, F = 2 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.21.

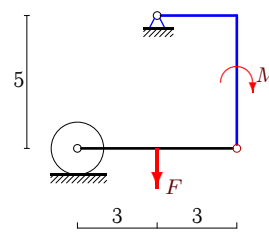
11



$P = 112 \text{ H}, F = 8 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.22.

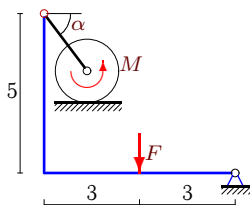
11



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

Задача S-18.23.

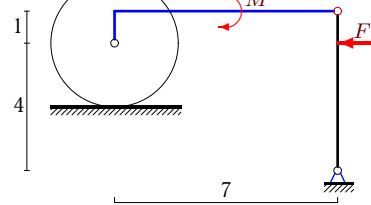
11



$P = 88 \text{ H}, F = 9 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.24.

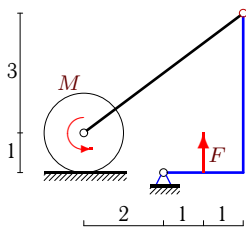
11



$P = 808 \text{ H}, F = 10 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.25.

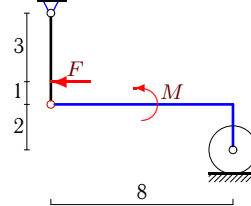
11



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

Задача S-18.26.

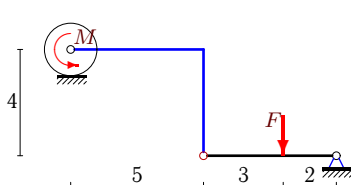
11



$P = 309 \text{ H}, F = 4 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.27.

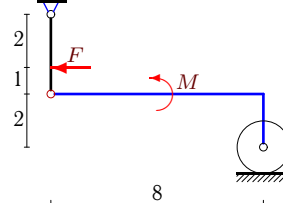
11



$P = 84 \text{ H}, F = 40 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.28.

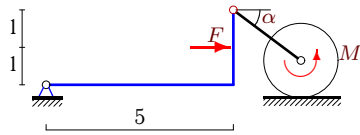
11



$P = 207 \text{ H}, F = 3 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.29.

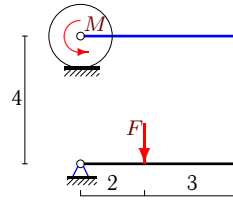
11



$P = 97 \text{ Н}, F = 23 \text{ Н}, R = 1 \text{ м},$
 $\delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.30.

11



$P = 42 \text{ Н}, F = 20 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$

S-18 Ответы.
Трение качения

05.05.2013

№	M_{min}	M_{max}
1	-6	-2
2	-112	-88
3	-6	-2
4	41	39
5	3	5
6	1	5
7	-5	-1
8	47	49
9	$-\infty$	66
10	-221	-179
11	-213	-187
12	79	71
13	-8	0
14	-33	-31
15	$-\infty$	112
16	177	183
17	$-\infty$	38
18	93	107
19	-9	-7
20	$-\infty$	119
21	-11	-7
22	-31	-29
23	8	10
24	$-\infty$	64
25	-223	-177
26	$-\infty$	66
27	19	21
28	$-\infty$	52
29	2	6
30	9	11