

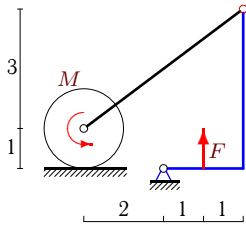
Трение качения

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

Задача S-18.1.

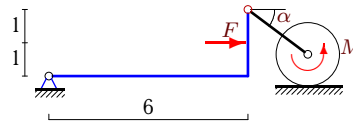
4



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

Задача S-18.2.

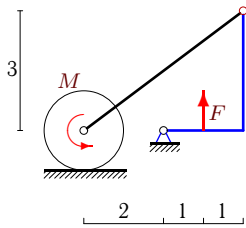
4



$$P = 197 \text{ Н}, F = 26 \text{ Н}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,8.$$

Задача S-18.3.

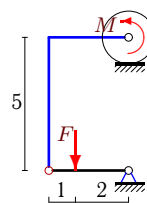
4



$$P = 120 \text{ Н}, F = 60 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.4.

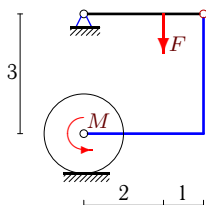
4



$$P = 40 \text{ Н}, F = 15 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.5.

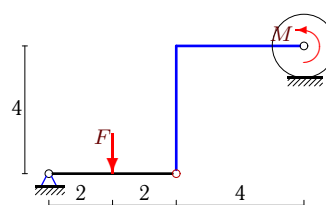
4



$$P = 94 \text{ Н}, F = 9 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}$$

Задача S-18.6.

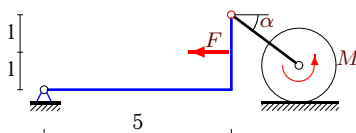
4



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

Задача S-18.7.

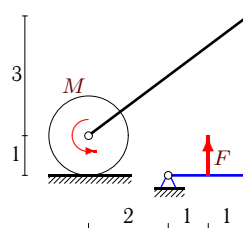
4



$$P = 103 \text{ Н}, F = 23 \text{ Н}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$$

Задача S-18.8.

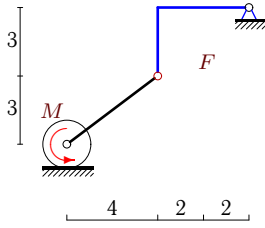
4



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

Задача S-18.9.

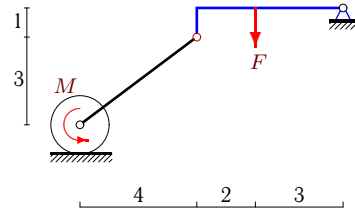
4



$P = F = 0 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.10.

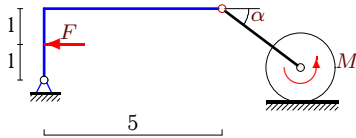
4



$P = F = 55 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.11.

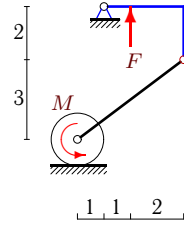
4



$P = 103 \text{ H}, F = 23 \text{ H}, R = 1 \text{ м},$
 $\delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.12.

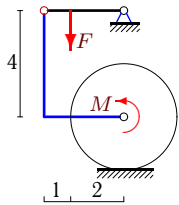
4



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

Задача S-18.13.

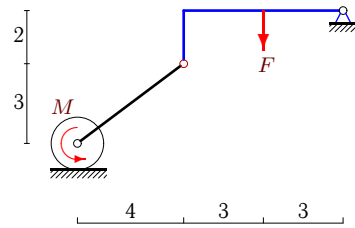
4



$P = 46 \text{ H}, F = 6 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.14.

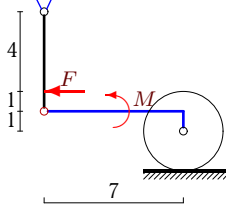
4



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

Задача S-18.15.

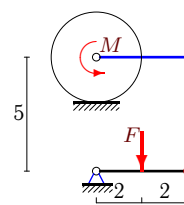
4



$P = 813 \text{ H}, F = 10 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.16.

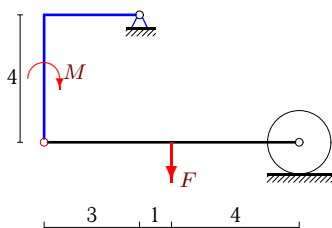
4



$P = 80 \text{ H}, F = 40 \text{ H}, R = 2 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.17.

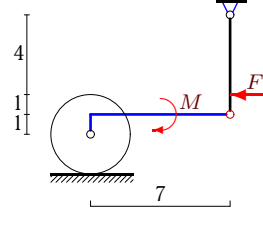
4



$P = 10 \text{ H}, F = 30 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.18.

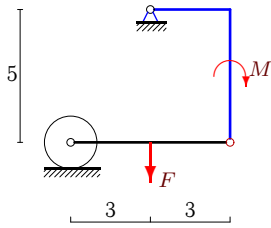
4



$P = 809 \text{ H}, F = 10 \text{ H}, R = 2 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.19.

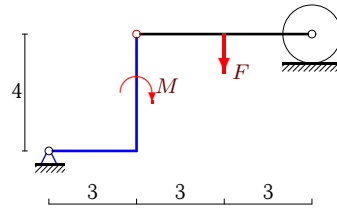
4



$P = 5 \text{ H}, F = 10 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.20.

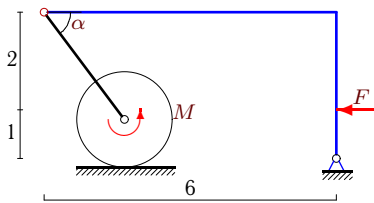
4



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

Задача S-18.21.

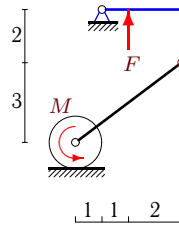
4



$P = 96 \text{ H}, F = 15 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,6.$

Задача S-18.22.

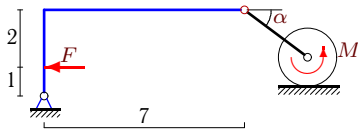
4



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

Задача S-18.23.

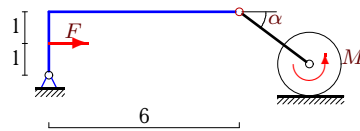
4



$P = 103 \text{ H}, F = 33 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.24.

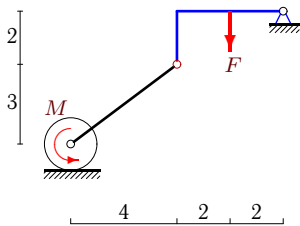
4



$P = 97 \text{ H}, F = 26 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.25.

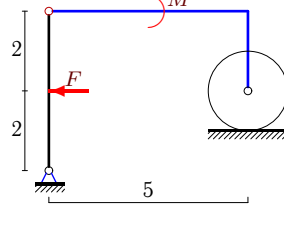
4



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

Задача S-18.26.

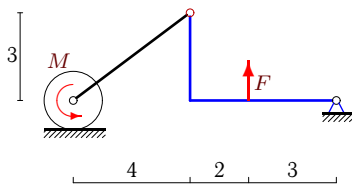
4



$P = 206 \text{ H}, F = 4 \text{ H}, R = 1 \text{ м}, \delta = 1 \text{ см}$

Задача S-18.27.

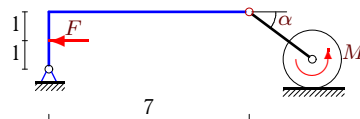
4



$P = F = 225 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}$

Задача S-18.28.

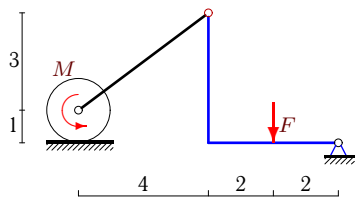
4



$P = 103 \text{ H}, F = 29 \text{ H}, R = 1 \text{ м}, \delta = 2 \text{ см}, \cos \alpha = 0,8.$

Задача S-18.29.

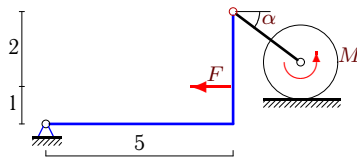
4



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

Задача S-18.30.

4



$P = 203 \text{ Н}, F = 27 \text{ Н}, R = 1 \text{ м},$
 $\delta = 1 \text{ см}, \cos \alpha = 0,8.$

S-18 Ответы.
Трение качения

05.05.2013

№	M_{min}	M_{max}
1	-213	-187
2	2	6
3	-43	-37
4	-7	-5
5	-8	-4
6	-5	-3
7	-6	-2
8	-223	-177
9	-203	-197
10	-62	-58
11	-6	-2
12	93	107
13	5	7
14	-619	-581
15	$-\infty$	83
16	31	33
17	43	47
18	$-\infty$	71
19	-16	-14
20	-59	-61
21	1	5
22	93	107
23	-5	-3
24	3	5
25	-41	-39
26	$-\infty$	26
27	97	103
28	-6	-2
29	-217	-183
30	-6	-2