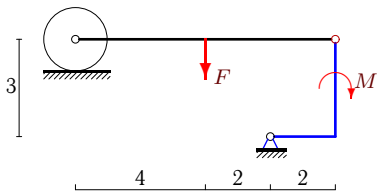
Трение качения

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

Задача S-18.1.

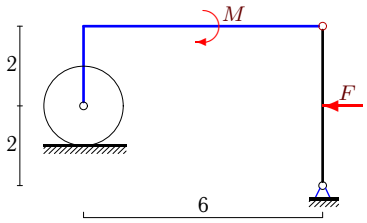
10



$P = 10$ Н, $F = 180$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.2.

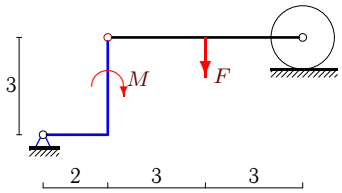
10



$P = 204$ Н, $F = 4$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.3.

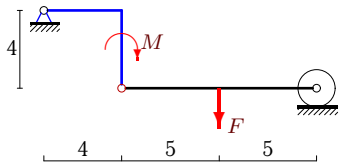
10



$P = 10$ Н, $F = 80$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.4.

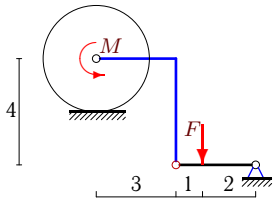
10



$P = 15$ Н, $F = 70$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.5.

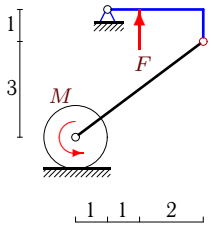
10



$P = 42$ Н, $F = 12$ Н, $R = 2$ м, $\delta = 2$ см

Задача S-18.6.

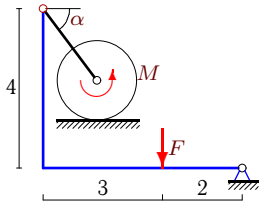
10



$P = F = 65$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.7.

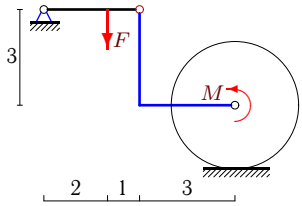
10



$P = 192$ Н, $F = 8$ Н, $R = 1$ м,
$\delta = 2$ см, $\cos\alpha = 0{,}6$.

Задача S-18.8.

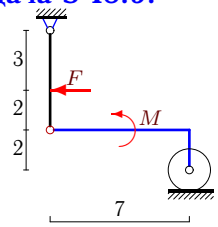
10



$P = 44$ Н, $F = 9$ Н, $R = 2$ м, $\delta = 2$ см

Задача S-18.9.

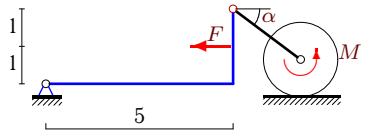
10



$P = 309$ Н, $F = 5$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.10.

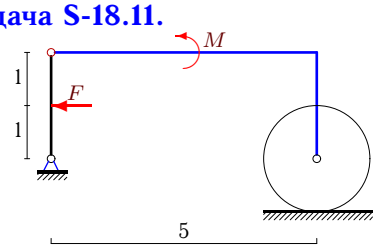
10



$P = 203$ Н, $F = 23$ Н, $R = 1$ м, $\delta = 1$ см, $\cos\alpha = 0{,}8$.

Задача S-18.11.

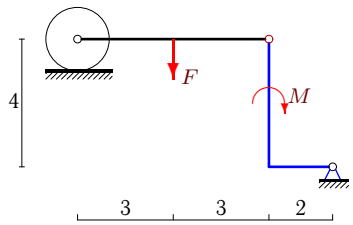
10



$P = 108$ Н, $F = 2$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.12.

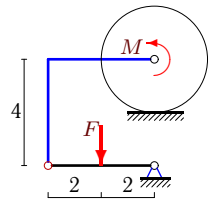
10



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

Задача S-18.13.

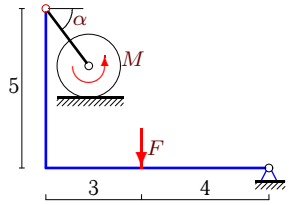
10



$P = 46$ Н, $F = 8$ Н, $R = 2$ м, $\delta = 2$ см

Задача S-18.14.

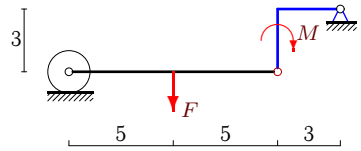
10



$P = 184$ Н, $F = 13$ Н, $R = 1$ м, $\delta = 2$ см, $\cos\alpha = 0{,}6$.

Задача S-18.15.

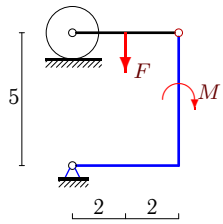
10



$P = 20$ Н, $F = 160$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.16.

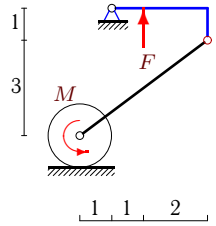
10



$P = 2$ Н, $F = 16$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.17.

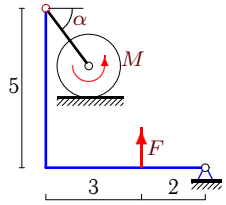
10



$P = F = 65$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.18.

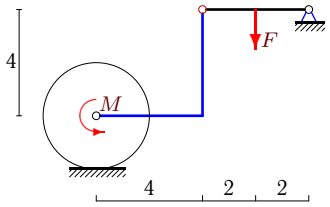
10



$P = 208$ Н, $F = 5$ Н, $R = 1$ м, $\delta = 2$ см, $\cos\alpha = 0{,}6$.

Задача S-18.19.

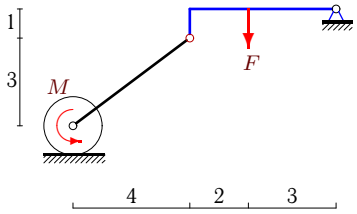
10



$P = 84$ Н, $F = 32$ Н, $R = 2$ м, $\delta = 1$ см

Задача S-18.20.

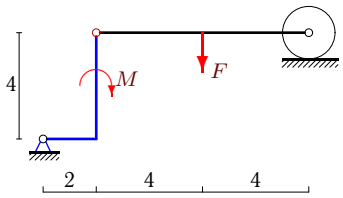
10



$P = F = 55$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.21.

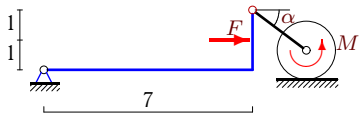
10



$P = 10$ Н, $F = 30$ Н, $R = 1$ м, $\delta = 1$ см

Задача S-18.22.

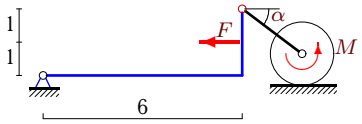
10



$P = 197$ Н, $F = 29$ Н, $R = 1$ м,
$\delta = 1$ см, $\cos\alpha = 0{,}8$.

Задача S-18.23.

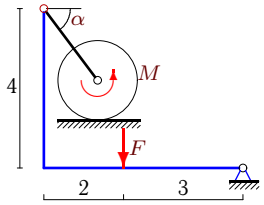
10



$P = 203$ Н, $F = 26$ Н, $R = 1$ м,
$\delta = 1$ см, $\cos\alpha = 0{,}8$.

Задача S-18.24.

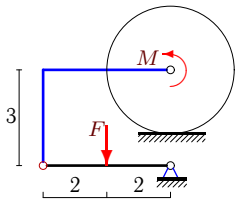
10



$P = 88$ Н, $F = 8$ Н, $R = 1$ м,
$\delta = 1$ см, $\cos\alpha = 0{,}6$.

Задача S-18.25.

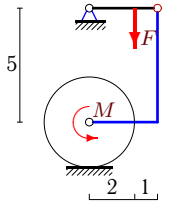
10



$P = 94$ Н, $F = 12$ Н, $R = 2$ м, $\delta = 1$ см

Задача S-18.26.

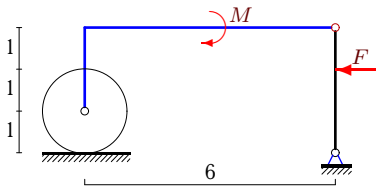
10



$P = 90$ Н, $F = 15$ Н, $R = 2$ м, $\delta = 1$ см

Задача S-18.27.

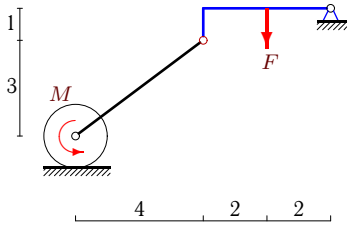
10



$P = 210$ Н, $F = 3$ Н, $R = 1$ м, $\delta = 1$ см

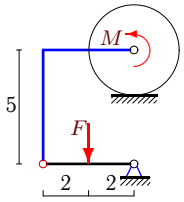
Задача S-18.28.

10



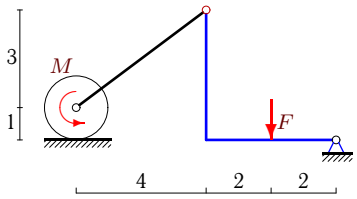
$P = F = 200$ Н, $R = 1$ м, $\delta = 2$ см

Задача S-18.29. *10*



$P = 45$ Н, $F = 10$ Н, $R = 2$ м, $\delta = 2$ см

Задача S-18.30. *10*



$P = 1400$ Н, $F = 700$ Н, $R = 1$ м, $\delta = 2$ см

S-18 Ответы. Трение качения

05.05.2013

№	M_{min}	M_{max}
	Нм	
1	-177	-183
2	$-\infty$	28
3	-77	-83
4	-144	-136
5	11	13
6	19	21
7	2	10
8	11	13
9	$-\infty$	57
10	-6	-2
11	$-\infty$	38
12	41	39
13	-9	-7
14	8	16
15	237	243
16	-31	-33
17	19	21
18	-10	-2
19	-33	-31
20	-62	-58
21	-29	-31
22	2	6
23	-6	-2
24	8	10
25	-17	-15
26	-13	-11
27	$-\infty$	64
28	-207	-193
29	-9	-7
30	-231	-169

S-18 файл o18s10A