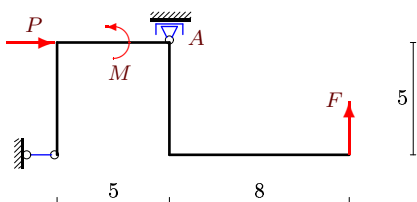


## Равновесие рамы с трением

Одна из опор рамы — негладкая неудерживающая шарнирная опора в точке  $A$  (односторонняя связь). Заданы нагрузки  $P$  и  $M$  и коэффициент трения скольжения в опоре  $A$ . Размеры на рисунке даны в метрах. Для каких значений силы  $F$  система находится в положении равновесия?

**Задача S-10.1.**

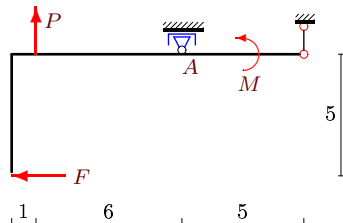
17



$$P = 399 \text{ кН}, M = 1596 \text{ кНм}, f_{\text{тр}} = 5/4.$$

**Задача S-10.2.**

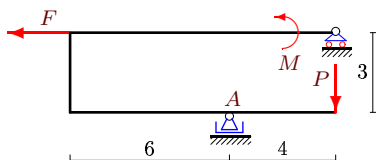
17



$$P = 23 \text{ кН}, M = 28 \text{ кНм}, f_{\text{тр}} = 4/5.$$

**Задача S-10.3.**

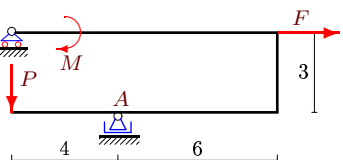
17



$$P = 23 \text{ кН}, M = 540 \text{ кНм}, f_{\text{тр}} = 2/3.$$

**Задача S-10.4.**

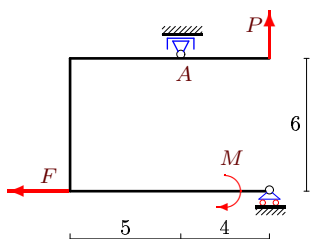
17



$$P = 31 \text{ кН}, M = 700 \text{ кНм}, f_{\text{тр}} = 3/4.$$

**Задача S-10.5.**

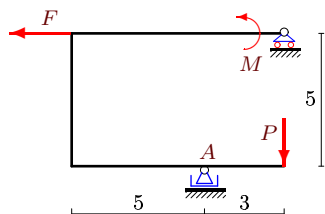
17



$$P = 11 \text{ кН}, M = 70 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.6.**

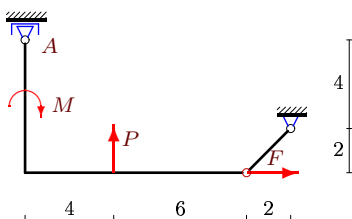
17



$$P = 1 \text{ кН}, M = 11 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.7.**

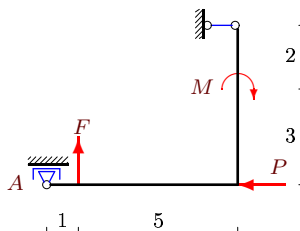
17



$$P = 63 \text{ кН}, M = 126 \text{ кНм}, f_{\text{тр}} = 2/3.$$

**Задача S-10.8.**

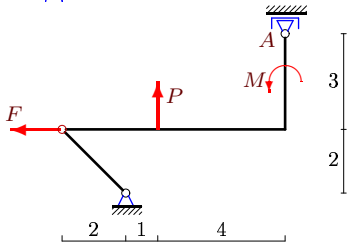
17



$$P = 1 \text{ кН}, M = 16 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.9.**

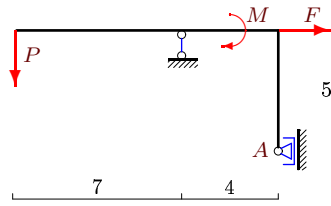
17



$P = 27 \text{ кН}, M = 27 \text{ кНм}, f_{\text{ТР}} = 2/3.$

**Задача S-10.10.**

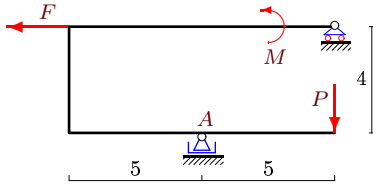
17



$P = 131 \text{ кН}, M = 33 \text{ кНм}, f_{\text{ТР}} = 1/6.$

**Задача S-10.11.**

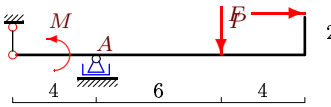
17



$P = 28 \text{ кН}, M = 483 \text{ кНм}, f_{\text{ТР}} = 2/3.$

**Задача S-10.12.**

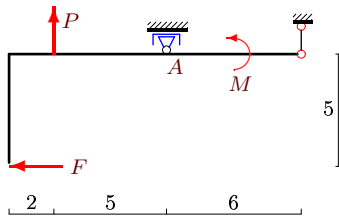
17



$P = 31 \text{ кН}, M = 90 \text{ кНм}, f_{\text{ТР}} = 3/4.$

**Задача S-10.13.**

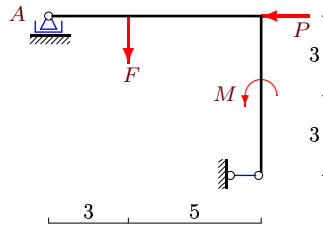
17



$P = 40 \text{ кН}, M = 89 \text{ кНм}, f_{\text{ТР}} = 3/4.$

**Задача S-10.14.**

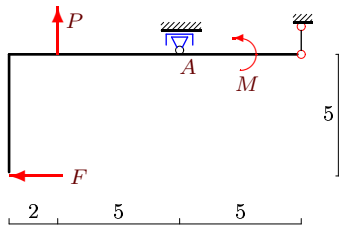
17



$P = 5 \text{ кН}, M = 210 \text{ кНм}, f_{\text{ТР}} = 3/4.$

**Задача S-10.15.**

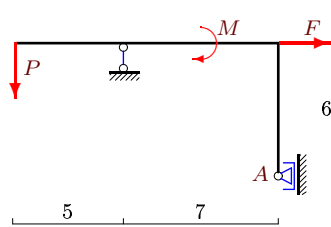
17



$P = 4 \text{ кН}, M = 15 \text{ кНм}, f_{\text{ТР}} = 2/3.$

**Задача S-10.16.**

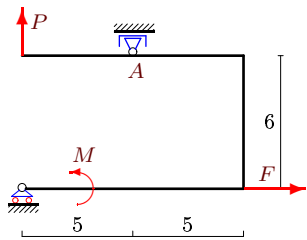
17



$P = 64 \text{ кН}, M = 45 \text{ кНм}, f_{\text{ТР}} = 1/3.$

**Задача S-10.17.**

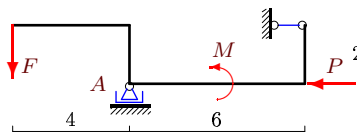
17



$P = 5 \text{ кН}, M = 81 \text{ кНм}, f_{\text{ТР}} = 2/3.$

**Задача S-10.18.**

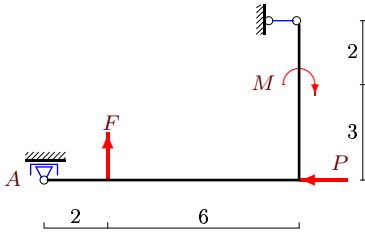
17



$P = 294 \text{ кН}, M = 504 \text{ кНм}, f_{\text{ТР}} = 4/5.$

Задача S-10.19.

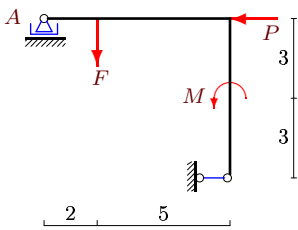
17



$P = 5 \text{ кН}, M = 7 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.21.

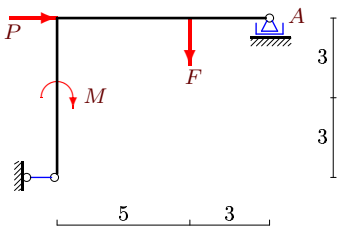
17



$P = 2 \text{ кН}, M = 42 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.23.

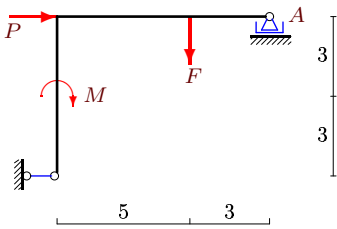
17



$P = 1 \text{ кН}, M = 9 \text{ кНм}, f_{TP} = 3/4.$

Задача S-10.25.

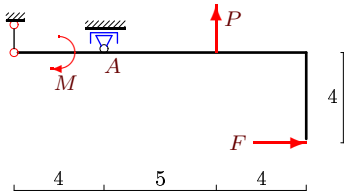
17



$P = 1 \text{ кН}, M = 84 \text{ кНм}, f_{TP} = 3/4.$

Задача S-10.27.

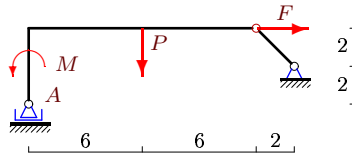
17



$P = 25 \text{ кН}, M = 81 \text{ кНм}, f_{TP} = 4/5.$

Задача S-10.20.

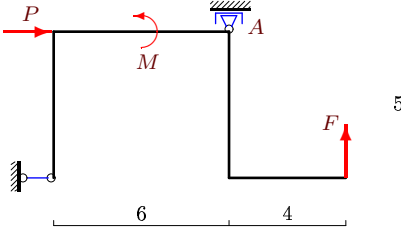
17



$P = 35 \text{ кН}, M = 70 \text{ кНм}, f_{TP} = 1/2.$

Задача S-10.22.

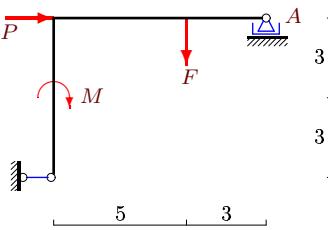
17



$P = 77 \text{ кН}, M = 341 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.24.

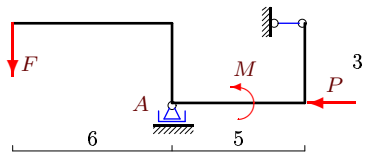
17



$P = 1 \text{ кН}, M = 54 \text{ кНм}, f_{TP} = 3/4.$

Задача S-10.26.

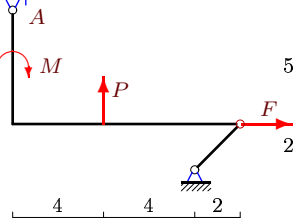
17



$P = 30 \text{ кН}, M = 80 \text{ кНм}, f_{TP} = 4/3.$

Задача S-10.28.

17



$P = 40 \text{ кН}, M = 40 \text{ кНм}, f_{TP} = 2/3.$

**Ответы.****Равновесие рамы с трением**

16.02.2015

№	$F$
1	$28 < F < 228$ кН
2	$-20 < F < 180$ кН
3	$-60 < F < 180$ кН
4	$-84 < F < 300$ кН
5	$-5 < F < 35$ кН
6	$-1 < F < 11$ кН
7	$-77 < F < 51$ кН
8	$F > 6$ кН
9	$-9 < F < 23$ кН
10	$156 < F < 204$ кН
11	$-42 < F < 138$ кН
12	$-30 < F < 66$ кН
13	$-27 < F < 117$ кН
14	$F > 32$ кН
15	$-2 < F < 10$ кН
16	$33 < F < 75$ кН
17	$-6 < F < 54$ кН
18	$15 < F < 35$ кН
19	$F > 6$ кН
20	$-7 < F < 25$ кН
21	$F > 9$ кН
22	$6 < F < 66$ кН
23	$F > 2$ кН
24	$F > 8$ кН
25	$F > 12$ кН
26	$1 < F < 5$ кН
27	$-16 < F < 144$ кН
28	$-30 < F < 33$ кН

S-10 файл о10s17A