

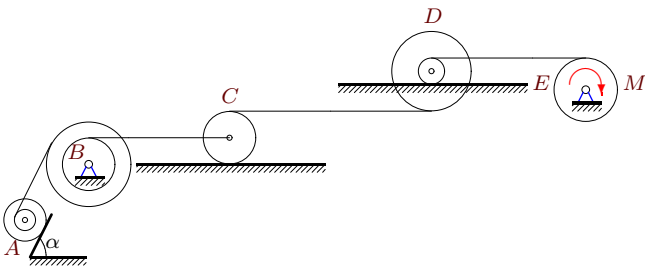
Кинетическая энергия системы. Приведенные массы

Механическая система, состоящая из пяти тел A , B , C , D и E , движется под действием внешних сил. Заданы радиусы цилиндров и блоков. Радиусы инерции даны для блоков, цилиндры считать однородными. Горизонтальный стержень, находящийся в зацеплении с блоками, считать невесомым. Массы даны в килограммах, радиусы — в сантиметрах. Вычислить приведенную массу системы μ в формуле $T = \mu v_A^2/2$, где v_A — скорость груза A (или центра цилиндра A).

Кирсанов М.Н. **Решбник. Теоретическая механика**/Под ред. А. И. Кириллова.— М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.257.)

Задача D33.1.

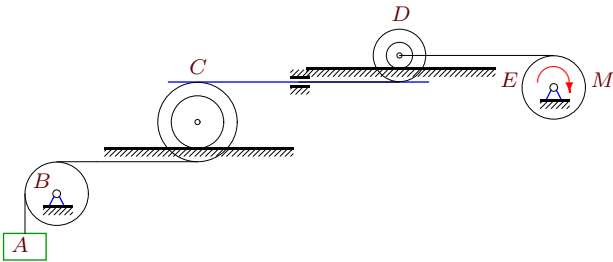
8



$$\begin{aligned} R_A &= 2, r_A = 1, i_A = 2, \\ R_B &= 3, r_B = 2, i_B = 2, \\ R_C &= 2, \\ R_D &= 3, r_D = 1, i_D = 2, \\ m_A &= 8, m_B = 20, \\ m_C &= 10, m_D = 4, \\ m_E &= 6. \end{aligned}$$

Задача D33.2.

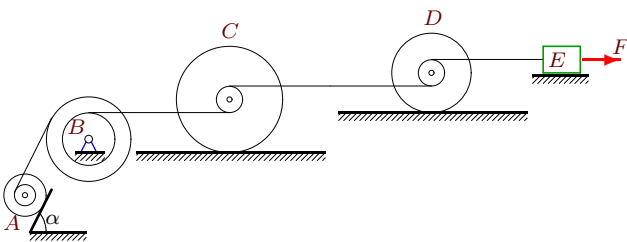
8



$$\begin{aligned} R_C &= 3, r_C = 2, i_C = 2, \\ R_D &= 2, r_D = 1, i_D = 1, \\ m_A &= 22, m_B = 12, \\ m_C &= 8, m_D = 7, \\ m_E &= 12. \end{aligned}$$

Задача D33.3.

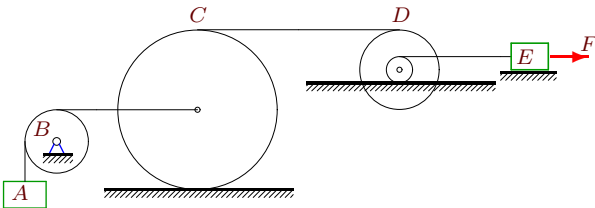
8



$$\begin{aligned} R_A &= 2, r_A = 1, i_A = 1, \\ R_B &= 3, r_B = 2, i_B = 3, \\ R_C &= 4, r_C = 1, i_C = 3, \\ R_D &= 3, r_D = 1, i_D = 2, \\ m_A &= 4, m_B = 8, \\ m_C &= 36, m_D = 36, \\ m_E &= 18. \end{aligned}$$

Задача D33.4.

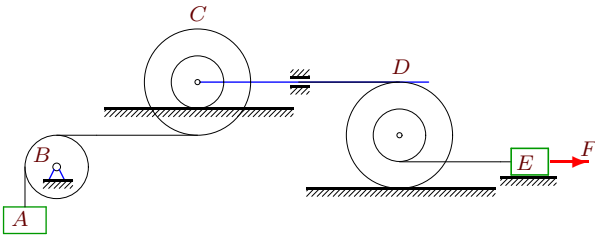
8



$$\begin{aligned} R_C &= 6, \\ R_D &= 3, r_D = 1, i_D = 2, \\ m_A &= 14, m_B = 10, \\ m_C &= 16, m_D = 28, \\ m_E &= 6. \end{aligned}$$

Задача D33.5.

8



$$R_C = 4, r_C = 2, i_C = 3,$$

$$R_D = 4, r_D = 2, i_D = 3,$$

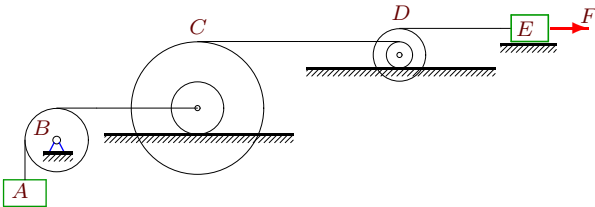
$$m_A = 14, m_B = 10,$$

$$m_C = 24, m_D = 320,$$

$$m_E = 64.$$

Задача D33.6.

8



$$R_C = 5, r_C = 2, i_C = 4,$$

$$R_D = 2, r_D = 1, i_D = 1,$$

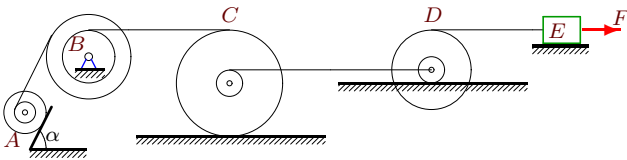
$$m_A = 14, m_B = 2,$$

$$m_C = 4, m_D = 24,$$

$$m_E = 16.$$

Задача D33.7.

8



$$R_A = 2, r_A = 1, i_A = 1,$$

$$R_B = 3, r_B = 2, i_B = 2,$$

$$R_C = 4, r_C = 1, i_C = 3,$$

$$R_D = 3, r_D = 1, i_D = 2,$$

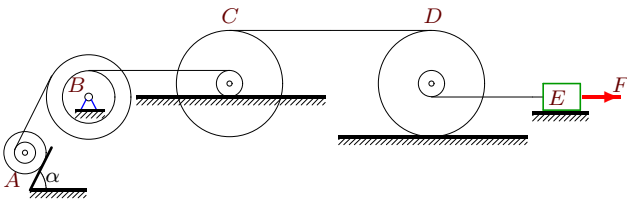
$$m_A = 16, m_B = 8,$$

$$m_C = 448, m_D = 64,$$

$$m_E = 20.$$

Задача D33.8.

8



$$R_A = 2, r_A = 1, i_A = 1,$$

$$R_B = 3, r_B = 2, i_B = 3,$$

$$R_C = 4, r_C = 1, i_C = 3,$$

$$R_D = 4, r_D = 1, i_D = 3,$$

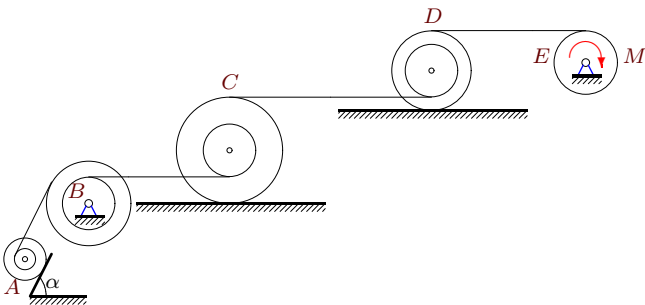
$$m_A = 4, m_B = 16,$$

$$m_C = 8, m_D = 256,$$

$$m_E = 256.$$

Задача D33.9.

8



$$R_A = 2, r_A = 1, i_A = 1,$$

$$R_B = 3, r_B = 2, i_B = 3,$$

$$R_C = 4, r_C = 2, i_C = 3,$$

$$R_D = 3, r_D = 2, i_D = 2,$$

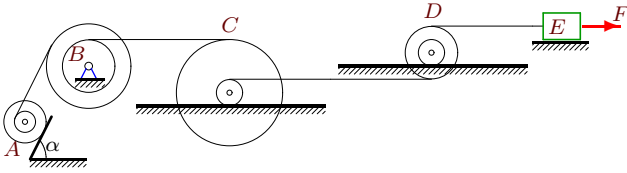
$$m_A = 12, m_B = 4,$$

$$m_C = 24, m_D = 1,$$

$$m_E = 2.$$

Задача D33.10.

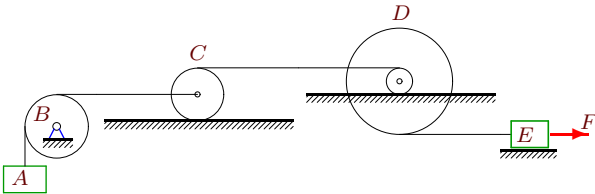
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 2, \\
 R_C &= 4, r_C = 1, i_C = 3, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 16, m_B = 24, \\
 m_C &= 35, m_D = 150, \\
 m_E &= 125.
 \end{aligned}$$

Задача D33.11.

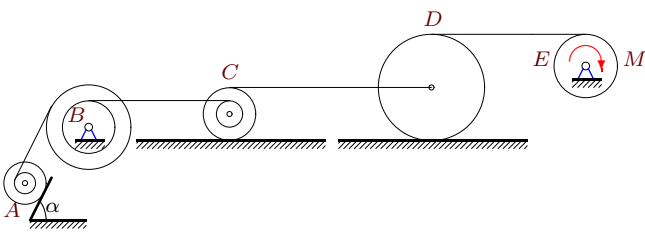
8



$$\begin{aligned}
 R_C &= 2, \\
 R_D &= 4, r_D = 1, i_D = 3, \\
 m_A &= 18, m_B = 8, \\
 m_C &= 16, m_D = 7, \\
 m_E &= 6.
 \end{aligned}$$

Задача D33.12.

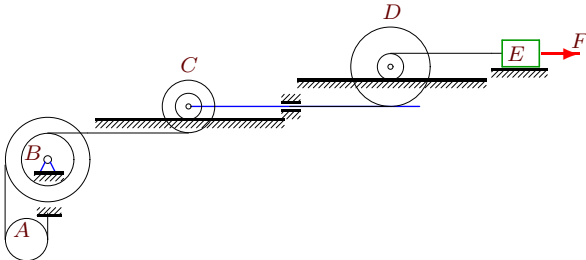
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 4, \\
 m_A &= 4, m_B = 16, \\
 m_C &= 36, m_D = 9, \\
 m_E &= 36.
 \end{aligned}$$

Задача D33.13.

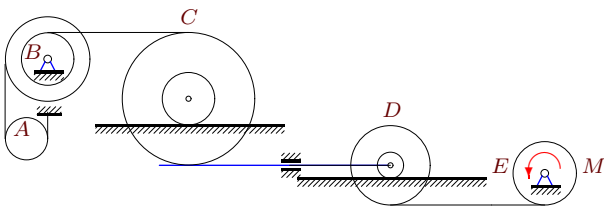
8



$$\begin{aligned}
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 2, m_B = 8, \\
 m_C &= 4, m_D = 12, \\
 m_E &= 2.
 \end{aligned}$$

Задача D33.14.

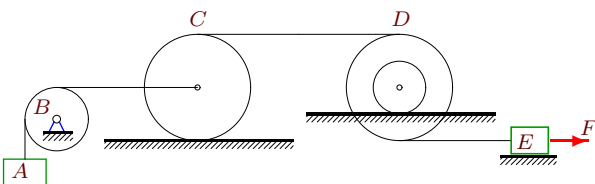
8



$$\begin{aligned}
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 6, m_B = 20, \\
 m_C &= 294, m_D = 245, \\
 m_E &= 392.
 \end{aligned}$$

Задача D33.15.

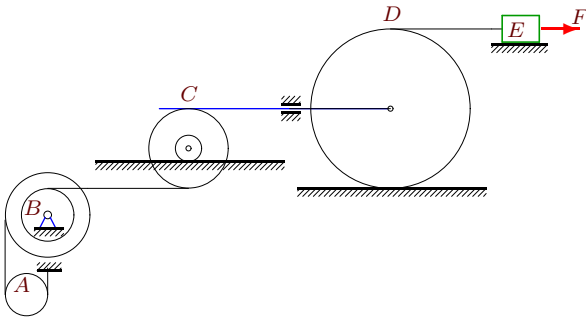
8



$$\begin{aligned}
 R_C &= 4, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 16, m_B = 10, \\
 m_C &= 16, m_D = 63, \\
 m_E &= 54.
 \end{aligned}$$

Задача D33.16.

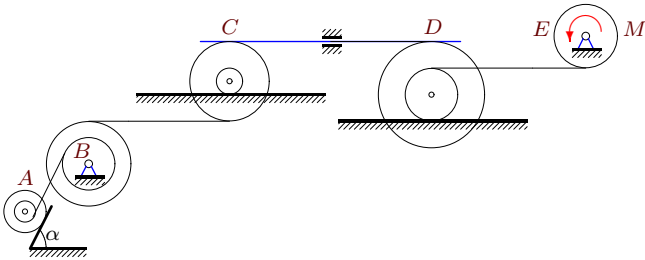
8



$$\begin{aligned}
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 3, r_C = 1, i_C = 2, \\
 R_D &= 6, \\
 m_A &= 4, m_B = 12, \\
 m_C &= 20, m_D = 4, \\
 m_E &= 3.
 \end{aligned}$$

Задача D33.17.

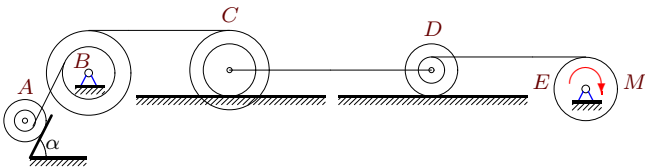
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 3, r_C = 1, i_C = 2, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 20, m_B = 32, \\
 m_C &= 32, m_D = 63, \\
 m_E &= 108.
 \end{aligned}$$

Задача D33.18.

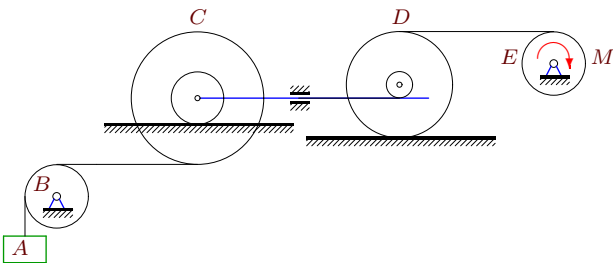
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 3, r_C = 2, i_C = 2, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 4, m_B = 16, \\
 m_C &= 100, m_D = 15, \\
 m_E &= 100.
 \end{aligned}$$

Задача D33.19.

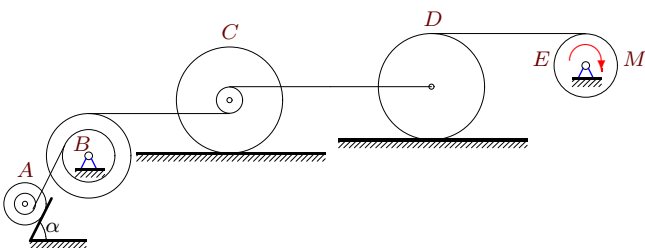
8



$$\begin{aligned}
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 4, r_D = 1, i_D = 3, \\
 m_A &= 15, m_B = 8, \\
 m_C &= 63, m_D = 486, \\
 m_E &= 162.
 \end{aligned}$$

Задача D33.20.

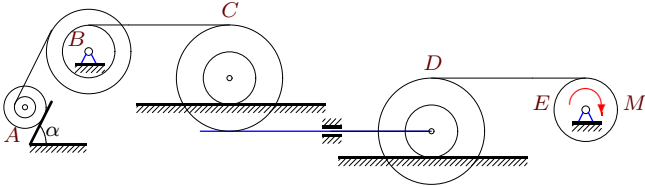
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 4, r_C = 1, i_C = 3, \\
 R_D &= 4, \\
 m_A &= 16, m_B = 48, \\
 m_C &= 63, m_D = 36, \\
 m_E &= 90.
 \end{aligned}$$

Задача D33.21.

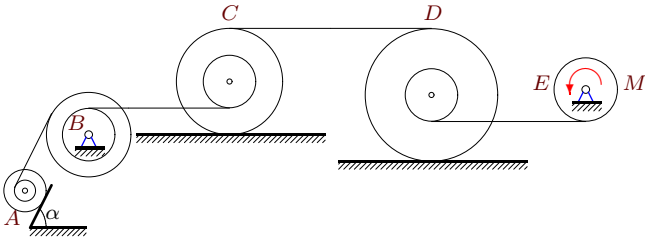
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 2, \\
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 20, m_B = 20, \\
 m_C &= 288, m_D = 252, \\
 m_E &= 12.
 \end{aligned}$$

Задача D33.22.

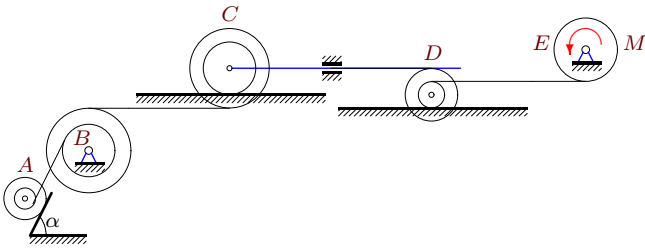
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 5, r_D = 2, i_D = 4, \\
 m_A &= 16, m_B = 16, \\
 m_C &= 28, m_D = 25, \\
 m_E &= 250.
 \end{aligned}$$

Задача D33.23.

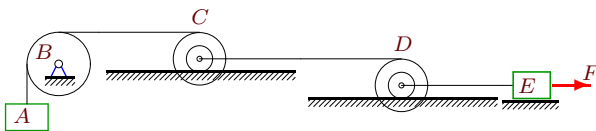
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 3, r_C = 2, i_C = 2, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 4, m_B = 16, \\
 m_C &= 4, m_D = 27, \\
 m_E &= 36.
 \end{aligned}$$

Задача D33.24.

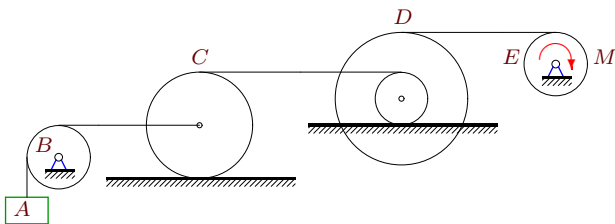
8



$$\begin{aligned}
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 17, m_B = 12, \\
 m_C &= 54, m_D = 405, \\
 m_E &= 324.
 \end{aligned}$$

Задача D33.25.

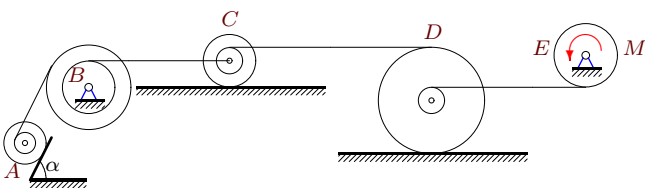
8



$$\begin{aligned}
 R_C &= 4, \\
 R_D &= 5, r_D = 2, i_D = 4, \\
 m_A &= 10, m_B = 8, \\
 m_C &= 8, m_D = 3, \\
 m_E &= 16.
 \end{aligned}$$

Задача D33.26.

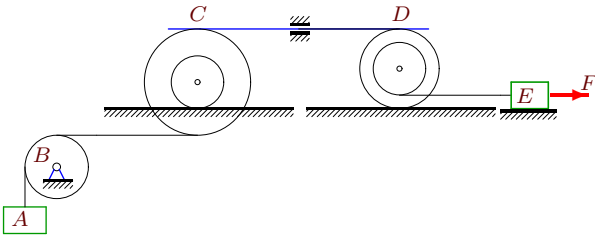
8



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 4, r_D = 1, i_D = 3, \\
 m_A &= 8, m_B = 12, \\
 m_C &= 20, m_D = 256, \\
 m_E &= 512.
 \end{aligned}$$

Задача D33.27.

8



$$R_C = 4, r_C = 2, i_C = 3,$$

$$R_D = 3, r_D = 2, i_D = 2,$$

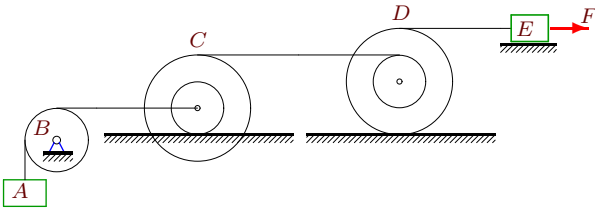
$$m_A = 14, m_B = 2,$$

$$m_C = 28, m_D = 24,$$

$$m_E = 20.$$

Задача D33.28.

8



$$R_C = 4, r_C = 2, i_C = 3,$$

$$R_D = 4, r_D = 2, i_D = 3,$$

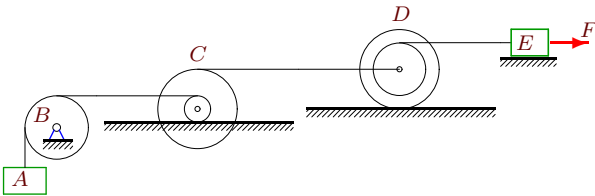
$$m_A = 12, m_B = 10,$$

$$m_C = 28, m_D = 24,$$

$$m_E = 5.$$

Задача D33.29.

8



$$R_C = 3, r_C = 1, i_C = 2,$$

$$R_D = 3, r_D = 2, i_D = 2,$$

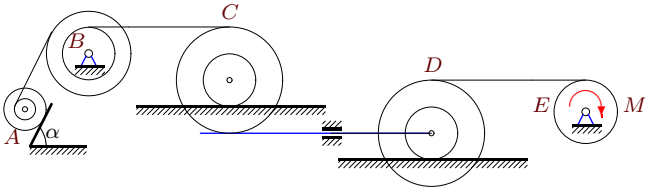
$$m_A = 13, m_B = 12,$$

$$m_C = 24, m_D = 45,$$

$$m_E = 36.$$

Задача D33.30.

8



$$R_A = 2, r_A = 1, i_A = 1,$$

$$R_B = 3, r_B = 2, i_B = 2,$$

$$R_C = 4, r_C = 2, i_C = 3,$$

$$R_D = 4, r_D = 2, i_D = 3,$$

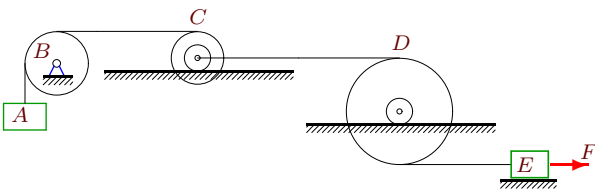
$$m_A = 8, m_B = 20,$$

$$m_C = 180, m_D = 144,$$

$$m_E = 6.$$

Задача D33.31.

8



$$R_C = 2, r_C = 1, i_C = 1,$$

$$R_D = 4, r_D = 1, i_D = 3,$$

$$m_A = 19, m_B = 8,$$

$$m_C = 63, m_D = 270,$$

$$m_E = 125.$$

D33 Ответы.**Кинетическая энергия системы. Приведенные массы** 17.09.2011

№	μ_A	μ_B	μ_C	μ_D	μ_E	μ
1	16	20	15	20	12	83
2	22	6	64	350	150	592
3	5	18	100	325	200	648
4	14	5	24	35	6	84
5	14	5	78	125	4	226
6	14	1	20	147	441	623
7	20	8	175	125	125	453
8	5	36	20	625	225	911
9	15	9	150	208	576	958
10	20	24	14	48	180	286
11	18	4	24	70	54	170
12	8	36	20	24	128	216
13	3	8	8	15	2	36
14	9	20	120	225	144	518
15	16	5	24	91	24	160
16	6	27	25	24	48	130
17	25	8	40	91	96	260
18	8	9	32	3	18	70
19	15	4	140	600	256	1015
20	20	27	175	150	500	872
21	25	20	104	91	6	246
22	20	36	175	164	180	575
23	8	4	32	24	32	100
24	17	6	12	10	4	49
25	10	4	12	15	98	139
26	16	27	25	225	225	518
27	14	1	91	78	5	189
28	12	5	91	150	80	338
29	13	6	30	260	400	709
30	10	20	65	52	3	150
31	19	4	14	12	5	54

D33 файл о33d8B