

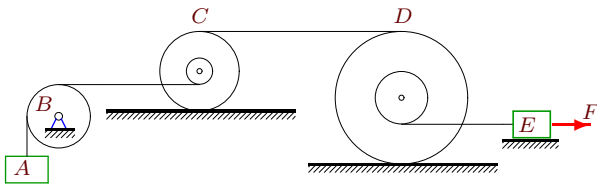
Кинетическая энергия системы. Приведенные массы

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.

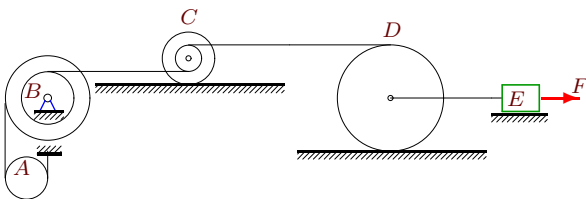
4



$$\begin{aligned} R_C &= 3, r_C = 1, i_C = 2, \\ R_D &= 5, r_D = 2, i_D = 4, \\ m_A &= 7, m_B = 8, \\ m_C &= 24, m_D = 100, \\ m_E &= 100. \end{aligned}$$

Задача D33.2.

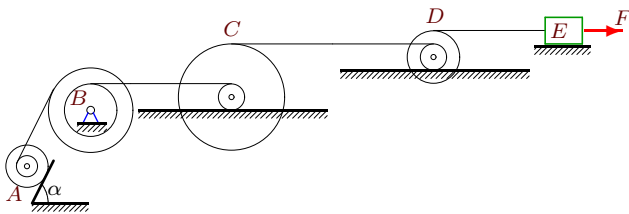
4



$$\begin{aligned} R_B &= 4, r_B = 2, i_B = 3, \\ R_C &= 2, r_C = 1, i_C = 1, \\ R_D &= 4, \\ m_A &= 2, m_B = 12, \\ m_C &= 4, m_D = 24, \\ m_E &= 8. \end{aligned}$$

Задача D33.3.

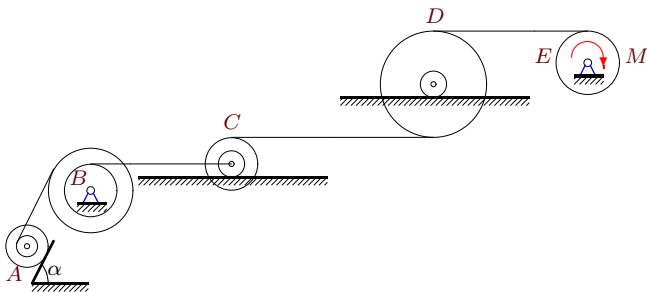
4



$$\begin{aligned} R_A &= 2, r_A = 1, i_A = 1, \\ R_B &= 3, r_B = 2, i_B = 2, \\ R_C &= 4, r_C = 1, i_C = 3, \\ R_D &= 2, r_D = 1, i_D = 1, \\ m_A &= 16, m_B = 4, \\ m_C &= 14, m_D = 48, \\ m_E &= 16. \end{aligned}$$

Задача D33.4.

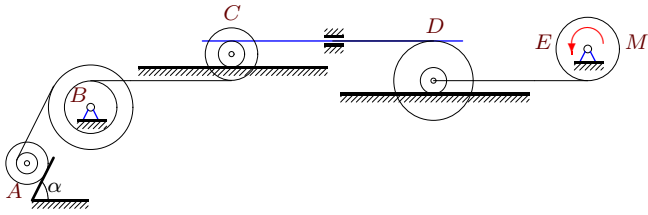
4



$$\begin{aligned} R_A &= 2, r_A = 1, i_A = 2, \\ R_B &= 3, r_B = 2, i_B = 2, \\ R_C &= 2, r_C = 1, i_C = 1, \\ R_D &= 4, r_D = 1, i_D = 3, \\ m_A &= 12, m_B = 16, \\ m_C &= 6, m_D = 5, \\ m_E &= 8. \end{aligned}$$

Задача D33.5.

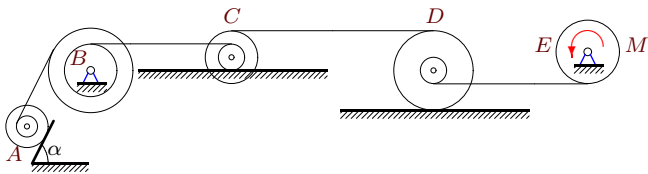
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 3, r_B = 2, i_B = 2, \\
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 16, m_B = 20, \\
 m_C &= 7, m_D = 24, \\
 m_E &= 40.
 \end{aligned}$$

Задача D33.6.

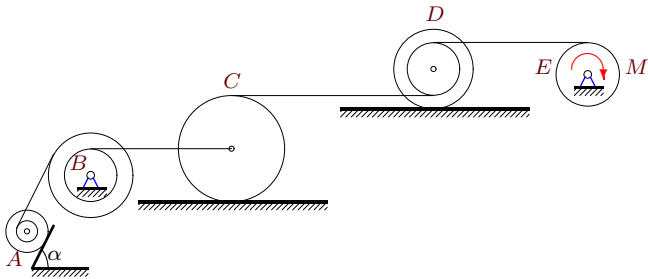
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 16, m_B = 20, \\
 m_C &= 14, m_D = 96, \\
 m_E &= 40.
 \end{aligned}$$

Задача D33.7.

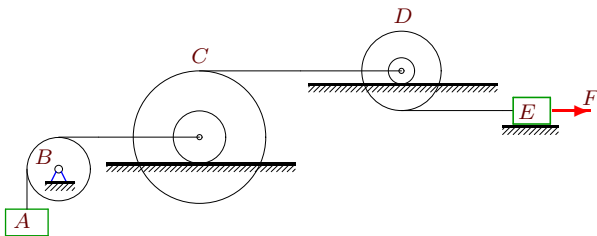
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 4, \\
 R_D &= 3, r_D = 2, i_D = 2, \\
 m_A &= 20, m_B = 24, \\
 m_C &= 16, m_D = 7, \\
 m_E &= 12.
 \end{aligned}$$

Задача D33.8.

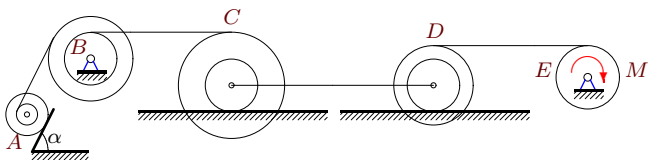
4



$$\begin{aligned}
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 17, m_B = 10, \\
 m_C &= 4, m_D = 4, \\
 m_E &= 2.
 \end{aligned}$$

Задача D33.9.

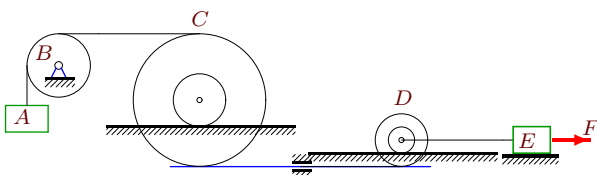
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 2, \\
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 3, r_D = 2, i_D = 2, \\
 m_A &= 12, m_B = 24, \\
 m_C &= 216, m_D = 45, \\
 m_E &= 288.
 \end{aligned}$$

Задача D33.10.

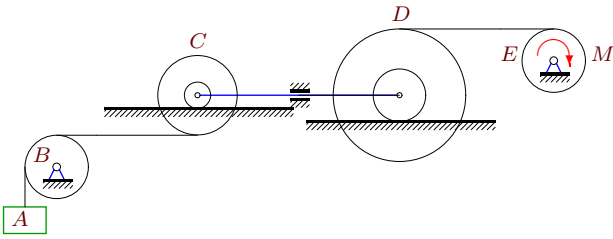
4



$$\begin{aligned}
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 22, m_B = 12, \\
 m_C &= 392, m_D = 343, \\
 m_E &= 294.
 \end{aligned}$$

Задача D33.11.

4



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

$$R_D = 5, r_D = 2, i_D = 4,$$

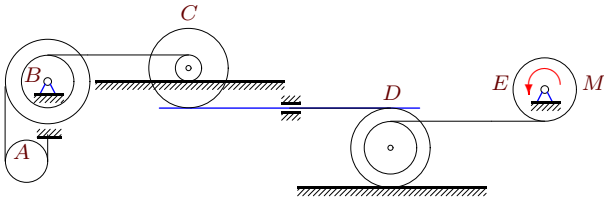
$$m_A = 21, m_B = 6,$$

$$m_C = 32, m_D = 28,$$

$$m_E = 192.$$

Задача D33.12.

4



$$R_B = 4, r_B = 2, i_B = 3,$$

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

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

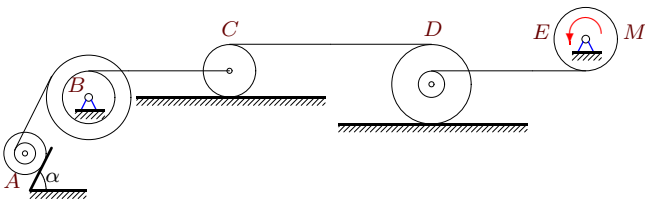
$$m_A = 4, m_B = 24,$$

$$m_C = 20, m_D = 144,$$

$$m_E = 216.$$

Задача D33.13.

4



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

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

$$R_C = 2,$$

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

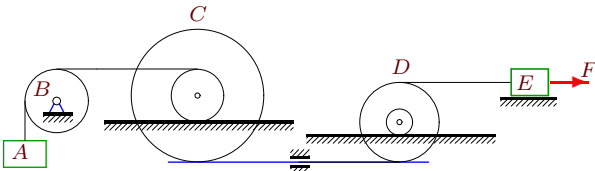
$$m_A = 4, m_B = 8,$$

$$m_C = 8, m_D = 27,$$

$$m_E = 36.$$

Задача D33.14.

4



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

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

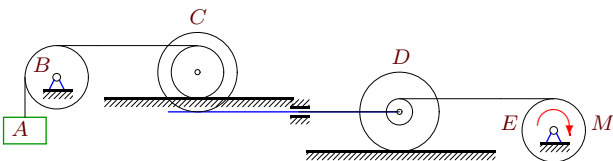
$$m_A = 23, m_B = 10,$$

$$m_C = 32, m_D = 448,$$

$$m_E = 24.$$

Задача D33.15.

4



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

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

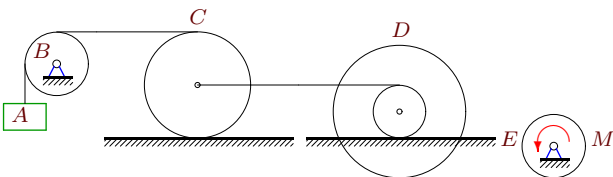
$$m_A = 18, m_B = 10,$$

$$m_C = 14, m_D = 144,$$

$$m_E = 90.$$

Задача D33.16.

4



$$R_C = 4,$$

$$R_D = 5, r_D = 2, i_D = 4,$$

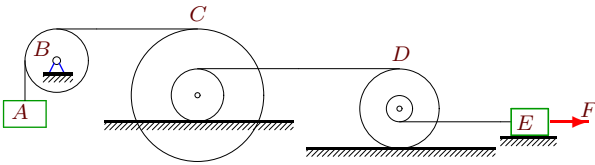
$$m_A = 16, m_B = 8,$$

$$m_C = 48, m_D = 80,$$

$$m_E = 128.$$

Задача D33.17.

4



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

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

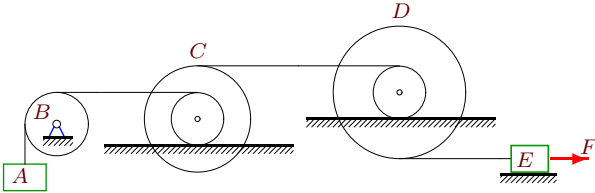
$$m_A = 13, m_B = 10,$$

$$m_C = 392, m_D = 441,$$

$$m_E = 441.$$

Задача D33.18.

4



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

$$R_D = 5, r_D = 2, i_D = 4,$$

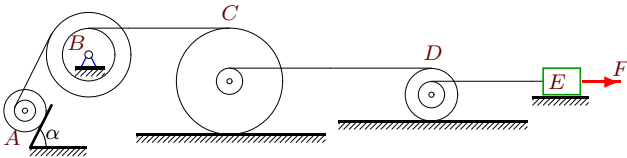
$$m_A = 20, m_B = 8,$$

$$m_C = 112, m_D = 96,$$

$$m_E = 320.$$

Задача D33.19.

4



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

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

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

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

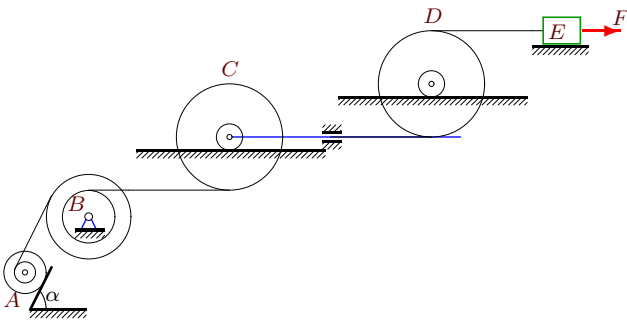
$$m_A = 16, m_B = 24,$$

$$m_C = 448, m_D = 1024,$$

$$m_E = 1024.$$

Задача D33.20.

4



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

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

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

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

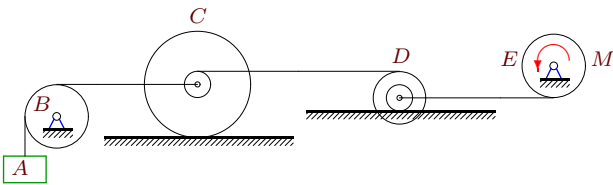
$$m_A = 8, m_B = 16,$$

$$m_C = 45, m_D = 324,$$

$$m_E = 243.$$

Задача D33.21.

4



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

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

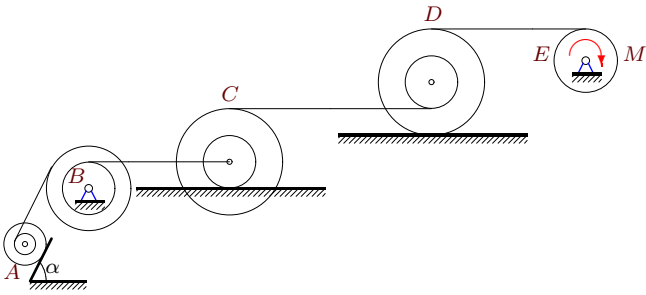
$$m_A = 16, m_B = 12,$$

$$m_C = 128, m_D = 504,$$

$$m_E = 288.$$

Задача D33.22.

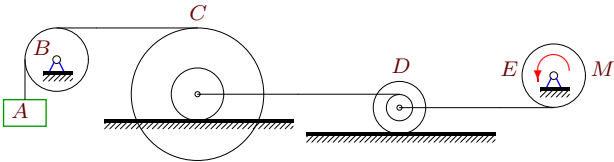
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 20, m_B = 8, \\
 m_C &= 32, m_D = 4, \\
 m_E &= 2.
 \end{aligned}$$

Задача D33.23.

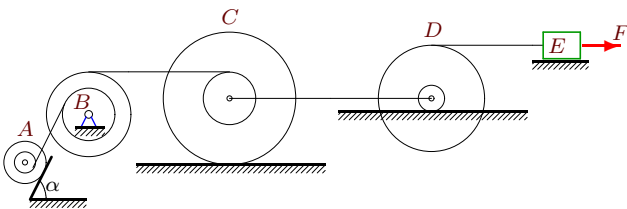
4



$$\begin{aligned}
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 13, m_B = 12, \\
 m_C &= 245, m_D = 441, \\
 m_E &= 882.
 \end{aligned}$$

Задача D33.24.

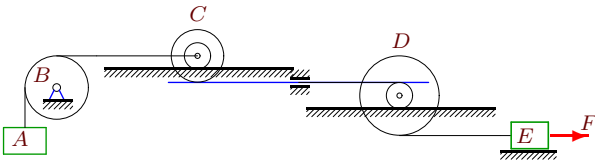
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 4, r_D = 1, i_D = 3, \\
 m_A &= 8, m_B = 48, \\
 m_C &= 245, m_D = 49, \\
 m_E &= 49.
 \end{aligned}$$

Задача D33.25.

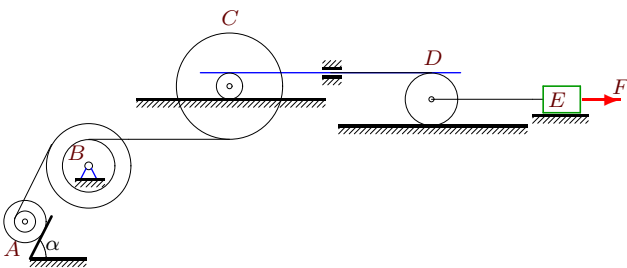
4



$$\begin{aligned}
 R_C &= 2, r_C = 1, i_C = 1, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 21, m_B = 4, \\
 m_C &= 5, m_D = 16, \\
 m_E &= 3.
 \end{aligned}$$

Задача D33.26.

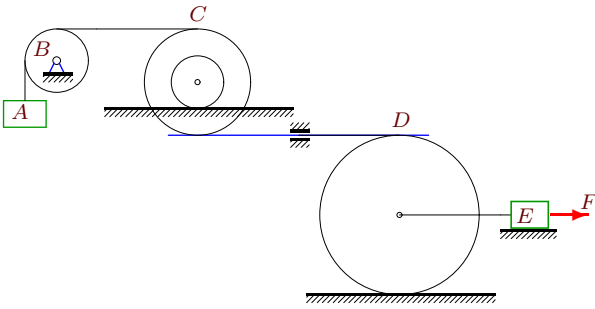
4



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 3, \\
 R_C &= 4, r_C = 1, i_C = 3, \\
 R_D &= 2, \\
 m_A &= 4, m_B = 24, \\
 m_C &= 36, m_D = 18, \\
 m_E &= 18.
 \end{aligned}$$

Задача D33.27.

4



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

$$R_D = 6,$$

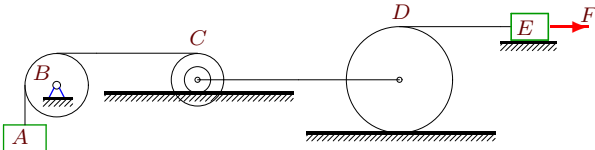
$$m_A = 14, m_B = 8,$$

$$m_C = 216, m_D = 120,$$

$$m_E = 144.$$

Задача D33.28.

4



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

$$R_D = 4,$$

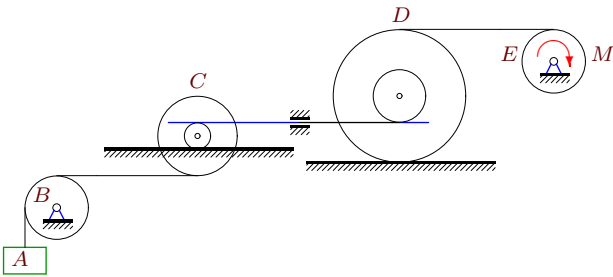
$$m_A = 13, m_B = 10,$$

$$m_C = 54, m_D = 30,$$

$$m_E = 36.$$

Задача D33.29.

4



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

$$R_D = 5, r_D = 2, i_D = 4,$$

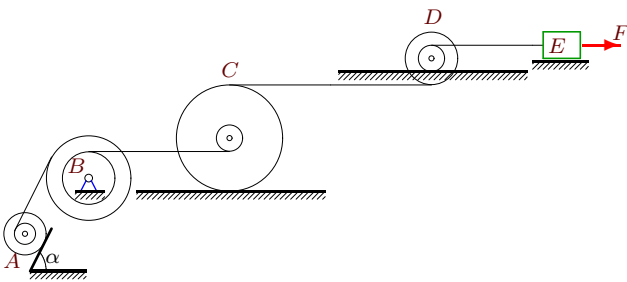
$$m_A = 16, m_B = 6,$$

$$m_C = 28, m_D = 54,$$

$$m_E = 90.$$

Задача D33.30.

4



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

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

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

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

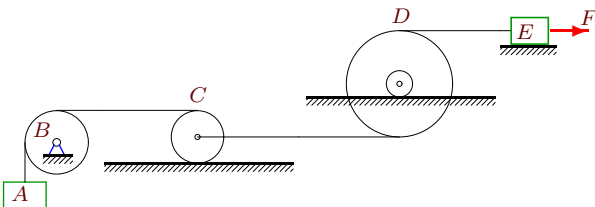
$$m_A = 4, m_B = 4,$$

$$m_C = 36, m_D = 9,$$

$$m_E = 9.$$

Задача D33.31.

4



$$R_C = 2,$$

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

$$m_A = 13, m_B = 8,$$

$$m_C = 40, m_D = 72,$$

$$m_E = 108.$$

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

№	μ_A	μ_B	μ_C	μ_D	μ_E	μ
1	7	4	78	369	81	539
2	3	27	20	81	18	149
3	20	4	35	150	225	434
4	24	16	12	50	100	202
5	32	20	14	30	5	101
6	32	45	7	78	5	167
7	25	54	24	364	600	1067
8	17	5	20	245	98	385
9	15	24	78	10	100	227
10	22	6	160	126	54	368
11	21	3	40	35	294	393
12	6	54	25	52	75	212
13	8	18	12	39	32	109
14	23	5	40	315	54	437
15	18	5	7	13	5	48
16	16	4	18	25	9	72
17	13	5	160	52	16	246
18	20	4	91	270	405	790
19	20	54	175	125	225	599
20	10	16	50	40	75	191
21	16	6	200	175	25	422
22	25	18	104	225	144	516
23	13	6	100	20	16	155
24	10	12	205	250	625	1102
25	21	2	10	20	3	56
26	5	54	40	3	2	104
27	14	4	78	5	4	105
28	13	5	12	5	16	51
29	16	3	35	246	500	800
30	5	4	100	128	256	493
31	13	4	15	20	75	127

D33 файл о33d4B