

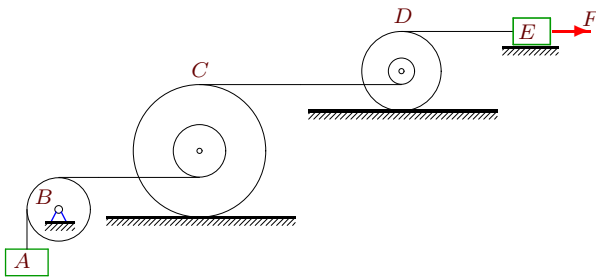
Кинетическая энергия системы. Приведенные массы

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.

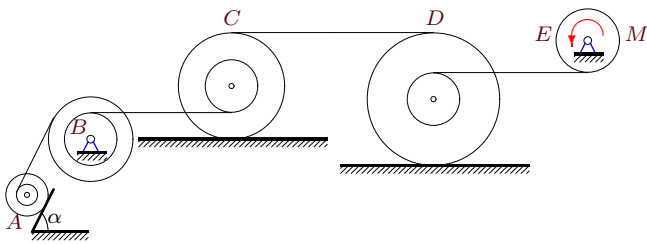
7



$$\begin{aligned} R_C &= 5, r_C = 2, i_C = 4, \\ R_D &= 3, r_D = 1, i_D = 2, \\ m_A &= 9, m_B = 10, \\ m_C &= 72, m_D = 9, \\ m_E &= 6. \end{aligned}$$

Задача D33.2.

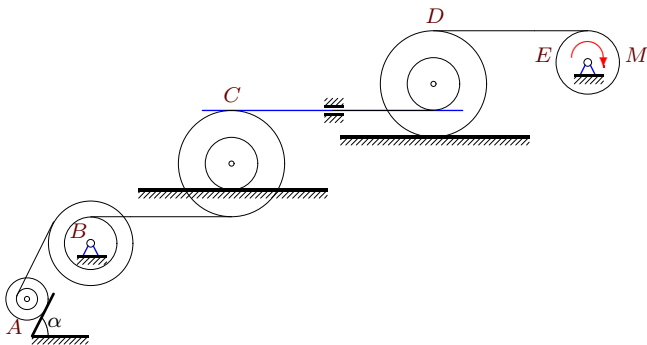
7



$$\begin{aligned} R_A &= 2, r_A = 1, i_A = 1, \\ R_B &= 3, r_B = 2, i_B = 3, \\ R_C &= 4, r_C = 2, i_C = 3, \\ R_D &= 5, r_D = 2, i_D = 4, \\ m_A &= 20, m_B = 16, \\ m_C &= 32, m_D = 25, \\ m_E &= 50. \end{aligned}$$

Задача D33.3.

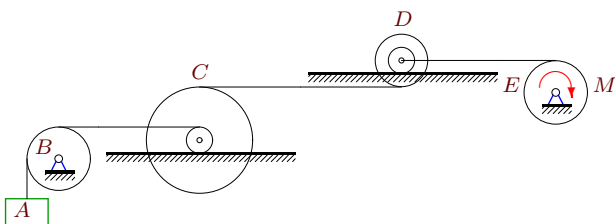
7



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

Задача D33.4.

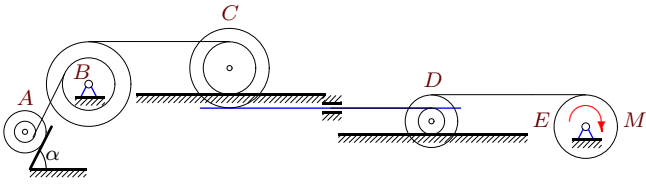
7



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

Задача D33.5.

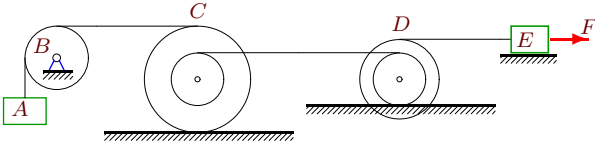
7



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 3, r_C = 2, i_C = 2, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 8, m_B = 16, \\
 m_C &= 10, m_D = 128, \\
 m_E &= 128.
 \end{aligned}$$

Задача D33.6.

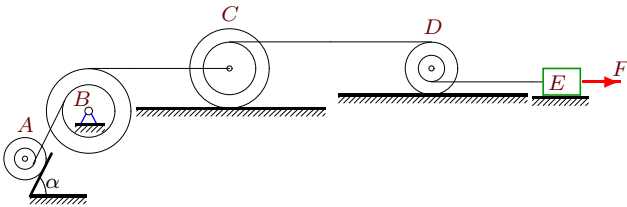
7



$$\begin{aligned}
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 3, r_D = 2, i_D = 2, \\
 m_A &= 11, m_B = 12, \\
 m_C &= 448, m_D = 192, \\
 m_E &= 256.
 \end{aligned}$$

Задача D33.7.

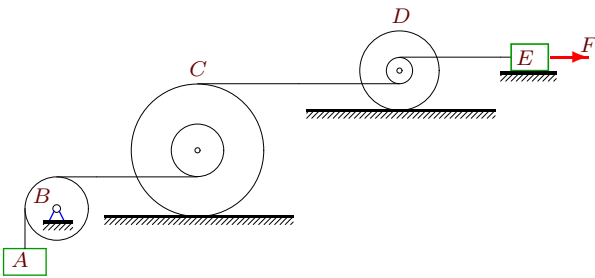
7



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 3, r_C = 2, i_C = 2, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 16, m_B = 16, \\
 m_C &= 63, m_D = 144, \\
 m_E &= 144.
 \end{aligned}$$

Задача D33.8.

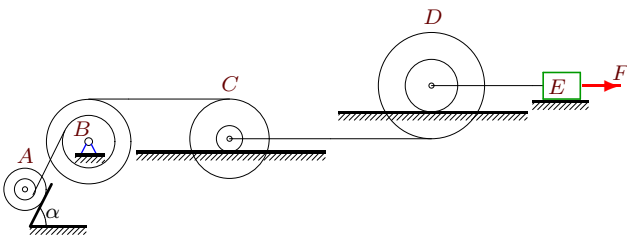
7



$$\begin{aligned}
 R_C &= 5, r_C = 2, i_C = 4, \\
 R_D &= 3, r_D = 1, i_D = 2, \\
 m_A &= 9, m_B = 4, \\
 m_C &= 45, m_D = 9, \\
 m_E &= 9.
 \end{aligned}$$

Задача D33.9.

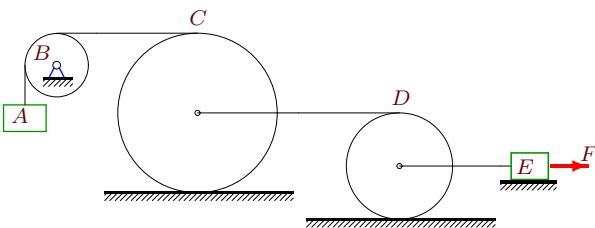
7



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 4, r_B = 2, i_B = 2, \\
 R_C &= 3, r_C = 1, i_C = 2, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 4, m_B = 32, \\
 m_C &= 64, m_D = 192, \\
 m_E &= 32.
 \end{aligned}$$

Задача D33.10.

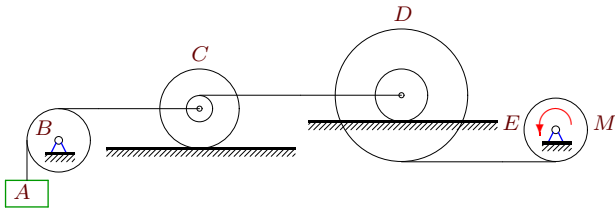
7



$$\begin{aligned}
 R_C &= 6, \\
 R_D &= 4, \\
 m_A &= 8, m_B = 4, \\
 m_C &= 40, m_D = 128, \\
 m_E &= 48.
 \end{aligned}$$

Задача D33.11.

7



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

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

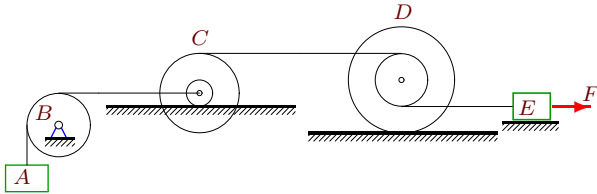
$$m_A = 16, m_B = 8,$$

$$m_C = 54, m_D = 45,$$

$$m_E = 8.$$

Задача D33.12.

7



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

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

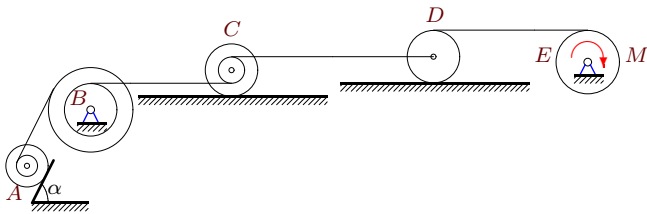
$$m_A = 13, m_B = 10,$$

$$m_C = 4, m_D = 27,$$

$$m_E = 18.$$

Задача D33.13.

7



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

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

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

$$R_D = 2,$$

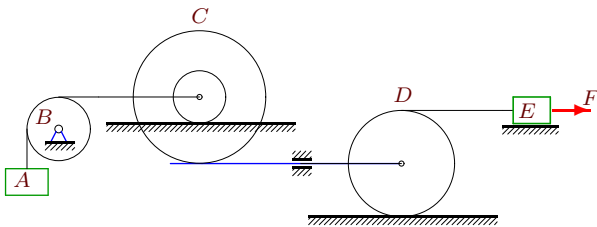
$$m_A = 16, m_B = 4,$$

$$m_C = 7, m_D = 12,$$

$$m_E = 10.$$

Задача D33.14.

7



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

$$R_D = 4,$$

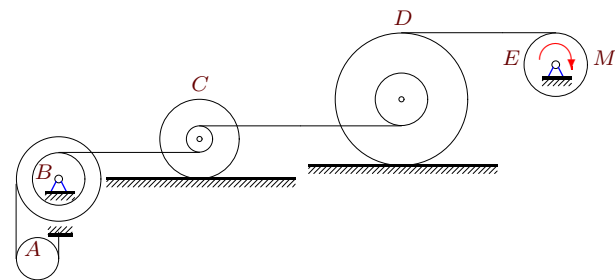
$$m_A = 17, m_B = 8,$$

$$m_C = 8, m_D = 56,$$

$$m_E = 6.$$

Задача D33.15.

7



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

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

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

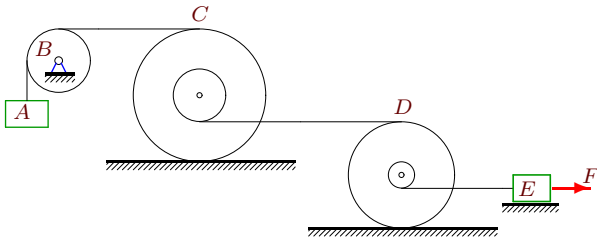
$$m_A = 4, m_B = 12,$$

$$m_C = 20, m_D = 9,$$

$$m_E = 18.$$

Задача D33.16.

7



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

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

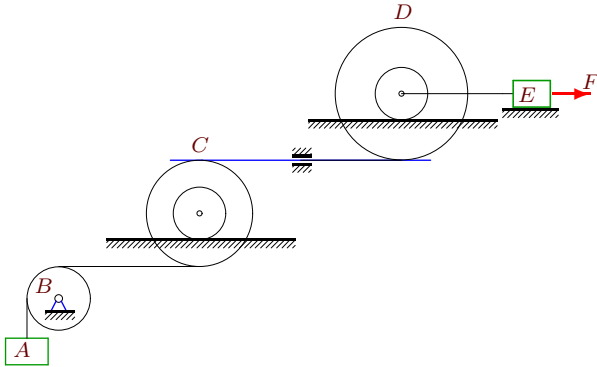
$$m_A = 5, m_B = 8,$$

$$m_C = 100, m_D = 256,$$

$$m_E = 6400.$$

Задача D33.17.

7



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

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

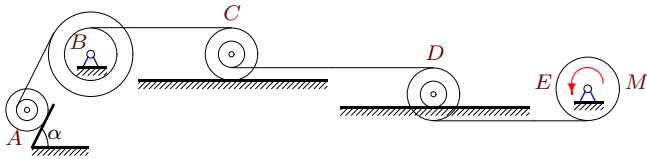
$$m_A = 22, m_B = 6,$$

$$m_C = 32, m_D = 7,$$

$$m_E = 6.$$

Задача D33.18.

7



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

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

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

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

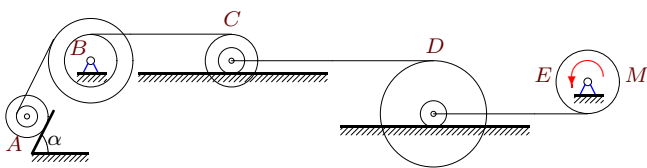
$$m_A = 16, m_B = 4,$$

$$m_C = 112, m_D = 432,$$

$$m_E = 288.$$

Задача D33.19.

7



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

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

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

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

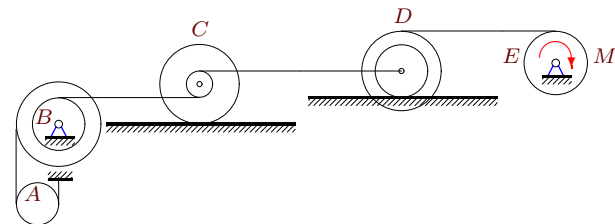
$$m_A = 12, m_B = 16,$$

$$m_C = 54, m_D = 225,$$

$$m_E = 450.$$

Задача D33.20.

7



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

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

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

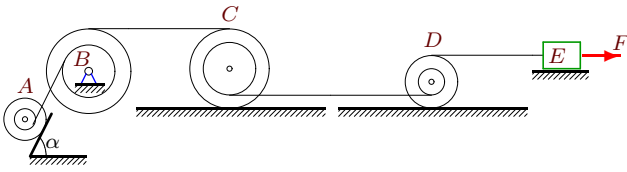
$$m_A = 4, m_B = 24,$$

$$m_C = 20, m_D = 4,$$

$$m_E = 6.$$

Задача D33.21.

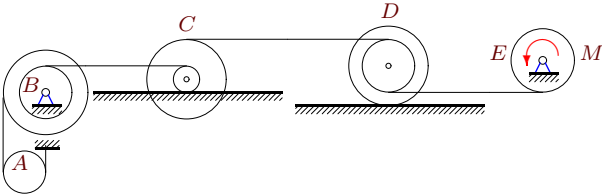
7



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 2, \\
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 3, r_C = 2, i_C = 2, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 12, m_B = 16, \\
 m_C &= 216, m_D = 180, \\
 m_E &= 36.
 \end{aligned}$$

Задача D33.22.

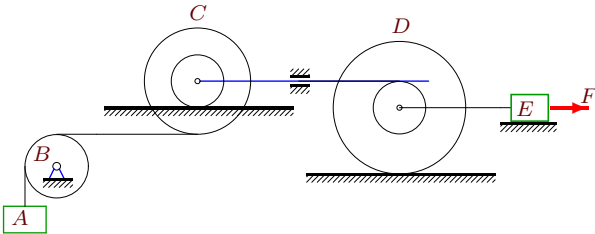
7



$$\begin{aligned}
 R_B &= 4, r_B = 2, i_B = 3, \\
 R_C &= 3, r_C = 1, i_C = 2, \\
 R_D &= 3, r_D = 2, i_D = 2, \\
 m_A &= 4, m_B = 4, \\
 m_C &= 20, m_D = 100, \\
 m_E &= 150.
 \end{aligned}$$

Задача D33.23.

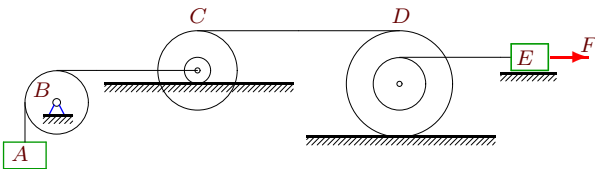
7



$$\begin{aligned}
 R_C &= 4, r_C = 2, i_C = 3, \\
 R_D &= 5, r_D = 2, i_D = 4, \\
 m_A &= 14, m_B = 6, \\
 m_C &= 16, m_D = 147, \\
 m_E &= 98.
 \end{aligned}$$

Задача D33.24.

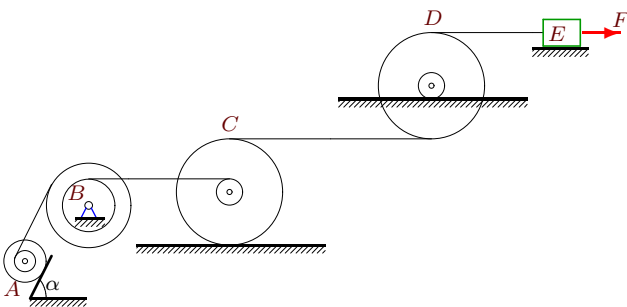
7



$$\begin{aligned}
 R_C &= 3, r_C = 1, i_C = 2, \\
 R_D &= 4, r_D = 2, i_D = 3, \\
 m_A &= 11, m_B = 10, \\
 m_C &= 6, m_D = 20, \\
 m_E &= 4.
 \end{aligned}$$

Задача D33.25.

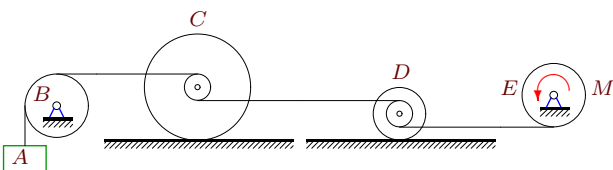
7



$$\begin{aligned}
 R_A &= 2, r_A = 1, i_A = 1, \\
 R_B &= 3, r_B = 2, i_B = 2, \\
 R_C &= 4, r_C = 1, i_C = 3, \\
 R_D &= 4, r_D = 1, i_D = 3, \\
 m_A &= 20, m_B = 12, \\
 m_C &= 8, m_D = 45, \\
 m_E &= 54.
 \end{aligned}$$

Задача D33.26.

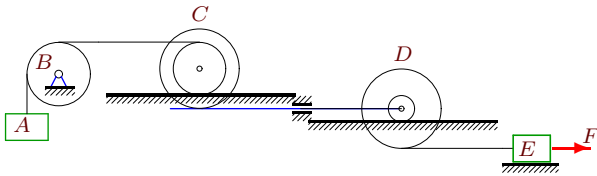
7



$$\begin{aligned}
 R_C &= 4, r_C = 1, i_C = 3, \\
 R_D &= 2, r_D = 1, i_D = 1, \\
 m_A &= 12, m_B = 12, \\
 m_C &= 5, m_D = 20, \\
 m_E &= 150.
 \end{aligned}$$

Задача D33.27.

7



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

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

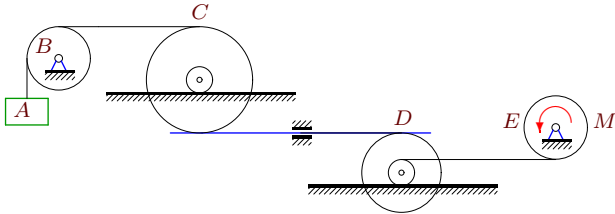
$$m_A = 24, m_B = 10,$$

$$m_C = 16, m_D = 112,$$

$$m_E = 24.$$

Задача D33.28.

7



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

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

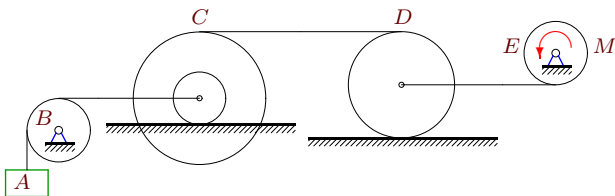
$$m_A = 19, m_B = 10,$$

$$m_C = 40, m_D = 560,$$

$$m_E = 200.$$

Задача D33.29.

7



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

$$R_D = 4,$$

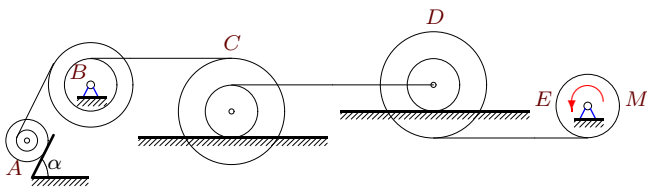
$$m_A = 12, m_B = 4,$$

$$m_C = 5, m_D = 32,$$

$$m_E = 96.$$

Задача D33.30.

7



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

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

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

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

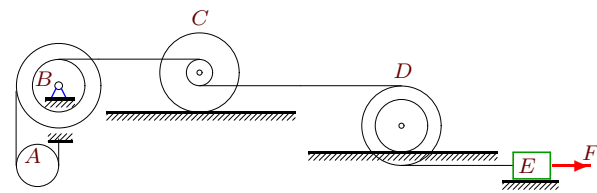
$$m_A = 16, m_B = 20,$$

$$m_C = 252, m_D = 54,$$

$$m_E = 90.$$

Задача D33.31.

7



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

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

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

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

$$m_C = 80, m_D = 100,$$

$$m_E = 100.$$

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

№	μ_A	μ_B	μ_C	μ_D	μ_E	μ
1	9	5	328	325	600	1267
2	25	36	200	164	196	621
3	5	18	52	225	144	444
4	16	1	20	75	50	162
5	16	4	5	4	9	38
6	11	6	175	54	225	471
7	32	9	91	125	25	282
8	9	2	205	325	400	941
9	5	8	20	39	2	74
10	8	2	15	12	3	40
11	16	4	78	400	16	514
12	13	5	20	300	32	370
13	32	9	35	162	180	418
14	17	4	40	189	54	304
15	6	27	65	164	400	662
16	5	4	41	9	81	140
17	22	3	104	140	24	293
18	32	4	35	6	1	78
19	24	16	12	10	1	63
20	6	24	65	32	75	202
21	24	9	78	25	16	152
22	6	9	25	208	12	260
23	14	3	52	123	50	242
24	11	5	30	125	36	207
25	25	12	8	128	384	557
26	12	6	5	4	3	30
27	24	5	8	35	6	78
28	19	5	16	63	9	112
29	12	2	25	147	147	333
30	20	20	91	78	20	229
31	6	24	65	8	1	104

D33 файл о33d7B