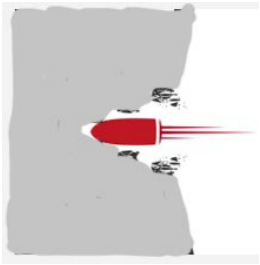
11th Physics (2017 – 18)

(2ndQ, #2Mini Test)

Class	No.	Name



In calculation problems, describe equations clearly and systematically enough to show how to solve the problems.

The circular constant $\pi = 3.14159\ldots$

Gravitational acceleration rate 重力加速度 $g = 9.80\ m/s^2$

Density [kg/m³]	
Gold	19,300
Silver	13,600
Iron	7,860
Sea water	1,025
Water	1,000
Ice	917
Air	1.29
Helium	0.179
Hydrogen gas	0.0899

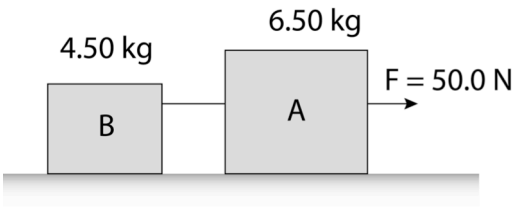
Specific Heat c [J/(kg・K)]	
Water	4186
Ice	2090
Steam	2010
Oil	1970
Copper	387
Ceramic	1090
Glass	837
Aluminum	900
Iron (Steel)	560
Lead	128

	Latent Heat of Fusion 融解潜熱 L_f[J/kg]	Latent Heat of Vaporization 蒸発潜熱 L_v[J/kg]
Water 水	3.35×10^5	22.6×10^5

4 pt/question x 13 questions = 52 pt Max 50 pt

／[Total 50 pt]

(1) (2) A box of mass 4.50 kg rest on a smooth, horizontal floor connected with a box of mass 6.50 kg with string. You pull the 6.50 kg box with a horizontal force of magnitude 50.0 N.



(1) What is the acceleration of the boxes?

(2) What is the tensional force of the string?

Equations

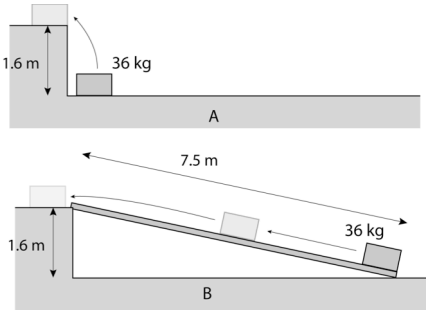
(1) Answer

(2) Answer

(3) A person pulls a 25 kg suitcase with a strap with a force of 33 N at an angle of 33° to the direction of motion through a displacement of 56 m, as shown in the figure. Find the work done by the force.

Equations

(3) Answer



(4) You want to load a 36 kg box onto the stage 1.6 m high of the gym by lifting it directly, as shown in Fig. A. Find the magnitude of the force required and the work done by the force.

(5) Instead of the above you load the box by sliding it up a loading ramp 7.5 m long, as shown in Fig. B. Assuming the box slides on the floor and ramp without friction, find the magnitude of the force required and the work done by the force.

Equations

(4) Answer

Force

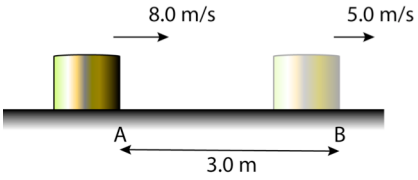
Work

(5) Answer

Force

Work

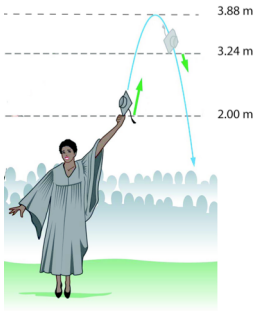
(6,7) A 2.0 kg body is moving on a horizontal rough plane. The body passes at point A with a speed of 8.0 m/s and then at point B with a speed of 5.0 m/s. The distance between A and B is 3.0 m. (6) Find the work done by the kinetic frictional force between A and B.
(7) Find the magnitude of the kinetic frictional force.



(6) Answer

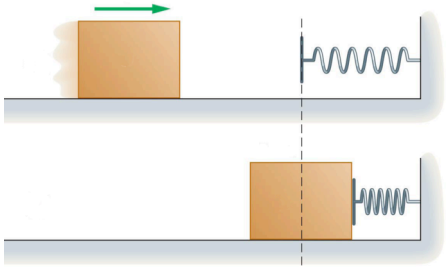
(7) Answer

(8) At the end of a graduation ceremony, graduates fling their caps into the air. A graduate throws her 0.120 kg cap upward with an initial speed of 8.88 m/s. After the cap is thrown from the release point 2.00 m high from the ground, the cap reaches the maximum height at 3.88 m from the ground and then begins to fall. Assuming that the frictional forces can be ignored, find the speed of the cap when it passes the point 3.24 m high from the ground.



(8) Answer

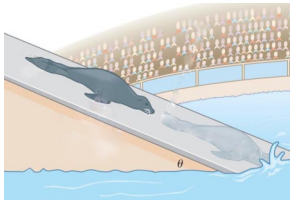
(9) A 1.90-kg block slides on a horizontal, frictionless surface until it encounters a spring with a force constant of 942 N/m. The block comes to rest after compressing the spring a distance of 5.60 cm. Find the initial speed of the block.



Equations

(9) Answer

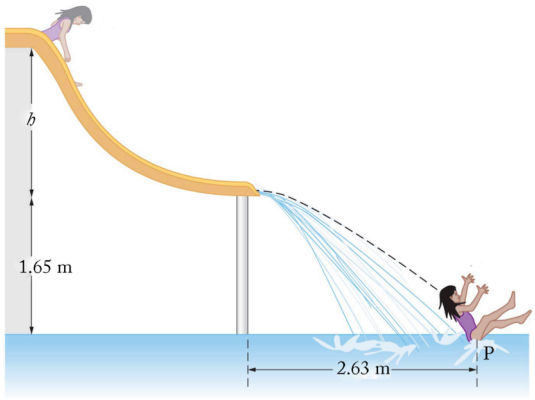
(10,11) A 42.0 kg seal at an amusement park slides from rest down a ramp into the pool below. The top of the ramp is 1.75 m higher than the surface of the water, and the ramp is inclined at an angle of 35.0° above the horizontal. The seal reaches the water with a speed of 4.40 m/s.
(10) Find the work done by kinetic friction.
(11) Find the coefficient of kinetic friction between the seal and the ramp.
Equations



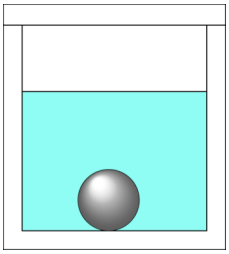
(10-a) Answer
(10-b) Answer

(11) The water slide shown in the figure ends at a height of 1.65 m above the pool. The ending part is horizontal. If the person starts from rest at the top of the water slider and lands in the water at point P, 2.63 m far from the end of the slide, what is the height h of the water slide? (Assume the water slid is frictionless.)

Equations



(Q11) Answer

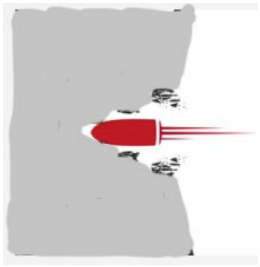


(12) A 241-g iron ball at a temperature of 84.2℃ is placed in a calorimeter containing 177 g of water at 21.2℃. Find the equilibrium temperature of the system.

Equations

(12) Answer

(13) A 55-g lead bullet is fired into a wood. The initial speed of the bullet is 280 m/s, and when it comes to rest, half of its kinetic energy goes into heating it. How much does the bullet's temperature increase?



Equations

(13) Answer

Trigonometric Function Table

角	正弦 (sin)	余弦 (cos)	正接 (tan)
0.0°	0.0000	1.0000	0.0000
0.5°	0.0087	1.0000	0.0087
1.0°	0.0175	0.9998	0.0175
1.5°	0.0262	0.9997	0.0262
2.0°	0.0349	0.9994	0.0349
2.5°	0.0436	0.9990	0.0437
3.0°	0.0523	0.9986	0.0524
3.5°	0.0610	0.9981	0.0612
4.0°	0.0698	0.9976	0.0699
4.5°	0.0785	0.9969	0.0787
5.0°	0.0872	0.9962	0.0875
5.5°	0.0958	0.9954	0.0963
6.0°	0.1045	0.9945	0.1051
6.5°	0.1132	0.9936	0.1139
7.0°	0.1219	0.9925	0.1228
7.5°	0.1305	0.9914	0.1317
8.0°	0.1392	0.9903	0.1405
8.5°	0.1478	0.9890	0.1495
9.0°	0.1564	0.9877	0.1584
9.5°	0.1650	0.9863	0.1673
10.0°	0.1736	0.9848	0.1763
10.5°	0.1822	0.9833	0.1853
11.0°	0.1908	0.9816	0.1944
11.5°	0.1994	0.9799	0.2035
12.0°	0.2079	0.9781	0.2126
12.5°	0.2164	0.9763	0.2217
13.0°	0.2250	0.9744	0.2309
13.5°	0.2334	0.9724	0.2401
14.0°	0.2419	0.9703	0.2493
14.5°	0.2504	0.9681	0.2586
15.0°	0.2588	0.9659	0.2679
15.5°	0.2672	0.9636	0.2773
16.0°	0.2756	0.9613	0.2867
16.5°	0.2840	0.9588	0.2962
17.0°	0.2924	0.9563	0.3057
17.5°	0.3007	0.9537	0.3153
18.0°	0.3090	0.9511	0.3249
18.5°	0.3173	0.9483	0.3346
19.0°	0.3256	0.9455	0.3443
19.5°	0.3338	0.9426	0.3541
20.0°	0.3420	0.9397	0.3640
20.5°	0.3502	0.9367	0.3739
21.0°	0.3584	0.9336	0.3839
21.5°	0.3665	0.9304	0.3939
22.0°	0.3746	0.9272	0.4040
22.5°	0.3827	0.9239	0.4142

角	正弦 (sin)	余弦 (cos)	正接 (tan)
22.5°	0.3827	0.9239	0.4142
23.0°	0.3907	0.9205	0.4245
23.5°	0.3987	0.9171	0.4348
24.0°	0.4067	0.9135	0.4452
24.5°	0.4147	0.9100	0.4557
25.0°	0.4226	0.9063	0.4663
25.5°	0.4305	0.9026	0.4770
26.0°	0.4384	0.8988	0.4877
26.5°	0.4462	0.8949	0.4986
27.0°	0.4540	0.8910	0.5095
27.5°	0.4617	0.8870	0.5206
28.0°	0.4695	0.8829	0.5317
28.5°	0.4772	0.8788	0.5430
29.0°	0.4848	0.8746	0.5543
29.5°	0.4924	0.8704	0.5658
30.0°	0.5000	0.8660	0.5774
30.5°	0.5075	0.8616	0.5890
31.0°	0.5150	0.8572	0.6009
31.5°	0.5225	0.8526	0.6128
32.0°	0.5299	0.8480	0.6249
32.5°	0.5373	0.8434	0.6371
33.0°	0.5446	0.8387	0.6494
33.5°	0.5519	0.8339	0.6619
34.0°	0.5592	0.8290	0.6745
34.5°	0.5664	0.8241	0.6873
35.0°	0.5736	0.8192	0.7002
35.5°	0.5807	0.8141	0.7133
36.0°	0.5878	0.8090	0.7265
36.5°	0.5948	0.8039	0.7400
37.0°	0.6018	0.7986	0.7536
37.5°	0.6088	0.7934	0.7673
38.0°	0.6157	0.7880	0.7813
38.5°	0.6225	0.7826	0.7954
39.0°	0.6293	0.7771	0.8098
39.5°	0.6361	0.7716	0.8243
40.0°	0.6428	0.7660	0.8391
40.5°	0.6494	0.7604	0.8541
41.0°	0.6561	0.7547	0.8693
41.5°	0.6626	0.7490	0.8847
42.0°	0.6691	0.7431	0.9004
42.5°	0.6756	0.7373	0.9163
43.0°	0.6820	0.7314	0.9325
43.5°	0.6884	0.7254	0.9490
44.0°	0.6947	0.7193	0.9657
44.5°	0.7009	0.7133	0.9827
45.0°	0.7071	0.7071	1.0000

角	正弦 (sin)	余弦 (cos)	正接 (tan)
45.0°	0.7071	0.7071	1.0000
45.5°	0.7133	0.7009	1.0176
46.0°	0.7193	0.6947	1.0355
46.5°	0.7254	0.6884	1.0538
47.0°	0.7314	0.6820	1.0724
47.5°	0.7373	0.6756	1.0913
48.0°	0.7431	0.6691	1.1106
48.5°	0.7490	0.6626	1.1303
49.0°	0.7547	0.6561	1.1504
49.5°	0.7604	0.6494	1.1708
50.0°	0.7660	0.6428	1.1918
50.5°	0.7716	0.6361	1.2131
51.0°	0.7771	0.6293	1.2349
51.5°	0.7826	0.6225	1.2572
52.0°	0.7880	0.6157	1.2799
52.5°	0.7934	0.6088	1.3032
53.0°	0.7986	0.6018	1.3270
53.5°	0.8039	0.5948	1.3514
54.0°	0.8090	0.5878	1.3764
54.5°	0.8141	0.5807	1.4019
55.0°	0.8192	0.5736	1.4281
55.5°	0.8241	0.5664	1.4550
56.0°	0.8290	0.5592	1.4826
56.5°	0.8339	0.5519	1.5108
57.0°	0.8387	0.5446	1.5399
57.5°	0.8434	0.5373	1.5697
58.0°	0.8480	0.5299	1.6003
58.5°	0.8526	0.5225	1.6319
59.0°	0.8572	0.5150	1.6643
59.5°	0.8616	0.5075	1.6977
60.0°	0.8660	0.5000	1.7321
60.5°	0.8704	0.4924	1.7675
61.0°	0.8746	0.4848	1.8040
61.5°	0.8788	0.4772	1.8418
62.0°	0.8829	0.4695	1.8807
62.5°	0.8870	0.4617	1.9210
63.0°	0.8910	0.4540	1.9626
63.5°	0.8949	0.4462	2.0057
64.0°	0.8988	0.4384	2.0503
64.5°	0.9026	0.4305	2.0965
65.0°	0.9063	0.4226	2.1445
65.5°	0.9100	0.4147	2.1943
66.0°	0.9135	0.4067	2.2460
66.5°	0.9171	0.3987	2.2998
67.0°	0.9205	0.3907	2.3559
67.5°	0.9239	0.3827	2.4142

角	正弦 (sin)	余弦 (cos)	正接 (tan)
67.5°	0.9239	0.3827	2.4142
68.0°	0.9272	0.3746	2.4751
68.5°	0.9304	0.3665	2.5386
69.0°	0.9336	0.3584	2.6051
69.5°	0.9367	0.3502	2.6746
70.0°	0.9397	0.3420	2.7475
70.5°	0.9426	0.3338	2.8239
71.0°	0.9455	0.3256	2.9042
71.5°	0.9483	0.3173	2.9887
72.0°	0.9511	0.3090	3.0777
72.5°	0.9537	0.3007	3.1716
73.0°	0.9563	0.2924	3.2709
73.5°	0.9588	0.2840	3.3759
74.0°	0.9613	0.2756	3.4874
74.5°	0.9636	0.2672	3.6059
75.0°	0.9659	0.2588	3.7321
75.5°	0.9681	0.2504	3.8667
76.0°	0.9703	0.2419	4.0108
76.5°	0.9724	0.2334	4.1653
77.0°	0.9744	0.2250	4.3315
77.5°	0.9763	0.2164	4.5107
78.0°	0.9781	0.2079	4.7046
78.5°	0.9799	0.1994	4.9152
79.0°	0.9816	0.1908	5.1446
79.5°	0.9833	0.1822	5.3955
80.0°	0.9848	0.1736	5.6713
80.5°	0.9863	0.1650	5.9758
81.0°	0.9877	0.1564	6.3138
81.5°	0.9890	0.1478	6.6912
82.0°	0.9903	0.1392	7.1154
82.5°	0.9914	0.1305	7.5958
83.0°	0.9925	0.1219	8.1443
83.5°	0.9936	0.1132	8.7769
84.0°	0.9945	0.1045	9.5144
84.5°	0.9954	0.0958	10.385
85.0°	0.9962	0.0872	11.430
85.5°	0.9969	0.0785	12.706
86.0°	0.9976	0.0698	14.301
86.5°	0.9981	0.0610	16.350
87.0°	0.9986	0.0523	19.081
87.5°	0.9990	0.0436	22.904
88.0°	0.9994	0.0349	28.636
88.5°	0.9997	0.0262	38.188
89.0°	0.9998	0.0175	57.290
89.5°	1.0000	0.0087	114.59
90.0°	1.0000	0.0000	− − −

Square and Root

n	n^2	$\sqrt{n}$
1	1	1.0000
2	4	1.4142
3	9	1.7321
4	16	2.0000
5	25	2.2361
6	36	2.4495
7	49	2.6458
8	64	2.8284
9	81	3.0000
10	100	3.1623

Opinions, excuses etc.