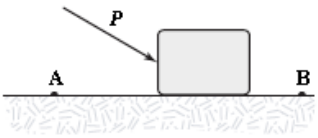
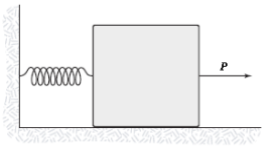
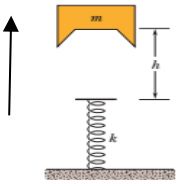
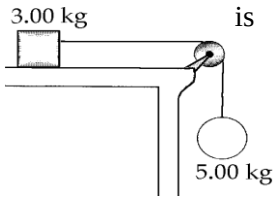
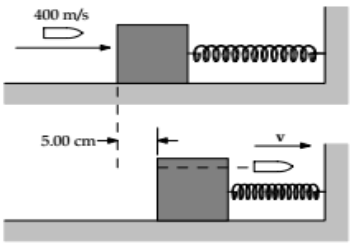
1	A race car travels 40 m/s around a banked (45° with the horizontal) circular (radius = 0.20 km) track. The magnitude of the resultant force on the 60 kg driver is: A) 680 N B) 640 N C) 420 N D) 480 N E) 560 N	D
2	A pilot of mass 75 kg flying in a vertical circle is weightless at the top of the circle. If his speed at the top of the circle is 60 m/s, the radius of the circle is: A) 218.1 m B) 255.1 m C) 367.3 m D) 394.2 m E) 431.1 m	C
3	A 2 kg projectile moves from its initial position to a point that is displaced 20 m horizontally and 18 m above its initial position. The work done by the gravitational force on the projectile is: A) -353 J B) -372 J C) -263 J D) -294 J E) -182 J	A
4	A block is pushed with a force P=5.4 N across a rough horizontal surface a distance of 0.5 m as shown in the figure. The magnitude of the force of friction acting on the block during this distance is 1.2 N. If the initial and final kinetic energies of the block are 4 J and 8.6 J, respectively. The work done on the block by the force P is:  A) 7.2 J B) 1.3 J C) 2.2 J D) 4.1 J E) 5.2 J	E
5	When a crate of mass m is dragged a distance d along a surface with coefficient of kinetic friction μ_k, then dragged back along the same path to its original position, the work done by friction is: A) $-\mu_k mgd$ B) $+2\mu_k mgd$ C) $+\mu_k mgd$ D) $-2\mu_k mgd$ E) 0	D
6	A 6 kg block on a horizontal frictionless surface is attached to a light spring (force constant = 0.80 kN/m).The block is initially at rest at its equilibrium position when a force (magnitude P = 80 N) acting parallel to the surface is applied to the block, as shown. What is the speed of the block when it is 13 cm from its equilibrium position?  A) 1.1 m/s B) 0.85 m/s C) 1.84 m/s D) 0.72 m/s E) 2.12 m/s	A
7	A spring (k = 600 N/m) is placed in a vertical position with its lower end supported by a horizontal surface. The upper end is depressed 20 cm, and a 4 kg block is placed on top of the depressed spring, but not attached to the spring. The system is then released from rest. How far above the point of release will the block rise?  A) 1.45 m B) 0.86 m C) 0.31 m D) 0.72 m E) 1.11 m	C
8	A stone with a weight of 5.29 N is launched vertically from ground level with an initial speed of 15 m/s, and the air resistance force is 0.265 N throughout the flight. What is the maximum height reached by the stone? A) 10.9 m B) 30.4 m C) 37.5 m D) 19.4 m E) 25.7 m	A

9	The coefficient of friction between the 3 kg block and the surface in the figure is 0.4. The system starts from rest. What is the speed of the 5 kg ball when it has fallen 2.5 m?  A) 3.74 m/s B) 1.76 m/s C) 4.82 m/s D) 2.28 m/s E) 5.71 m/s	C
10	Which of the following is a conservative force? (All refer to a car on a slope.) A) The force you exert on the car pushing it uphill. B) The gravitational force acting on the car. C) The frictional force of the road on the car. D) The force exerted by rain drops falling on the car. E) The force you exert on the car (pushing it up hill) after it starts to slide downhill.	B
11	What is the power output of an engine of 1200 kg car if the car can go from 25 km/h to 100 km/h in 11 s? A) 28.12 kW B) 36.17 kW C) 42.17 kW D) 39.46 kW E) 33.39 kW	D
12	In the figure, a bullet of mass 5 g, moving with a speed of 400 m/s, hits and passes through a 1 kg block. The block, initially at rest on a frictionless horizontal surface, is connected to a spring of force constant 900 N/m. If the block moves 5 cm to the right after impact, the speed at which the bullet emerges from the block:  A) 100 m/s B) 73 m/s C) 119 m/s D) 88 m/s E) 107 m/s	A
13	A 3 kg ball with an initial velocity of (4**i** + 3**j**) m/s collides with a wall and rebounds with velocity of (–4**i** + 3**j**) m/s. What is the impulse exerted on the ball by the wall? A) +28 **j** N s B) +18 **j** N.s C) -16 **j** N.s D) -24 **i** N.s E) -36 **j** N.s	D
14	A glass vase falls off a table, but lands on a thicker carpet and does not break. The vase has a mass of 0.5 kg and falls a distance of 0.8 m before hitting the carpet. It is in contact with the carpet for 0.2 s before completely stopping. Which of the following is closest to the average stopping force that the carpet applies against the vase? A) 7 N B) 23 N C) 14 N D) 10 N E) 19 N	D
15	Two cars collide in a low-speed collision in an intersection. After the collision, the two are cars stuck together. Which of the following statements is true about this collision? A) Kinetic energy is conserved, but momentum is not. B) Momentum is conserved, but kinetic energy is not. C) Both momentum and kinetic energy are conserved. D) Neither momentum nor kinetic energy is conserved. E) It is impossible to tell.	B

The end

Rough work