EXAM2-022

Q1 Q0 A 5.0-kg object is pulled along a rough horizontal surface at
7 Q0 constant speed by a 15 N force acting 30 degrees above the
Q0 horizontal (see Fig.1). How much work is done by the friction
Q0 force as the object moves 6.0 m?
Q0
A1 -78 J
A2 -82 J
A3 -85 J
A4 -75 J
A5 0 J
Q0
Q2 Q0 A 2.0-kg block slides 2.0 m down a frictionless incline from
7 Q0 point A to point B. A force (magnitude F =3.0 N) acts on the
Q0 block between A and B, as shown in Fig.2. If the kinetic energy
Q0 of the block at A is 10 J, what is its kinetic energy at B?
Q0
A1 24 J
A2 20 J
A3 27 J
A4 17 J
A5 37 J
Q0
Q3 Q0 A 2.0-kg object moves along the +x-axis with a speed of 5 m/s
7 Q0 under the influence of a force F= (3i+4j) N. What is the power
Q0 delivered by this force?
Q0
A1 15 W
A2 20 W
A3 25 W
A4 35 W
A5 30 W
Q0
Q4 Q0 A 12-kg block is resting on a horizontal frictionless surface.
8 Q0 The block is attached to an unstretched spring (k= 800 N/m) (see
Q0 Fig.3). A force F = 80 N parallel to the surface is applied to
Q0 the block. What is the speed of the block when it is displaced
Q0 by 13 cm from its initial position?
Q0
A1 0.78 m/s
A2 0.85 m/s
A3 1.1 m/s
A4 0.58 m/s
A5 0.64 m/s
Q0
Q5 Q0 A block of mass m = 10 kg is connected to unstretched spring
8 Q0 (k=400 N/m) (see Fig. 4). The block is released from rest. If
Q0 the pulley is massless and frictionless, what is the maximum
Q0 extension of the spring?
Q0
A1 49 cm
A2 25 cm
A3 33 cm
A4 55 cm
A5 11 cm
Q0
Q6 Q0 A 0.6-kg ball is suspended from the ceiling at the end of a
8 Q0 2.0-m string. As this ball swings, it has a speed of 4.0 m/s at
Q0 the lowest point of its path. What maximum angle does the string

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FIGURE 1

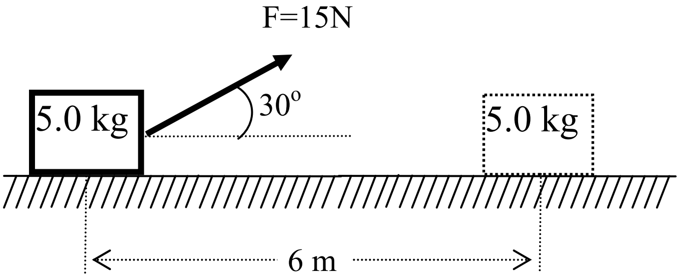


FIGURE 2

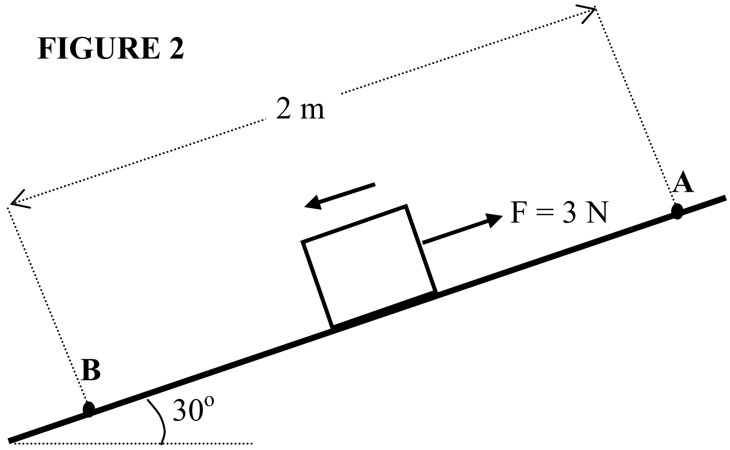


FIGURE 3

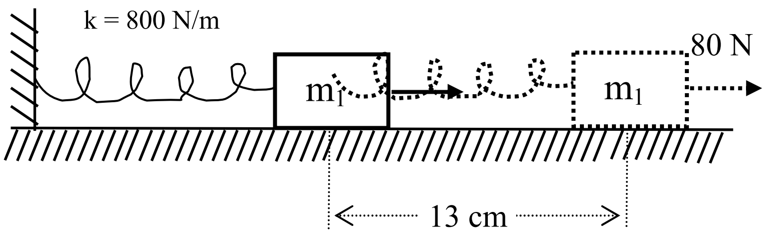


FIGURE 4

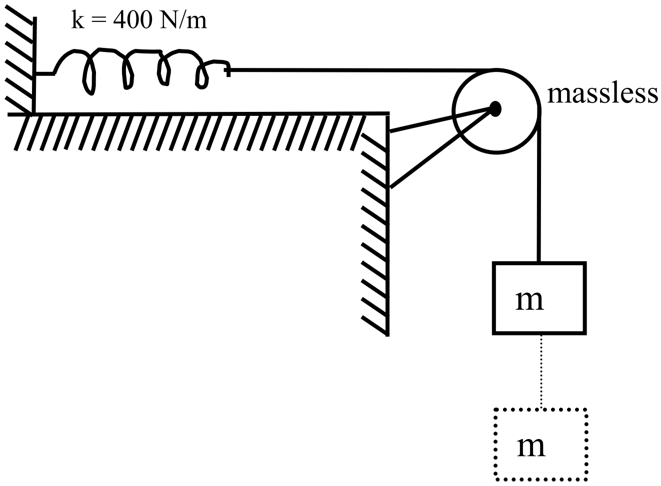


FIGURE 5

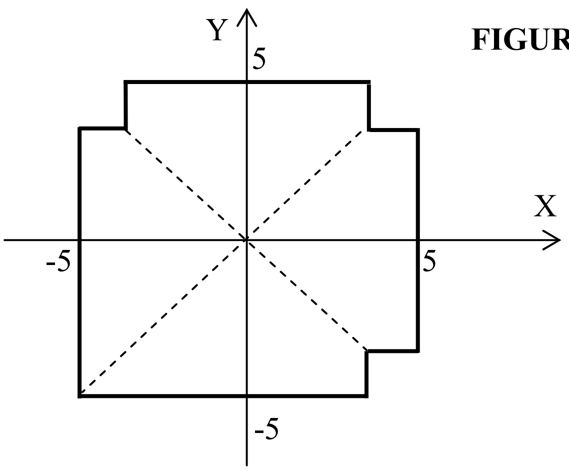


FIGURE 6

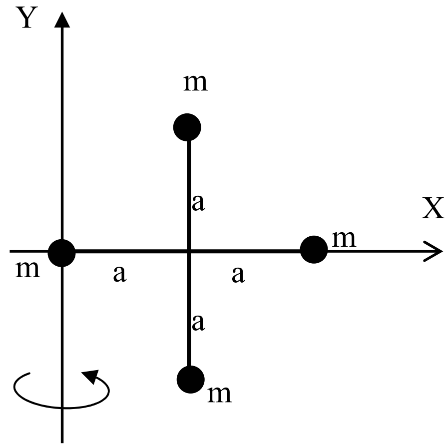
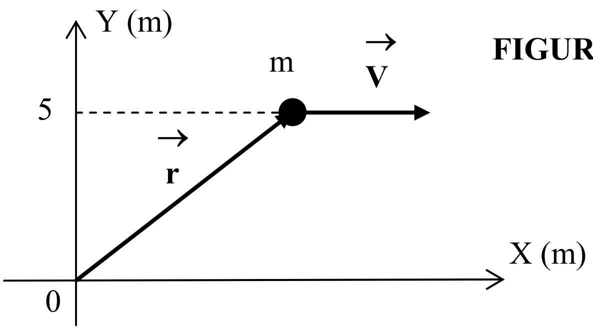


FIGURE 7



Q0 make with the vertical as the ball swings?
Q0
A1 54 degrees
A2 61 degrees
A3 69 degrees
A4 77 degrees
A5 47 degrees
Q0
Q7 Q0 When applied to a single object, a force is conservative if:
8 Q0
A1 its work done for motion in closed paths is equal to zero.
A2 its work done for motion in closed paths is greater than zero.
A3 it is parallel to the displacement always.
A4 it does equal work in equal displacement.
A5 its work done for motion in closed paths is less than zero.
Q0
Q8 Q0 Fig. 5 shows a uniform square sheet from which three identical
9 Q0 corners are removed. What is the location of its center of mass?
Q0
A1 in the third quadrant.
A2 along the x-axis
A3 along the y-axis
A4 in the first quadrant.
A5 in the second quadrant.
Q0
Q9 Q0 Car A (mass 1000 kg) travels east with a constant velocity of
9 Q0 80 km/h. Car B (mass 1500 kg) has an unknown velocity. If the
Q0 center of mass of these two cars is moving with a velocity of
Q0 24 km/h due north, find the velocity of car B.
Q0 (Take i and j along east and north respectively).
Q0
A1 (-53i + 40j) km/h
A2 (30i + 40j) km/h
A3 (-40i + 18j) km/h
A4 (18i - 40j) km/h
A5 (35i + 35j) km/h
Q0
Q10Q0 A 80-kg hunter gets a rope around a 120-kg polar bear. They are
9 Q0 stationary, 10 m apart, on frictionless level ice. When the
Q0 hunter pulls the polar bear to him, the polar bear will move:
Q0
A1 4.0 m
A2 6.0 m
A3 5.0 m
A4 8.0 m
A5 2.0 m
Q0
Q11Q0 Initially a 2-kg disk is moving north at 3 m/s on a horizontal
10 Q0 smooth ice surface. Then a 4-N force in the east direction acts
Q0 on the disk for 1.5 s. What is the final velocity of the disk?
Q0 (Take i and j along east and north respectively).
Q0
A1 (3i + 3j) m/s
A2 (3i + 4j) m/s
A3 6(m/s) in the northeast direction.
A4 zero
A5 (5i) m/s
Q0
Q12Q0 A 2.0-kg and a 3.0-kg carts approach each other on a horizontal
10 Q0 air track in such a way that their center of mass has a speed of

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   Q0 2.0 m/s. They collide and stick together. After the collision
   Q0 their total kinetic energy in joules is:
   Q0
   A1 10
   A2 4.0
   A3 can't tell from the given data
   A4 6.0
   A5 5.0
   Q0
Q13Q0 Sphere A of mass 200 g is moving with VAi = +6.0 m/s. It makes
10 Q0 a head-on collision with sphere B of mass 400 g at rest.
   Q0 After collision sphere B moves with VBf = +3.0 m/s.
   Q0 What is the velocity of sphere A after collision?
   Q0
   A1  0   m/s
   A2 -2.0 m/s
   A3  4.0 m/s
   A4  3.0 m/s
   A5  2.0 m/s
   Q0
Q14Q0 The angular speed in rad/s of the minute hand of a watch is:
11 Q0 (Note that PI = 3.14159..)
   Q0
   A1 PI/1800
   A2 PI/60
   A3 PI/3600
   A4 2*PI
   A5 60
   Q0
Q15Q0 A wheel of radius 0.10 m has a 2.5 m cord wrapped around its
11 Q0 outside edge. Starting from rest, the wheel is given a constant
   Q0 angular acceleration of 2.0 rad/s**2. The cord will unwind in:
   Q0
   A1 5.0  s
   A2 2.0  s
   A3 8.0  s
   A4 0.82 s
   A5 130  s
   Q0
Q16Q0 A disk starts from rest and rotates around a fixed axis, subject
11 Q0 to a constant net torque. The work done by the torque from t=0
   Q0 to t=3.0 s is W1 and the work done from t=0 s to t=6 s is W2.
   Q0 The value of W1/W2 is:
   Q0
   A1 1/4
   A2 2
   A3 1/2
   A4 1
   A5 4
   Q0
Q17Q0 Four identical particles, each with mass m, are arranged in the
11 Q0 x, y plane as shown in Fig. 6. They are connected by massless
   Q0 rods to form a rigid body. If m =2.0 kg and a =1.0 m, the
   Q0 rotational inertia of this array about the y-axis is:
   Q0
   A1 12  kg.m**2
   A2 4.0 kg.m**2
   A3 9.6 kg.m**2
   A4 4.8 kg.m**2
   A5 16  kg.m**2
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   Q0
Q18Q0 A 2-kg particle moves in the xy plane with constant speed of
12 Q0 3.0 m/s in the +x-direction along the line y = 5 m (see Fig.7).
   Q0 What is its  angular momentum (in kg.m**2/s) relative to the
   Q0 origin? (i, j, k are the unit vectors in x, y, z axes)
   Q0
   A1 -30 k
   A2 +30 k
   A3 -15 j
   A4 +15 j
   A5 -30 i
   Q0
Q19Q0 A solid sphere rolls without slipping along the floor. The ratio
12 Q0 of its translational kinetic energy to its rotational kinetic
   Q0 energy (about an axis through its center of mass) is:
   Q0
   A1 5/2
   A2 7/5
   A3 2/5
   A4 1/2
   A5 1/3
   Q0
Q20Q0 A man, with his arms at his sides, is spinning on a light
12 Q0 frictionless turntable. When he extends his arms:
   Q0
   A1 his angular momentum remains the same
   A2 his angular velocity remains the same
   A3 his rotational inertia decreases
   A4 his rotational kinetic energy increases
   A5 his angular velocity increases
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