1. Q0 As a 2.0 kg object moves along the x axis, the only force
   Q0 acting on it is given by
   Q0 F = (4 X) N
   Q0 where X is measured in m. What is the work done by this force
   Q0 as the object moves from X = 1.0 m to X = 3.0 m?
   Q0
   A1 16 J
   A2 8 J
   A3 12 J
   A4 32 J
   A5 28 J
   Q0
2. Q0 In Fig(1), a block (M = 2.0 kg) slides on a frictionless
   Q0 horizontal surface towards a spring with a spring constant
   Q0 k = 2000 N/m. The speed of the block just before it hits
   Q0 the spring is 6.0 m/s. How fast is the block moving at the
   Q0 instant the spring has been compressed 15 cm?
   Q0
   A1 3.7 m/s
   A2 4.4 m/s
   A3 4.9 m/s
   A4 5.4 m/s
   A5 14 m/s
   Q0
3. Q0 In Fig(2), a 2.0 kg block slides down a 30 deg frictionless
   Q0 incline from point A to point B. A force (magnitude F = 3.0 N)
   Q0 acts on the block between A and B. Points A and B are 2.0 m
   Q0 apart. If the kinetic energy of the block at A is 10 J, what
   Q0 is the kinetic energy of the block at B?
   Q0
   A1 24 J
   A2 20 J
   A3 27 J
   A4 17 J
   A5 37 J
   Q0
4. Q0 A 2.0 kg block is pulled at a constant speed of 1.1 m/s
   Q0 across a horizontal rough surface by an applied force of 12 N
   Q0 directed 30 degrees above the horizontal. At what rate is the
   Q0 frictional force doing work on the block?
   Q0
   A1 -11.4 W
   A2 +5.8 W
   A3 -13.2 W
   A4 +13.2 W
   A5 -4.9 W
   Q0
5. Q0 An object moves from point A to point B. Only two forces act
   Q0 on it: one force is nonconservative and does - 40 J of work,
   Q0 and the other force is conservative and does +60 J of work.
   Q0 Between points A and B, K is the kinetic energy of object,
   Q0 and E is its mechanical energy.
   Q0 Which of the following statements is correct?
   Q0
   A1 K increases, E decreases.
   A2 K decreases, E decreases.
   A3 K decreases, E increases.
   A4 K increases, E increases.
   A5 None of the other answers.
   Q0

PHYS101 - SECOND MAJOR EXAM – FIGURES
Term-021

FIGURE-1

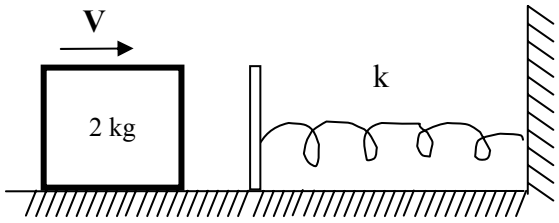


FIGURE-2

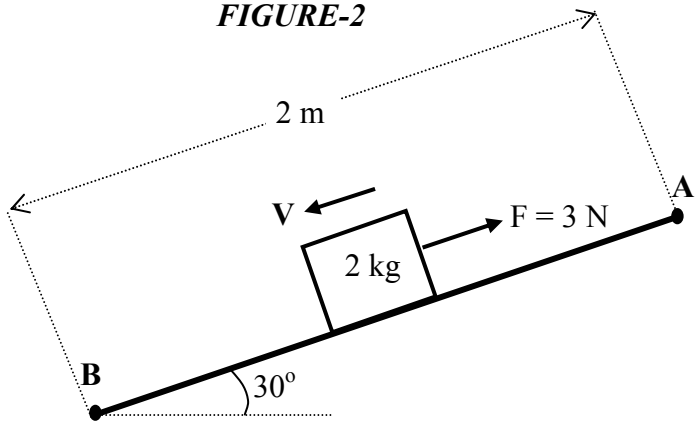


FIGURE-3

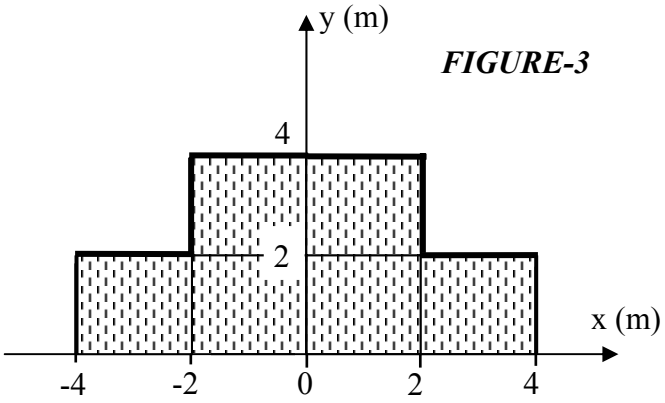


FIGURE-4

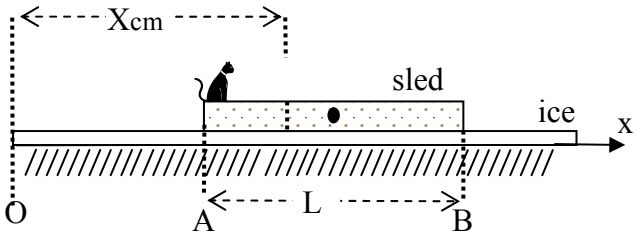
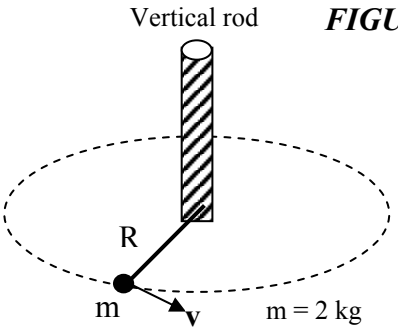


FIGURE-5



m = 2 kg
R_i = 0.75 m, R_f = 0.25 m

FIGURE-6

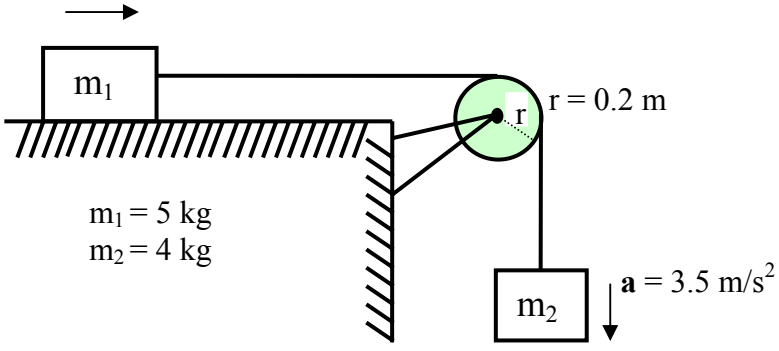
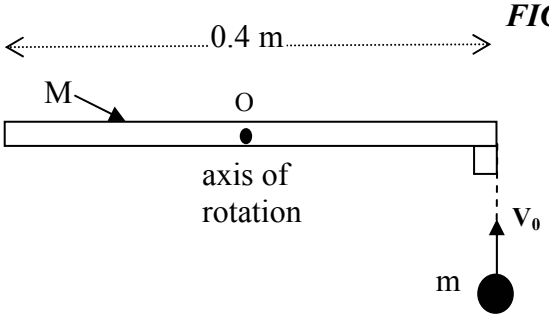


FIGURE-7



6. Q0 A 10 kg object is dropped vertically from rest. After falling
   Q0 a distance of 50 m, it has a speed of 26 m/s. How much work
   Q0 is done by the air resistance on the object during this
   Q0 descent?
   Q0
   A1 -1500 J
   A2 -1300 J
   A3 -1800 J
   A4 -2000 J
   A5 -2300 J
   Q0
7. Q0 A 3.0 kg particle is moving along the +x direction at 30 m/s
   Q0 toward a stationary 7.0 kg particle. What is the velocity of
   Q0 the center of mass of the two particles?
   Q0
   A1 9.0 m/s
   A2 0   m/s
   A3 19 m/s
   A4 30 m/s
   A5 15 m/s
   Q0
8. Q0 A 3.0 kg object, initially at rest explodes into three pieces
   Q0 of equal mass. Two pieces move perpendicular to each other,
   Q0 each with a speed of 10 m/s. What is the speed of the third
   Q0 piece?
   Q0
   A1 14 m/s
   A2 10 m/s
   A3 5.0 m/s
   A4 20 m/s
   A5 0   m/s
   Q0
9. Q0 A uniform plate is shaped as in Fig(3). Find the coordinates
   Q0 of the center of mass of the plate?
   Q0
   A1 (0,1.67) m
   A2 (0,0) m
   A3 (0,1.5) m
   A4 (1.5,0) m
   A5 (0,2) m
   Q0
10. Q0 In Fig(4), a dog stands at the edge (A) of a uniform sled of
    Q0 length L which lies on frictionless ice. The sled and the dog
    Q0 have equal mass. The center of mass of the dog-sled system
    Q0 is at a distance Xcm from the fixed point O. As the dog walks
    Q0 toward edge (B), which of the following statements is correct?
    Q0
    A1 The center of mass remains at the same distance from point O.
    A2 The center of mass moves away from point O.
    A3 The center of mass moves toward point O.
    A4 The sled does not move.
    A5 The sled moves away from point O.
    Q0
11. Q0 A 0.2 kg ball drops vertically onto a floor, hitting with
    Q0 a speed of 30 m/s. The ball rebounds up with a speed of
    Q0 20 m/s. The ball is in contact with the floor for 0.01 s.
    Q0 The magnitude of the average force of the floor on the ball
    Q0 during this time is:
    Q0

A1 1000 N
A2 600 N
A3 2000 N
A4 1600 N
A5 1800 N
Q0

12.Q0 A particle (A) has a mass m and is moving with a velocity v.
Q0 It makes a head-on elastic collision with a particle (B)
Q0 of mass 2m at rest. After the collision, their velocities
Q0 (vA, and vB) are:
Q0
A1 -v/3, 2v/3
A2 0 , v/2
A3 -v, v
A4 -2v/3, v/3
A5 none of these
Q0

13.Q0 Block A(mass = 2.0 kg, velocity = 50 m/s) and block B(mass =
Q0 5 kg, velocity= -20 m/s)are moving towards each other along
Q0 the x axis. They collide and stick together after collision.
Q0 The kinetic energy lost during the collision is:
Q0
A1 3500 J
A2 5000 J
A3 5600 J
A4 0
A5 1200 J
Q0

14.Q0 A disk has a rotational inertia of 6.0 kg.m**2 and a constant
Q0 angular acceleration of 2.0 rad/s**2. If it starts from rest,
Q0 the work done by the net torque on it during the first 5.0
Q0 seconds is:
Q0
A1 300 J
A2 0 J
A3 60 J
A4 600 J
A5 30 J
Q0

15.Q0 If the net external torque acting on an object rotating about
Q0 a fixed axis is zero, which of the following statements is
Q0 correct?
Q0
A1 The angular momentum of the object will not change.
A2 The angular momentum of the object will change.
A3 The angular acceleration of the object is not zero.
A4 The rotational kinetic energy of the object will change.
A5 The angular velocity of the object will change.
Q0

16.Q0 A 2.0 kg mass is attached to a string and fixed to
Q0 a vertical rod Fig (5). The mass is initially orbiting with
Q0 a speed of 5.0 m/s in a circle of radius 0.75 m. The string
Q0 is then slowly winding around the vertical rod. What is the
Q0 speed of the mass at the moment the string reaches a length
Q0 of 0.25 m?
Q0
A1 15 m/s
A2 3.9 m/s
A3 45 m/s
A4 75 m/s
A5 12 m/s

Q0
17.Q0 A mass (m1 = 5.0 kg) which slides on a frictionless surface is
Q0 connected by a light cord to a mass (m2 = 4.0 kg) , as shown
Q0 in Fig (6). The pulley (radius = 0.20 m) rotates about a
Q0 frictionless axle. The acceleration of m2 is 3.5 m/s**2.
Q0 What is the rotational inertia of the pulley?
Q0
A1 0.088 kg.m**2
A2 0.029 kg.m**2
A3 0.044 kg.m**2
A4 0.062 kg.m**2
A5 0.060 kg.m**2
Q0
18.Q0 A solid ball, whose radius R is 10 cm and whose mass M is
Q0 8.5 kg, rolls smoothly from rest down a 25 deg inclined
Q0 plane whose length L is 5.0 m. What is the speed of the
Q0 center of mass of the ball when it reaches the bottom of
Q0 the inclined plane?
Q0
A1 5.4 m/s
A2 0.98 m/s
A3 5.1 m/s
A4 4.6 m/s
A5 4.2 m/s
Q0
19.Q0 A 2.5 kg block travels around a 0.50 m radius circle with
Q0 an angular velocity of 12 rad/s. Find the magnitude of
Q0 the angular momentum of the block about the center of the
Q0 circle.
Q0
A1 7.5 kg.m**2/s
A2 1.5 kg.m**2/s
A3 6.0 kg.m**2/s
A4 9.0 kg.m**2/s
A5 12 kg.m**2/s
Q0
20.Q0 Fig (7) shows an object of mass m=100 g and velocity =Vo is
Q0 fired onto one end of a uniform thin rod (L=0.4 m, M = 1.0 kg)
Q0 initially at rest. The rod can rotate freely about an axis
Q0 through its center (O). The object sticks to the rod after
Q0 collision. The angular velocity of the system (rod + object)
Q0 is 10 rad/s immediately after the collision. Calculate Vo.
Q0
A1 8.7 m/s
A2 4.0 m/s
A3 1.8 m/s
A4 2.2 m/s
A5 9.5 m/s