```
Q1 Q0
ch Q0 A force F = (4.0 i + 3.0 j ) N acts on a particle
7  Q0 as it moves in the x-y plane from the point (0,10 m)
   Q0 to (10 m,0).Calculate the work done on the particle
   Q0 by this force.
   Q0
   A1 10 J
   A2 25 J
   A3 15 J
   A4 35 J
   A5 20 J
   Q0
Q2 Q0 A 1500 kg car accelerates uniformly from rest to 10 m/s
ch Q0 in 3.0 s. The average power delivered by the engine of
7  Q0 the car in the first 3.0 s is:
   Q0
   A1 25 kW
   A2 20 kW
   A3 15 kW
   A4 10 kW
   A5 30 kW
   Q0
Q3 Q0 The amount of work required to stop a moving object
ch Q0 (mass = M, speed =V, kinetic energy = K) is equal to:
7  Q0
   A1      K
   A2  V
   A3  MV
   A4  V**2
   A5  MV/2
   Q0
Q4 Q0 As a particle moves from point A to point B only two
Ch Q0 forces act on it: one force is non-conservative and
8  Q0 does work = -30 J, the other force is conservative and
   Q0 does +50 J work. The change of the kinetic energy of
   Q0 the particle is:
   Q0
   A1  20 J
   A2   0 J
   A3  30 J
   A4  50 J
   A5  80 J
   Q0
Q5 Q0 A 2.2-kg block starts from rest on a rough inclined
ch Q0 plane that makes an angle of 25 degrees with the
8  Q0 horizontal. The coefficient of kinetic friction is 0.25.
   Q0 As the block goes 2.0 m down the plane, find the change
   Q0 in the  mechanical energy of the  block.
   Q0
   A1  -9.8 J
   A2   9.8 J
   A3  19.6 J
   A4 -19.6 J
   A5   0.0 J
   Q0
Q6 Q0 A 2-kg block is initially moving to the right on a
ch Q0 horizontal frictionless surface at a speed of 10 m/s.
8  Q0 It collides with a spring whose spring constant is
   Q0 100 N/m and is brought to rest momentarily by compressing
   Q0 the spring. Find the compression of the spring.
   Q0
```

PHYS101 Second Major Exam Term-012

FIGURE 1

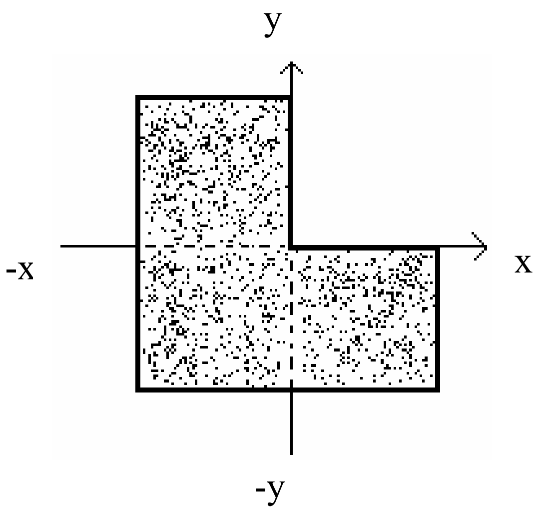


FIGURE 2

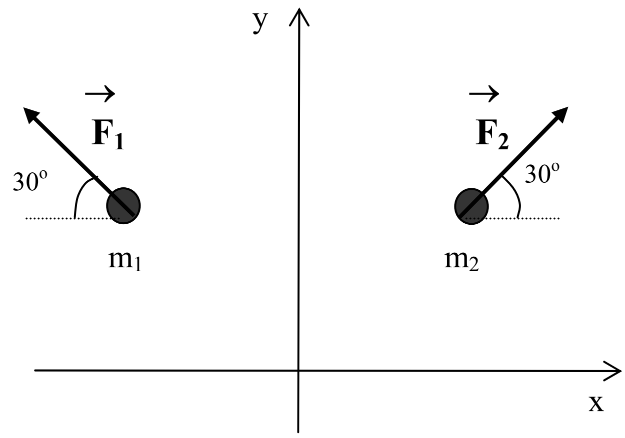


FIGURE 3

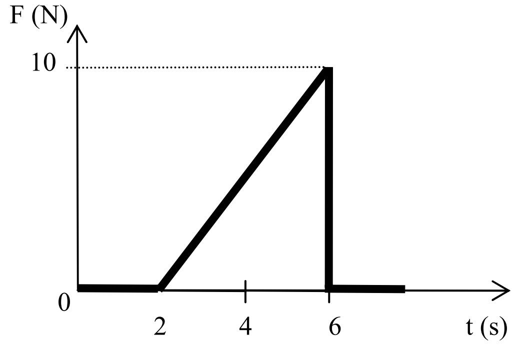


FIGURE 4

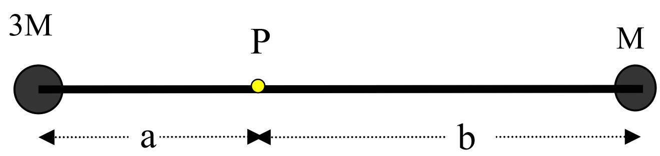


FIGURE 5

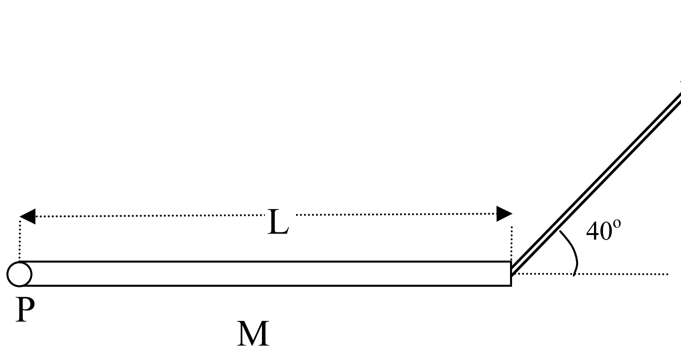
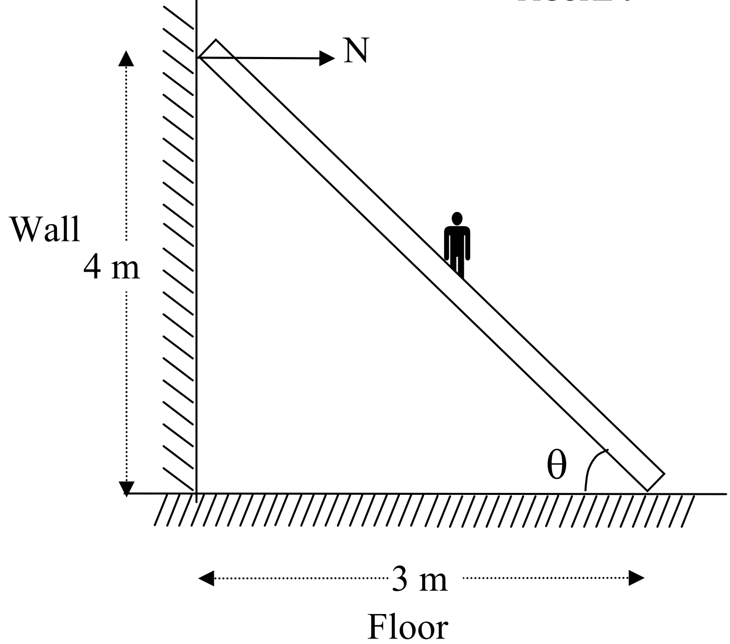


FIGURE 6



```
   A1  1.4 m
   A2  2.0 m
   A3  1.0 m
   A4  1.5 m
   A5  2.5 m
   Q0
Q7 Q0 A uniform plate of the shape shown in Fig. 1. The
ch Q0 center of mass of this plate is located in:
9  Q0
   A1   Quadrant 3
   A2   Quadrant 2
   A3       Quadrant 1
   A4   Quadrant 4
   A5   at the origin O
   Q0
Q8 Q0 A 4.0 kg object moving on a frictionless surface with
ch Q0 speed v explodes into two objects of masses 1.0 kg and
9  Q0 3.0 kg. The 1.0 kg object moves north at 5.0 m/s and the
   Q0 3.0 kg object moves east at 3.0 m/s. What is v?
   Q0
   A1  2.6 m/s
   A2  4.0 m/s
   A3  1.7 m/s
   A4  3.3 m/s
   A5  2.0 m/s
   Q0
Q9 Q0 Two particles m1 and m2,5.0-kg each, are initially at
ch Q0 rest. External forces F1 and F2, 12 N each, are acting
9  Q0 on these particles as shown in Fig.2. The acceleration
   Q0 of the center of mass of the two particles system is:
   Q0
   A1  1.2 j m/s**2
   A2  1.2 i m/s**2
   A3  0.75i m/s**2
   A4  0.75j m/s**2
   A5  (1.2 i + 1.2 j) m/s**2
   Q0
Q10Q0 A 5-kg object is acted upon by a single force in the
ch Q0 x-direction as shown in Fig.3. Find the change of momentum
10 Q0 delivered to the object in 6 s.
   Q0
   A1  20 N.s
   A2  16 N.s
   A3  30 N.s
   A4  10 N.s
   A5  32 N.s
   Q0
Q11Q0 An elastic collision is one in which:
ch Q0
10 A1   Kinetic energy and linear momentum are both conserved.
   A2   Only  kinetic energy is conserved.
   A3   Linear momentum is conserved but mass is not conserved.
   A4   Only momentum is conserved.
   A5   The total impulse is equal to the change in kinetic energy.
   Q0
Q12Q0 Cart A of mass 3.0 kg and cart B of mass 2.0 kg approach
ch Q0 each other on a horizontal air track in such a way that
10 Q0 their center of mass has a speed of 4.0 m/s. They collide
   Q0 and stick together. After the collision the kinetic energy
   Q0 of the two carts system is:
   Q0
```

```
   A1  40 J
   A2  16 J
   A3  20 J
   A4  25 J
   A5  50 j
   Q0
Q13Q0 A rotating wheel has an initial angular velocity Wo.
ch Q0 After 3.00 s its angular velocity is 98 rad/s.If it
11 Q0 completes 37 revolutions during this 3.00 s interval,
ch Q0 find Wo (assume constant angular acceleration).
   Q0
   A1 57.0 rad/s
   A2 88.0 rad/s
   A3 108  rad/s
   A4 41.0 rad/s
   A5 32.0 rad/s
   Q0
Q14Q0 The rigid body shown in Fig. 4 is rotated about an axis
ch Q0 perpendicular to the paper and passing through point P.
11 Q0 If M = 0.40 kg, a = 30 cm, b = 50 cm, find the work
   Q0 required to increase the angular velocity of the body
   Q0 from rest to 5.0 rad/s. (Neglect the force of friction,
   Q0  mass of the connecting rods and treat the particles as
   Q0  point masses).
   Q0
   A1 2.6 J
   A2 2.9 J
   A3 3.4 J
   A4 1.2 J
   A5 4.3 J
   Q0
Q15Q0 A uniform rod of mass M = 1.2 kg and length L = 0.80 m is
ch Q0 pivoted at point P and rests on a horizontal smooth surface
11 Q0 (Fig. 5). If a force (F =5.0 N, theta = 40 degrees) is applied
   Q0 as shown, find its angular acceleration about point P.
   Q0
   A1   10  rad/s**2
   A2   16  rad/s**2
   A3   12  rad/s**2
   A4   8.0 rad/s**2
   A5   33  rad/s**2
   Q0
Q16Q0 A student in a class demonstration is sitting on a frictionless
ch Q0 rotating chair with his arms by the side of his body. The
12 Q0 chair-student system is rotating with an angular speed w. The
   Q0 student suddenly extends his arms horizontally. The angular
   Q0 velocity of the system:
   Q0
   A1  decreases
   A2  increases
   A3  remains the same
   A4  may increase or decrease depending on the mass of the student
   A5  may increase or decrease depending on the mass of the chair
   Q0
Q17Q0 A solid cylinder of mass M and radius R starts from rest and
ch Q0 rolls down an incline plane making an angle of 30 degrees
12 Q0 with the horizontal. The linear speed of its center, after
   Q0 it has travelled 5 m down the incline,is:
   Q0  ( Icm = 1/2* M* R**2)
   Q0
```

```
   A1 5.7 m/s
   A2 3.8 m/s
   A3 2.5 m/s
   A4 4.9 m/s
   A5 1.3 m/s
   Q0
Q18Q0 Force F = (2.0i -3.0j) N, acts on a mass located at
ch Q0 r = (0.50i +2.0j) m. Find the resulting torque (in N.m) about
12 Q0 the origin.
   Q0
   A1 -5.5 k
   A2 +5.5 k
   A3 +2.5 k
   A4 -2.5 k
   A5  0.0 k
   Q0
Q19Q0 An 800-N man stands halfway up a 5.0-m ladder of negligible
ch Q0 weight. The base of  the ladder is 3.0 m from the wall as
13 Q0 shown in Fig. 6  . Assuming that the wall-ladder contact is
   Q0 frictionless,  the wall pushes against the ladder with a
   Q0 force of:
   Q0
   A1   300 N
   A2   100 N
   A3   200 N
   A4   150 N
   A5   380 N
   Q0
Q20Q0 A solid copper cube has an edge length of 85.5 cm. How
ch Q0 much pressure (in N/m**2) must be applied to the cube
13 Q0 to reduce the edge length to 85.0 cm? The bulk modulus
   Q0 of copper is 1.4* 10**11 N/m**2.
   Q0
   A1  2.44* 10**(9)
   A2  4.32* 10**(10)
   A3  8.37* 10**(9)
   A4  6.47* 10**(9)
   A5  5.00* 10**(8)
   Q0
```