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PHYS101=012 final
Q1 Q0  Consider a simple harmonic motion, say as described
ch Q0 by a mass-spring system. The ACCELERATION of the mass
16 Q0 will be maximum when the
***Q0
   A1 displacement of the mass is maximum
   A2 velocity of the mass is maximum
   A3 displacement of the mass is minimum
   A4 potential energy is minimum
   A5 kinetic energy is maximum
   Q0
Q2 Q0  What happens to the FREQUENCY if the length of a
ch Q0 simple pendulum is INCREASED by a factor of FOUR?
16 Q0
***A1 it decreases by a factor of TWO.
   A2 it increases by a factor of TWO.
   A3 it remains constant(i.e. does not change).
   A4 it increases by a factor of FOUR.
   A5 it decreases by a factor of FOUR.
   Q0
Q3 Q0 A particle of mass 0.10 kg is vibrating with simple
ch Q0 harmonic motion with a period of 0.20 s and a maximum
16 Q0 speed of 10 m/s. Find the maximum DISPLACEMENT of the
***Q0 particle.
   Q0
   A1 0.32 m
   A2 0.12 m
   A3 o.53 m
   A4 0.98 m
   A5 0.00 m
   Q0
Q4 Q0 A simple harmonic oscillator is oscillating with an
ch Q0 amplitude A. For what value of the DISPLACEMENT does
16 Q0 the kinetic energy equal the potential energy?
***Q0
   A1 0.707 * A
   A2 0.500 * A
   A3 1.414 * A
   A4 0.816 * A
   A5 1.633 * A
   Q0
Q5 Q0 A 3-kg block, attached to a spring, executes simple
ch Q0 harmonic motion on a horizontal frictionless surface
16 Q0 according to  x = 2 cos(10 t + 3.14) where x is in
***Q0 meters and t is in seconds. Find the magnitude of the
   Q0 maximum ACCELERATION.
   Q0
   A1 200  m/s**2
   A2 400  m/s**2
   A3  20  m/s**2
   A4 500  m/s**2
   A5  00  m/s**2
   Q0
Q6 Q0 The open vertical tube in FIGURE 1 contains two liquids
ch Q0 of densities Rho1 = 1000 kg/m**3 and Rho2 = 600 kg/m**3,
15 Q0 Which do not mix. Find the PRESSURE (in N/m**2) at the
   Q0 bottom of the tube.
***Q0
   A1 1.3* 10**5
   A2 1.9* 10**4
   A3 2.1* 10**4
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PHYS101 Final Exam Term-012

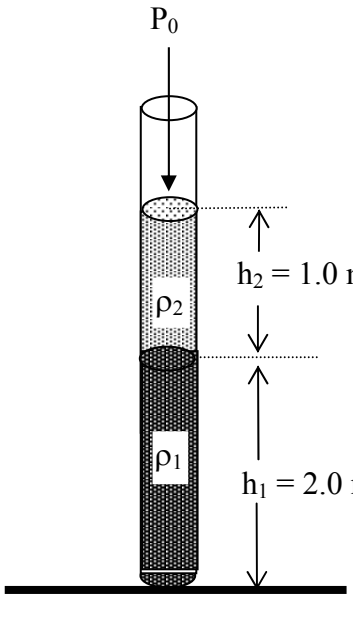
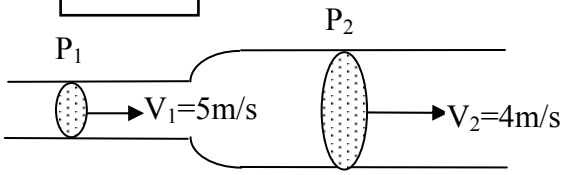


FIGURE 1

FIGURE 2



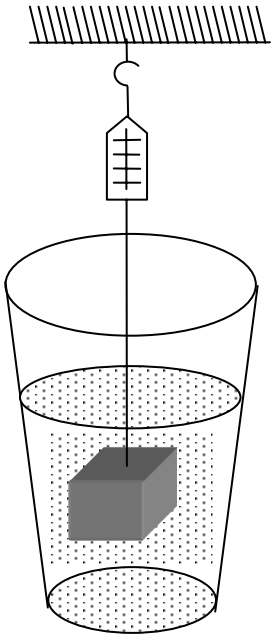


FIGURE 3

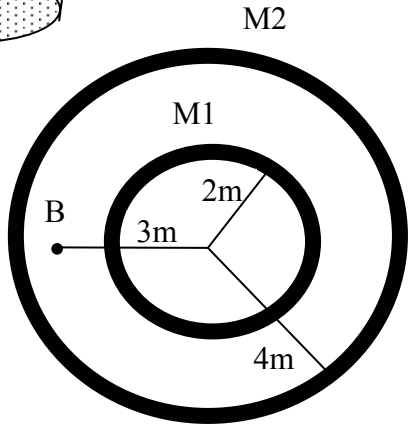


FIGURE 4

FIGURE 5

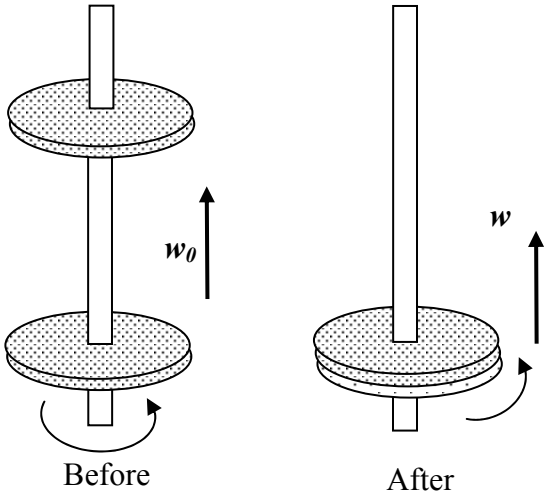


FIGURE 6

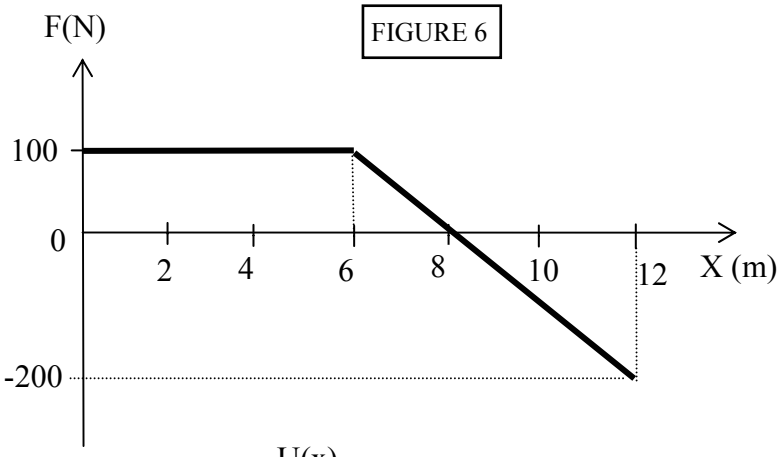


FIGURE 7

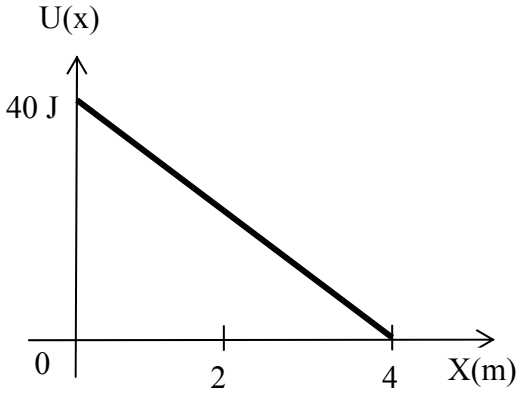
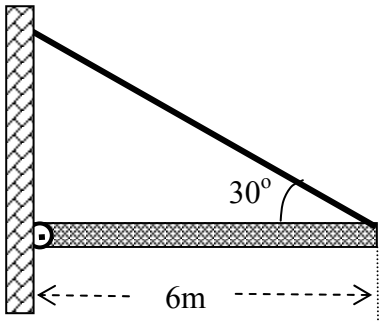


FIGURE 8



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   A4 3.7* 10**5
   A5 0.3* 10**4
   Q0
Q7 Q0 Water (density = 1.0 x 10**3 kg/m**3) flows through a
ch Q0 horizontal pipe as shown in FIGURE 2. At the wider end
15 Q0 its speed is 4.0 m/s and at the narrow end its speed
***Q0 is 5.0 m/s. The DIFFERENCE in pressure,P2 - P1, between
   Q0 the two ends is:
   Q0
   A1 +4.5 x 10**3 Pa
   A2 -4.5 x 10**3 Pa
   A3 +7.0 x 10**2 Pa
   A4 -7.0 x 10**2 Pa
   A5  0.0 Pa
   Q0
Q8 Q0 A 3.20-kg block of metal measuring 15 cm X 10 cm X 10 cm
ch Q0 is suspended from a scale and totally immersed in water
15 Q0 as shown in FIGURE 3. What is the READING of the spring
***Q0 scale (in N)? (density of water = 1.0* 10**3 kg/m**3)
   Q0
   A1  16.7
   A2  10.3
   A3  28.9
   A4  31.4
   A5  14.7
   Q0
Q9 Q0 A block of wood floats in water with two-third of its volume
ch Q0 submerged. Find the DENSITY of the wood (in kg/m**3).
15 Q0  ( Density of water is 1.0* 10**3 kg/m**3).
***Q0
   A1    667
   A2 1500
   A3   1000
   A4    500
   A5  333
   Q0
Q10Q0 The rate of flow of water through a horizontal pipe
ch Q0 is 2.0 m**3/minute. Determine the SPEED of flow at
15 Q0 a point where the radius of the pipe is 5.0 cm.
***Q0
   A1 4.2  m/s
   A2 2.0  m/s
   A3 6.0  m/s
   A4 5.3  m/s
   A5 7.2  m/s
   Q0
Q11Q0 Two concentric shells of uniform density having masses
ch Q0 M1 and M2 and Radii R1 =2.0 m, R2 = 4.0 m are situated
14 Q0 as shown in FIGURE 4. Find the gravitational FORCE on
   Q0 a particle of mass m placed at point B at a distance of
   Q0 3.0 m from the center :
***Q0
   A1   (G*M1*m)/9
   A2   G*(M1+M2)*m/9
   A3   G*(M1+M2)*m/3
   A4   (G*M2)*m/16
   A5   G*(M1+M2)*m/4
   Q0
Q12Q0 Three particles with equal mass M = 2.0 kg are located
ch Q0 at (0,0), (4,0) and (0,3) where the x and y coordinates
14 Q0 are in meters. Find the magnitude of the gravitational
```

```
   Q0 FORCE exerted on the particle located  at  the origin by
   Q0 the other two particles.
   Q0
   A1  3.4* 10**(-11)  N
   A2  4.6* 10**(-11)  N
   A3  5.2* 10**(-12)  N
   A4  1.7* 10**(-10)  N
   A5  2.6* 10**(-11)  N
   Q0
Q13Q0 A moon is moving in a circular orbit around a planet with
ch Q0 a period of 2.75* 10**4 s. Find the MASS of the planet if the
14 Q0 radius of the orbit is 9.4* 10**6 m.
***Q0
   A1  6.5* 10**23 kg
   A2  5.9* 10**26 kg
   A3  2.3* 10**25 kg
   A4  4.2* 10**23 kg
   A5  7.6* 10**35 kg
   Q0
Q14Q0 A 1000-kg rocket is fired vertically from Earth's surface
ch Q0 with zero total mechanical energy. With what KINETIC energy
14 Q0 was it fired?
***Q0 (Mass of Earth = 6.0* 10**24 kg, Re = 6.4* 10**6 m)
   Q0
   A1 6.3* 10**10 J
   A2 3.1* 10**10 J
   A3 5.2* 10**6  J
   A4   1.0* 10**9  J
   A5 9.8* 10**7  J
   Q0
Q15Q0 Calculate the WORK required to move an Earth satellite of
ch Q0 mass m from a circular orbit of radius 3Re to one of radius
14 Q0 4Re.(Re = radius of the the earth, Me = Mass of the Earth and
   Q0  G = Gravitational constant)
***Q0
   A1 (G*m*Me)/24*Re
   A2 (G*m*Me)/12*Re
   A3 (G*m*Me)/6*Re
   A4 (G*m*Me)/8*Re
   A5 (G*m*Me)/4*R
   Q0
Q16Q0 A 5.00-kg ball moving horizontally hits a wall  with a
ch Q0 speed of 5.00 m/s and rebounds with a speed of 2.00 m/s.
10 Q0 Find the magnitude of the IMPULSE exerted on the ball
***Q0 by the wall.
   Q0
   A1 35.0 N.s
   A2 25.0 N.s
   A3 10.0 N.s
   A4 15.0 N.s
   A5 40.0 N.s
   Q0
Q17Q0 As shown in FIGURE 5 a disk rotates about a vertical,
ch Q0 frictionless axle with angular velocity 50 rad/s.
12 Q0 A second identical disk, initially NOT rotating, drops
***Q0 onto the first disk and the two disks eventually reach
   Q0 an angular velocity W. Calculate W (in rad/s).
   Q0
   A1 25
   A2 50
   A3 75
```

```
   A4 35
   A5 15
   Q0
Q18Q0 The only force acting on a 1.5-kg particle as it moves along
ch Q0 the x-axis varies as shown in FIGURE 6. The particle was at
7  Q0 rest at x = 0. Find the SPEED of the particle at x = 12 m.
***Q0
   A1 20  m/s
   A2 30  m/s
   A3 45  m/s
   A4 15  m/s
   A5 0.0 m/s
   Q0
Q19Q0 One end of a 0.80 m string is fixed, the other end
ch Q0 is attached to a 2.00-kg stone. The stone swings in
6  Q0 a vertical circle, passing the bottom point at 10.0 m/s.
***Q0 The RADIAL acceleration of the stone at the top of the
   Q0 circle is:
   Q0
   A1 86    m/s**2
   A2 125   m/s**2
   A3 100   m/s**2
   A4 39    m/s**2
   A5 0     m/s**2
   Q0
Q20Q0 As a particle moves along the x-axis it is acted on by
Ch Q0 a conservative force F(x). The potential energy U(x) of
8  Q0 the particle as a function of x is shown in Figure 7.
***Q0 The FORCE F(x) is:
   Q0
   A1 +10 N
   A2 -10 N
   A3 +20 N
   A4 -20 N
   A5 0.0 N
   Q0
Q21Q0 At time t, a 2.0-kg object has a position vector
ch Q0  r = (3.5  + 1.6 t) i-2.7 j + 3.0 k, with r in meters
9  Q0 and t in seconds. The LINEAR momentum of the object is
   Q0 (in kg.m/s):
***Q0
   A1  3.2 i
   A2  7.0 i
   A3 -5.4 i
   A4 7.0 i + 3.2 j
   A5 0.0
   Q0

Q22Q0 By exerting a horizontal force of 200 N a man pushes a
ch Q0 box of weight 3000 N over a horizontal distance of
7  Q0 5 m along a level road. The WORK done by the man is:
***Q0
   A1 1000  J
   A2 15000 J
   A3 1531  J
   A4 8000  J
   A5 7500  J
   Q0
Q23Q0 A certain wheel has a rotational inertia of 12 kg*m**2. Under
ch Q0 the application of a certain CONSTANT torque, it turns through
11 Q0 5.0 revolutions and its an angular velocity increases from
```

***Q0 5.0 rad/s to 6.0 rad/s. Find the value of the TORQUE.
   Q0
   A1 2.1 N.m
   A2 5.7 N.m
   A3 3.3 N.m
   A4 1.1 N.m
   A5 3.6 N.m
   Q0
Q24Q0 Increasing the angular speed of a rotating body will not
ch Q0 cause an increase in (Choose the CORRECT answer):
11 Q0
***A1 the moment of inertia
   A2 angular momentum
   A3 linear speed
   A4 rotational kinetic energy
   A5 the frequency
   Q0
Q25Q0 A horizontal uniform beam of weight W = 200 N and length
ch Q0 L = 6.0 m is supported by a hinge and a cable as shown
13 Q0 in Figure 8. The system is in equilibrium. find the
   Q0 TENSION in the cable.
***Q0
   A1 200 N
   A2 100 N
   A3 400 N
   A4 500 N
   A5 150 N
   Q0
Q26Q0 For two vectors A = 3i +2j and B = i - 3j,
ch Q0 find (AXB)/(A.B).
3 Q0
***A1 (+ 11/3) k
   A2 (- 11/3) k
   A3 (+ 7/9) k
   A4 (- 7/9) k
   A5 (+ 11/9) k
   Q0
Q27Q0 A 27.6-gram gold is in the form of a right circular
ch Q0 cylinder of radius 2.50 micrometer and length L. Find
1 Q0 L (Take the density of gold to be 19.32 g/cm**3).
***Q0
   A1 7.3* 10**4 m
   A2 7.3* 10**8 m
   A3 1.2* 10**3 m
   A4 1.2* 10**5 m
   A5 6.4* 10**7 m
   Q0
Q28Q0 A gunner can hit a target 200 m away if he aims his
ch Q0 gun at 55 degrees above the horizontal. At what OTHER
4 Q0 ANGLE can he aim his gun and still hit the target?
***Q0
   A1 35 degrees
   A2 15 degrees
   A3 45 degrees
   A4 75 degrees
   A5   60 degrees
   Q0
Q29Q0 Find the COEFFICIENT of kinetic friction for which
ch Q0 a body of mass m = 2.0 kg will slide down a 10 degree
6 Q0 inclined plane with constant velocity.
   Q0

```
   A1 0.18
   A2 0.32
   A3   0.23
   A4 0.00
   A5   0.50
   Q0
Q30Q0 A stone is thrown vertically upward with a speed of
ch Q0 8.0 m/s. Find its ACCELERATION just before it hits
 2 Q0 the ground.
***Q0
   A1 9.8 m/s**2 (downward)
   A2 9.8 m/s**2 (upward)
   A3 8.0 m/s**2 (downward)
   A4 8.0 m/s**2 (upward)
   A5 0.0 m/s**2
   Q0
```