

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 0.53 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

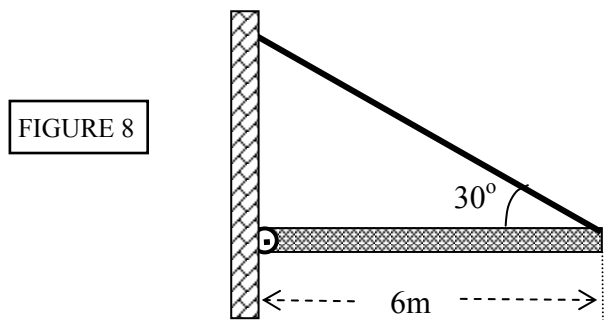
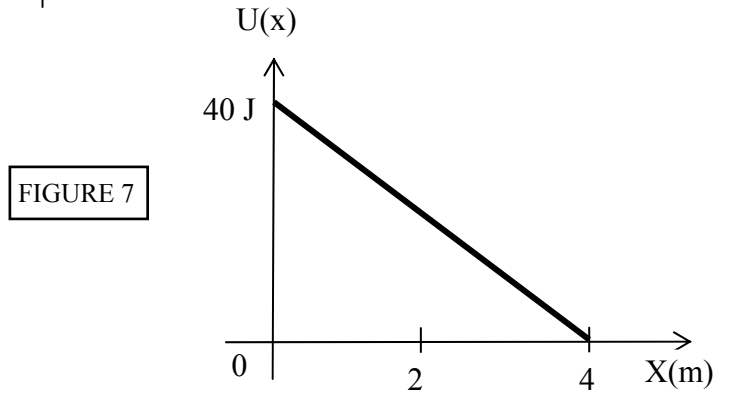
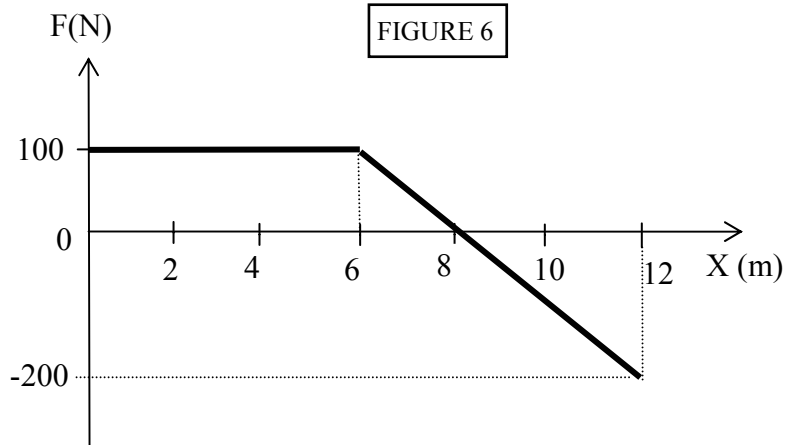
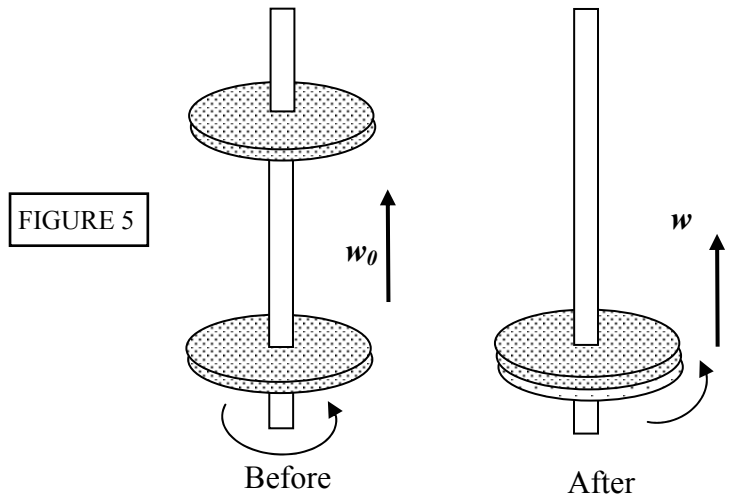
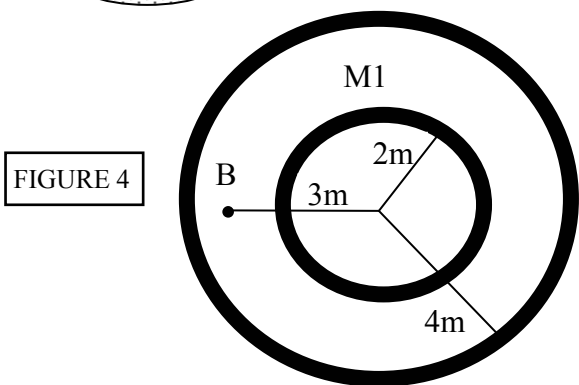
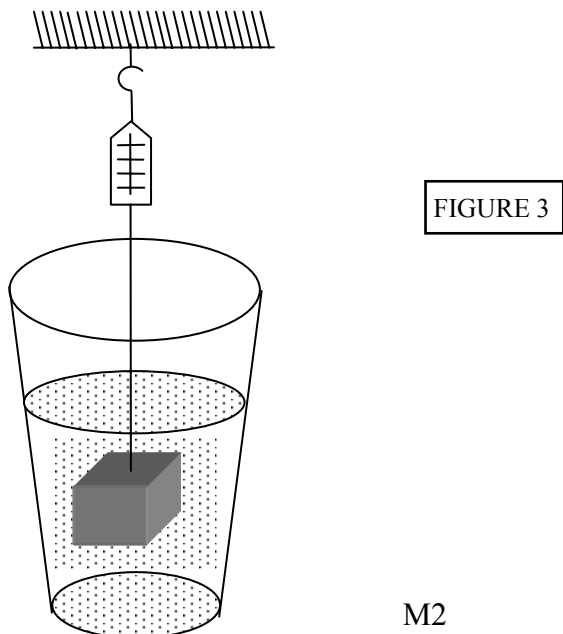
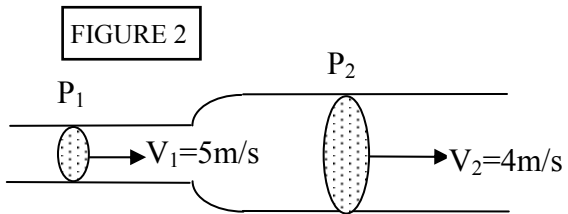
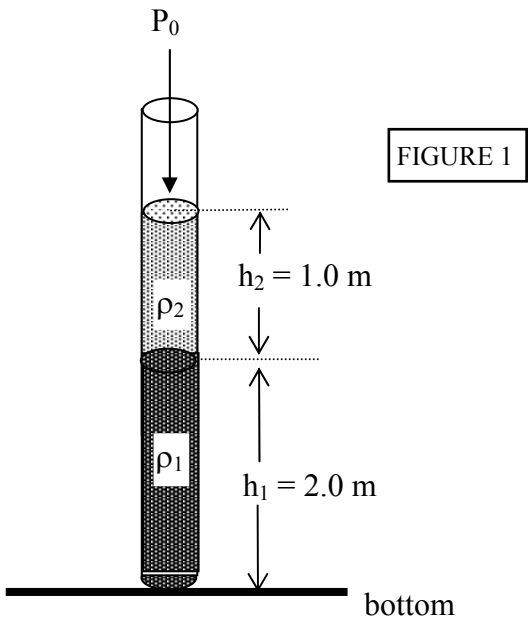
Q0

Q6 Q0 The open vertical tube in FIGURE 1 contains two liquids
ch Q0 of densities $\rho_{01} = 1000 \text{ kg/m}^{**3}$ and $\rho_{02} = 600 \text{ kg/m}^{**3}$,
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 $2.1 * 10^{**4}$

PHYS101 Final Exam Term-012



A4 3.7×10^5

A5 0.3×10^4

Q0

Q7 Q0 Water (density = $1.0 \times 10^3 \text{ kg/m}^3$) 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, $P_2 - P_1$, between
Q0 the two ends is:

Q0

A1 $+4.5 \times 10^3 \text{ Pa}$

A2 $-4.5 \times 10^3 \text{ Pa}$

A3 $+7.0 \times 10^2 \text{ Pa}$

A4 $-7.0 \times 10^2 \text{ Pa}$

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 = $1.0 \times 10^3 \text{ kg/m}^3$)

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 $1.0 \times 10^3 \text{ kg/m}^3$).

***Q0

A1 667

A2 1500

A3 1000

A4 500

A5 333

Q0

Q10 Q0 The rate of flow of water through a horizontal pipe
ch Q0 is $2.0 \text{ m}^3/\text{minute}$. 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

Q11 Q0 Two concentric shells of uniform density having masses
ch Q0 M_1 and M_2 and Radii $R_1 = 2.0 \text{ m}$, $R_2 = 4.0 \text{ m}$ 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 $(G \cdot M_1 \cdot m) / 9$

A2 $G \cdot (M_1 + M_2) \cdot m / 9$

A3 $G \cdot (M_1 + M_2) \cdot m / 3$

A4 $(G \cdot M_2) \cdot m / 16$

A5 $G \cdot (M_1 + M_2) \cdot m / 4$

Q0

Q12 Q0 Three particles with equal mass $M = 2.0 \text{ kg}$ 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 $3.4 \times 10^{(-11)}$ N

A2 $4.6 \times 10^{(-11)}$ N

A3 $5.2 \times 10^{(-12)}$ N

A4 $1.7 \times 10^{(-10)}$ N

A5 $2.6 \times 10^{(-11)}$ 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, $R_e = 6.4 \times 10^6$ 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 $3R_e$ to one of radius
14 Q0 $4R_e$. (R_e = radius of the the earth, M_e = Mass of the Earth and
Q0 G = Gravitational constant)

***Q0

A1 $(G \cdot m \cdot M_e) / 24 \cdot R_e$

A2 $(G \cdot m \cdot M_e) / 12 \cdot R_e$

A3 $(G \cdot m \cdot M_e) / 6 \cdot R_e$

A4 $(G \cdot m \cdot M_e) / 8 \cdot R_e$

A5 $(G \cdot m \cdot M_e) / 4 \cdot R_e$

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 $12 \text{ kg}\cdot\text{m}^2$. 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 $(A \times B) / (A \cdot B)$.

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