Quiz 5 Name Solutions
Physics 141
07/02/2010

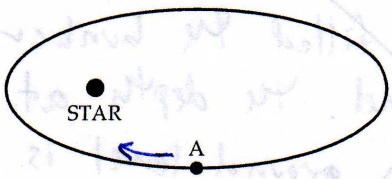
Show all work clearly and justify all answers mathematically/logically. You have 15 minutes to complete this 10 point quiz.

1.) A satellite is in a circular orbit about the Earth at an altitude at which air resistance is negligible. Which of the following statements is true?

only force is gravitational force.

(a.) There is only one force acting on the satellite.
b. There are two forces acting on the satellite, and their resultant is zero.
c. There are two forces acting on the satellite, and their resultant is not zero.
d. There are three forces acting on the satellite.
e. None of the preceding statements are correct.

2.) The figure below shows a planet traveling in a clockwise direction on an elliptical path around a star located at one focus of the ellipse. When the planet is at point A,



a. its speed is constant.
(b.) its speed is increasing.
c. its speed is decreasing.
d. its speed is a maximum.
e. its speed is a minimum.

By Kepler's 2nd law ("equal areas in equal times"), the planet must be moving faster near the star.

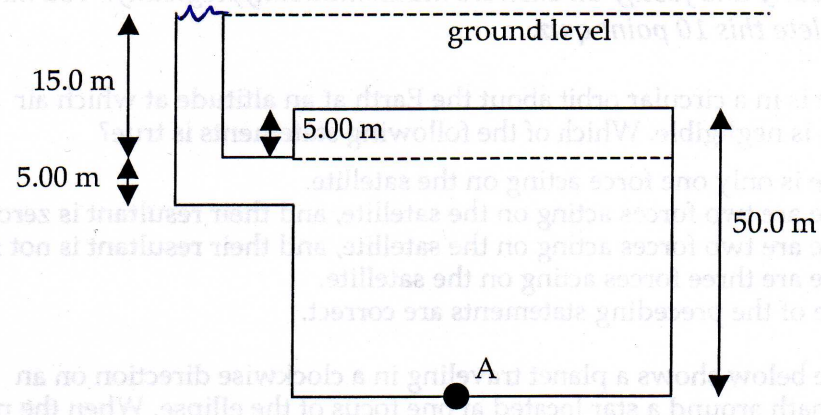
3.) The amplitude of a system moving with simple harmonic motion is doubled. The total energy will then be

(a.) 4 times larger
b. 3 times larger
c. 2 times larger
d. the same as it was
e. half as much

$E_{TOT} = \frac{1}{2} k A^2$

if $A \rightarrow 2A$ $E \rightarrow 4E$

4.) A dictator has built a bunker for his use in emergencies. Its dimensions are shown below. When it floods during a tropical storm, air is trapped above the dashed line in the bunker. The gauge pressure at point A, in Pa, is



a. 3.92×10^5.
b. 4.90×10^5.
c. 5.39×10^5.
d. 5.88×10^5.
e. 6.89×10^5.

Water has filled the bunker up to ground level. The depth below ground level we are at point A is 60m. Therefore the gauge pressure is

$$P = \rho g h = (1000\ kg/m^3)(9.8\ m/s^2)(60.m)$$
$$= 5.88\times10^5\ Pa$$