TEST 8 - WERSJA ANGIELSKA

8.1A In simple harmonic motion, the restoring force must be proportional to the:

A) amplitude
B) frequency
C) velocity
D) displacement
E) displacement squared

8.2A In simple harmonic motion, the magnitude of the acceleration is:

A) constant
B) proportional to the displacement
C) inversely proportional to the displacement
D) greatest when the velocity is greatest
E) never greater than g

8.3A An object is undergoing simple harmonic motion. Throughout a complete cycle it:

A) has constant speed
B) has varying amplitude
C) has varying period
D) has varying acceleration
E) has varying mass

8.4A A *0.20-kg* object mass attached to a spring whose spring constant is *500 N/m* executes simple harmonic motion. If its maximum speed is *5.0 m/s*, the amplitude of its oscillation is:

A) 0.0020 m B) 0.10 m C) 0.20 m D) 25 m E) 250 m

8.5A Three physical pendulums, with masses m_1, $m_2 = 2m_1$, and $m_3 = 3m_1$, have the same shape and size and are suspended at the same point. Rank them according to their periods, from shortest to longest.

A) 1, 2, 3 B) 3, 2, 1 C) 2, 3, 1 D) 2, 1, 3 E) All the above are the same

8.6A Five hoops are each pivoted at a point on the rim and allowed to swing as physical pendulums. The masses and radii are

hoop 1: $M = 150g$ and $R = 50\ cm$

hoop 2: $M = 200g$ and $R = 40\ cm$

hoop 3: $M = 250g$ and $R = 30\ cm$

hoop 4: $M = 300g$ and $R = 20\ cm$

hoop 5: $M = 350g$ and $R = 10\ cm$

Order the hoops according to the periods of their motions, smallest to largest.

A) 1, 2, 3, 4, 5
B) 5, 4, 3, 2, 1
C) 1, 2, 3, 5, 4
D) 1, 2, 5, 4, 3
E) 5, 4, 1, 2, 3

8.7A The rotational inertia of a uniform thin rod about its end is $ML^2/3$, where M is the mass and L is the length. Such a rod is hung vertically from one end and set into small amplitude oscillation. If L = 1.0 m this rod will have the same period as a simple pendulum of length:

A) 33 cm B) 50 cm C) 67 cm D) 100 cm E) 150 cm

8.8A Five particles undergo damped harmonic motion. Values for the spring constant k, the damping constant b, and the mass m are given below. Which leads to the smallest rate of loss of mechanical energy?

A) k = 100N/m, m = 50g, b = 8g/s
B) k = 150N/m, m = 50g, b = 5g/s
C) k = 150N/m, m = 10g, b = 8g/s
D) k = 200N/m, m = 8g, b = 6g/s
E) k = 100N/m, m = 2g, b = 4g/s

8.9A A sinusoidal force with a given amplitude is applied to an oscillator. To maintain the largest amplitude oscillation the frequency of the applied force should be:

A) half the natural frequency of the oscillator
B) the same as the natural frequency of the oscillator
C) twice the natural frequency of the oscillator
D) unrelated to the natural frequency of the oscillator
E) determined from the maximum speed desired

8.10A A sinusoidal force with a given amplitude is applied to an oscillator. At resonance the amplitude of the oscillation is limited by:

A) the damping force
B) the initial amplitude
C) the initial velocity
D) the force of gravity
E) none of the above