



United International University

School of Science and Engineering

Assignment-1; Year 2020; Semester: Fall

Course: PHY 105; Title: Physics, Section: A

1. A body of mass 25 gm is attached with a spring of spring constant 400 dynes/cm. The body is displaced by 10cm from its equilibrium position and released. Then the body executes simple harmonic motion. Calculate (i) the time period, (ii) frequency, (iii) angular frequency, (iv) maximum velocity, and (v) maximum acceleration.
2. In an electric shaver, the blade moves back and forth over a distance of 2.0mm in simple harmonic motion, with a frequency 120Hz. Find (a) the amplitude, (b) the maximum blade speed and (c) the magnitude of the maximum acceleration of blade.
3. A 0.12kg body undergoes simple harmonic motion of amplitude 8.5cm and period 0.20s. (a) What is the magnitude of the maximum force acting on it? (b) If the oscillations are produced by a spring what is the spring constant?
4. A hydrogen atom has a mass of 1.68×10^{-27} kg, when it attach to a certain massive molecule, it oscillate as classical oscillator with frequency of 10^{14} Hz and with amplitude of 10^{-10} m. Calculate force acting on the hydrogen atom.
5. A body executes SHM such that its velocity at mean position is 1m/s and acceleration at one extremity is 1.57m/s^2 . Calculate time period of oscillation.
6. A particle executes SHM of amplitude 5m when the particle is 3m from its mean position, its acceleration is found to be 48m/s^2 . Find (i) velocity (ii) time period (iii) Maximum velocity.
7. Particle executes harmonic motion about the point $x=0$; at $t=0$ it has displacement $x=0.37\text{cm}$ and zero velocity. The frequency of the motion is 0.25Hz, determine, (i) the period, (ii) the angular frequency, (iii) the amplitude, (iv) the displacement at $t=3.0\text{s}$ and v) the velocity at $t=3.0\text{s}$.
8. A body oscillates with SHM according to the equation $x = 10\cos(3\pi t + \frac{\pi}{3})$. Calculate (i) displacement at $t=2.5\text{s}$, (ii) velocity at $t=3.0\text{s}$, and (iii) acceleration when $t=2\text{s}$.
9. In oscillatory circuit $L=0.4\text{h}$, $C=0.0020\mu\text{F}$. What is maximum value of resistance(R) for the circuit to be oscillatory?
10. For a damped oscillator $m=250\text{gm}$, $k=85\text{N/m}$ and $b=70\text{gm/s}$. (a) What is the period of the motion? (b) How long does it take for the amplitude of the damped oscillations to drop to half its initial value?
11. The equation of a traveling wave is $y=4.0\sin(0.10x-2t)$. Find (i) amplitude, (ii) wavelength, (iii) speed, (iv) frequency of wave, and (v) time period of wave.