Mid-semester Examination-2

Course: PHY105B (Physics for Biologist) for BMB,

(Session: 2010-2011), 2nd Semester, **Time: 50 min.**, Full Marks: 20, Date: 23/10/2011 (at 4:00 pm)

[Answer the following questions]

1. Define simple harmonic motion. 2
2. Show that the instantaneous velocity of a simple harmonic oscillator is expressed by $v = \omega\sqrt{(A^2 - x^2)}$, where ω is the angular frequency, A is the amplitude and x is the position of the oscillator. 5
3. A simple harmonic motion is given by $x = (15\text{m})\sin\left(5t + \frac{\pi}{3}\right)$. Calculate (i) the frequency, (ii) the maximum velocity and (iii) the maximum acceleration. 4.5
4. What is damped harmonic motion? Derive differential equation for this motion. 2+2
5. State Fourier's theorem. 2
6. Distinguish between infrasonic and ultrasonic sound wave. 2.5

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