PH 101
Quiz-I
Total Marks: 10
Date: 04/09/2017
Your Name:
Your Roll Number:

*[Please write your **Final answer** in the box provided; you can use supplementary sheets for your detailed calculations]*

1. (a) An insect flies on a spiral trajectory such that its polar co-ordinates at time t are given by: $r = ae^{\omega t}$, $\theta = \omega t$ where a and ω are positive constants. Find the velocity and acceleration *vectors* of the insect at time t. **2**

Ans:

$\vec{v} =$

$\vec{a} =$

(b) Five identical pigeons are flying together northward with speed v_0. One of the pigeons is shot dead by a hunter and the other four continue to fly with the same speed. *Find the centre of mass speed* of the rest of the pigeons that continue to fly with the same speed after the dead pigeon has hit the ground. **1**

Ans:

$v_{CM} =$

2. A particle performs SHM with a period of 16 s. At time t = 2 s, the particle passes through the origin while at t = 4 s, its velocity is 4m/s. Find the expression for amplitude A of the motion. **4**

Ans:

$A =$

3. A uniform chain of length L and mass M is lying on a smooth table and one third of its length is hanging vertically down over the edge of the table. Find the work required to pull the hanging part on the table. **3**

Ans:

$W =$