Haldia Institute of Technology
Department of Applied Science
Assignment - VI
Course: PH 101/PH 201 (Beyond Syllabus)

1. Define Rectangular Cartesian, Plane Polar and Spherical Polar Coordinate systems.
2. Find out unit vectors in above mentioned three coordinate systems.
3. Define Cylindrical Coordinate system. Find the unit vector in the system.
4. Define line, area and volume elements in the above mentioned four coordinate systems.
5. Find out the expressions for velocity and acceleration in above mentioned four coordinate systems.
6. Define Newton's laws of motion and review the laws critically.
7. Find out the equation of motion of a particle.
8. Prove the conservation of linear momentum, angular momentum and energy of a moving particle.
9. The polar coordinates of a point $(r,\theta,\varphi) = 8,30^0,45^0$. Find the Cartesian coordinates of the same point.
10. A particle moving in a plane has coordinated, $x = 3$, $y = 4$ and has components of speed $dx/dt = 5$ cm/s, $dy/dt = 8$ cm/s at some instant of time. Find the components of speed in terms of (r,θ) along the directions of unit vectors of r and θ.