The Open University of Sri Lanka
B.Sc./B.Ed. Degree Programme – Level 05
No Book Test (NBT) – 2016/2017
Applied Mathematics
APU3145/ APE5145– Newtonian Mechanics II
Duration :- One Hour

Date :- 11-11-2017   Time :- 4.00 p.m. – 5.00 p.m.

Answer All Questions.

1. An object is projected vertically downward with speed v_0. Prove that after time t, the object is deflected east of the vertical by the amount $\omega v_0 \cos \lambda \, t^2 + \dfrac{1}{3} \omega g \, t^3 \cos \lambda$ where λ is the latitude of the point of projection and ω is the angular speed of the earth about its polar axis.

2. The Hamilton's of a dynamical system is given by

$$H = q_1 p_1 - q_2 p_2 - a q_1^2 + b q_2^2$$

where a, b are constants. Find q_1, q_2, p_1 and p_2.

(Hint: Hamilton's equations of motion are given by $\dot{p_i} = -\dfrac{\partial H}{\partial q_i}$, $\dot{q_i} = \dfrac{\partial H}{\partial p_i}$ where $i = 1, 2, ..., n.$)