

The Open University of Sri Lanka
 B.Sc./B.Ed. Degree Programme – Level 05
 No Book Test (NBT) – 2017/2018
 Applied Mathematics
 ADU5303/ ADE5303– Newtonian Mechanics II
 Duration :- One Hour



Date :- 02-02-2019

Time :- 4.00 p.m. – 5.00 p.m.

Answer All Questions.

- 1 A projectile located at a point of latitude λ is projected with speed v_0 in a southward direction at an angle α to the horizontal. Show that the position of the projectile after time t is given by

$$x = \frac{gt^3}{3} \omega \cos \lambda - t^2 \omega v_0 \sin(\alpha + \lambda),$$

$$y = -v_0 t \cos \alpha,$$

$$z = v_0 t \sin \alpha - \frac{gt^2}{2}.$$

2. Derive Hamilton's equations of motion for a simple pendulum.

(Hint: Hamilton's equations of motion are given by

$$\dot{p}_i = -\frac{\partial H}{\partial q_i}, \quad \dot{q}_i = \frac{\partial H}{\partial p_i} \quad \text{where } i=1,2, \dots, n.)$$

