

EASTERN UNIVERSITY, SRI LANKA

06 NOV 2015

FIRST EXAMINATION IN SCIENCE - 2012/2013

FIRST SEMESTER (February/March-2015)

PH 101 MECHANICS - I

Time: 01 hour

Answer ALL Questions

1. (a) Briefly explain the followings:
- Kinetic energy
 - Potential energy
 - Work
 - Power
- (b) State Newton's second law in mechanics. If the mass m of the body is constant, then show that the force applied on the body is $F=ma$, where a is the acceleration of the body.
- (c) A 40 kg boy and an 8.4 kg sled are on a frictionless surface at 15 m apart. By means of a rope, the boy exerts 5.4 N horizontal force on the sled and pulling it towards him.
- What is the acceleration of the sled?
 - What is the acceleration of the boy?
 - How far from the boy's initial position do they meet?
 - Find the work done by the boy.
 - Find the power produced by the boy.
2. (a) What do you mean by the terms "elastic collision" and "inelastic collision"?
- (b) Explain the principles of conservation of energy and conservation of linear momentum in a collision.
- (c) A particle of mass m collides head on with another particle M which is initially at rest. As a result of the collision a characteristic amount of energy E is stored in the rest particle M . Show that the minimum initial velocity v_0 is given by

$$v_0 = \left[2E \left(\frac{M+m}{Mm} \right) \right]^{1/2}$$