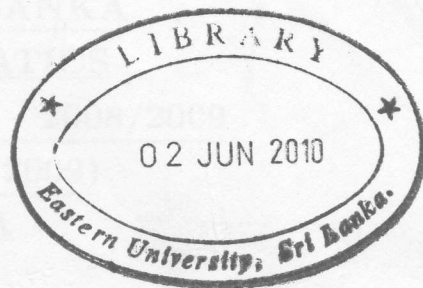# EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE - 2007/2008

FIRST SEMESTER (PROPER/REPEAT)

(March/April 2010)

PH 101 MECHANICS I

Time: 01 hour.

Answer ALL Questions

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1. State the "**Work-Energy theorem**". A force $\vec{F} = (4\vec{i} + 16\vec{j} + 12t\vec{k})N$ acts on a particle of mass 2 kg initially at the origin with velocity $(2\vec{i} - \vec{k})ms^{-1}$.

   a) Find the power of the force at any time t sec.
   b) Find the work done by the force in the time interval $t = 0$ to $t = 1$ sec.
   c) Find the velocity of the particle at time $t = 0$ and $t = 1$ sec.
   d) Calculate the kinetic energy of the particle when time $t = 0$ and $t = 1$ sec.
   e) Verify your answer by using the **Work-Energy theorem**.

2. Explain briefly what is meant by a conservative force. A force $\vec{F} = (x^2 + y)\vec{i} + (y^3 + 1)\vec{j}$ N, acts on a particle which moves from O to B, along the paths OAB and OB, as indicated in the figure. Here x and y are in meters. What is the work done by the force along the paths OAB and OB? Is this force conservative? Explain your answer.