

# PY2101 Classical Mechanics

## Problem Set 1

*Solutions to the problem set must be submitted by the beginning of the lecture on Thursday 11<sup>th</sup> October 2007. No late submissions will be accepted. This problem set contributes towards your continuous assessment grades.*

1. The two components of a double star are observed to move in circles of radii  $r_1$  and  $r_2$ . What is the ratio of their masses? (Hint: Write their accelerations in terms of the angular velocity of rotation,  $\omega$ .) *Problem 1.2 K&B*
2. Consider a transformation to a relatively uniformly moving frame of reference, where each position vector  $\mathbf{r}_i$  is replaced by  $\mathbf{r}'_i = \mathbf{r}_i - \mathbf{v}t$ , where  $v$  is a constant, the relative velocity of the two frames. How does a relative position vector  $\mathbf{r}_{ij}$  transform? How do momenta and forces transform? *Problem 1.5 K&B*