# PHY102A
# PROBLEM SHEET 5, PART 2

**For the problems below, it is given that any inertial observer sees the same speed of light, i.e $c$ irrespective of his own speed.**

**(1)** Consider an observer A on a car (that is not accelerating), fixed to it. In the frame of A, a light source is placed midway between the two walls of the car, at distance $L$ from each. The light is momentarily switched on and it emits two flashes towards the two walls, along the length of the car. A will say that flashes of light will simultaneously reach the walls. Now consider an observer B who is moving with speed $v$ w.r.t the car, along its length. From the point of view of B, do the light flashes simultaneously reach the wall ? What happens when $v$ is very large.
Now replace the light source with two cricket bowling machines. In the frame of A, at an instant, two cricket balls are thrown towards the walls along the length of the car, both with speed $v$. From the point of view of B, do the cricket balls reach the walls simultaneously ? **Ignore gravity.**

**(2)** An observer on the ground sees two photons emitted from a light source inside a car moving with constant speed $v$, hit the walls of the car simultaneously. According to an observer on the car, what will be the difference in time between the two photons striking the walls ?