Week 8 Questions

① Why do we have to rotate our arms while falling for safety and in what direction?

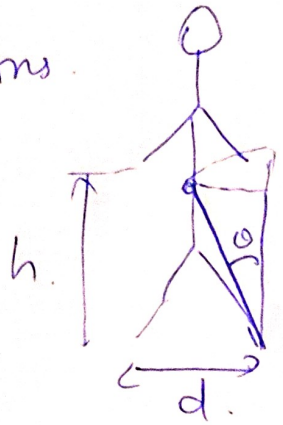
Ans: This is because the change in angular momentum of the system of arms and body due to external torque due to gravity will reduce with the gain of momentum of the arms alone in the same direction of falling w.r.t to any body part

② Can the centre of mass the body be changed while airborne and why?

Ans: No, as no external force can be exerted on the body other than gravity which uniformly acts on each body part. Thus the position of c.o.M of w. each body part cannot be changed while airborne

(3) Derive the angle beyond which a sideward toppling cannot be prevented assuming gap between feet and height of C.O.M from ground.

Ans. $\theta = \tan^{-1}\left(\frac{d}{2h}\right)$.



(4). Where will the reaction force of on the body will be acting for the lifting of maximum load without toppling?

Ans: The reaction force will be acting at the toes.

(5). Within what region should the centre of mass lie in the transverse plane for safe standing posture?.

Ans: It should lie within the rectangle just enclosing the normal position of both the feet.